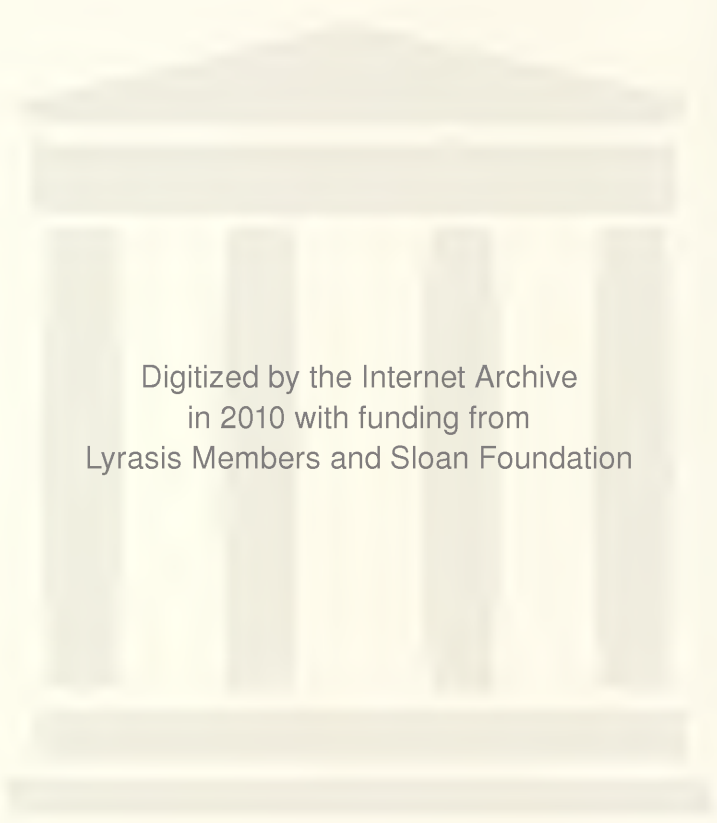




RICE UNIVERSITY
GENERAL
ANNOUNCEMENTS
1989-90



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Rice University
General
Announcements
1989-90

NOTE: This catalog represents the most accurate information available at the time of publication. However, it necessarily cannot reflect changes in staff and costs over the longer term. As far as courses are concerned, the departments have used their best judgment in anticipating which courses will be offered over the one-year period and when they will be offered. Despite their best efforts, though, the inevitable changes in faculty as well as student demand and even funding, in some cases, may affect course offerings. A good faith effort has been made to indicate these uncertainties appropriately; however, these provisions are subject to change without notice.

Offices to contact for additional information:

Mailing Address: Rice University, P.O. Box 1892, Houston, Texas 77251

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Please address all correspondence to the appropriate office or department followed by the University mailing address given above.

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The policy of this institution is to attract to its faculty, staff, and student body qualified persons of diverse backgrounds. In accordance with this policy, Rice does not discriminate in admissions, educational programs, or employment against any individual on the basis of sex, race, color, religion, age, national or ethnic origin, or handicap. University policy also includes affirmative action in seeking to recruit and advance women, minority group members, handicapped individuals, and veterans.

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The University and the Campus

Dedicated to the “the advancement of letters, science, and art,” Rice is private, independent, nonsectarian, and coeducational. It includes among its academic divisions both undergraduate and graduate studies in the humanities, social sciences, natural sciences, engineering, architecture, administrative sciences, and music.

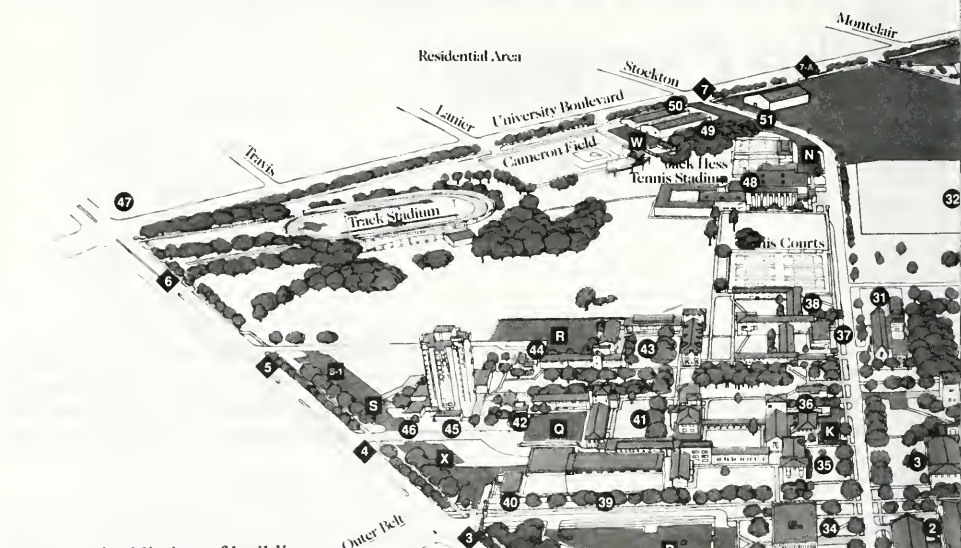
Highly talented students with diverse interests are attracted to Rice by the opportunities for creative learning. They find rewarding student-faculty relationships, options for individually tailored programs of study, opportunities for research, cooperative activities with other institutions in the nation’s fourth largest city, and the unique experience of residential colleges.

About 60 percent of Rice’s 2,500 undergraduate students live on campus in the eight residential colleges. The colleges have independent student governments, plan social functions, field intramural teams, and sponsor innovative academic courses, distinguished speakers, plays, and other functions. In each college, the college master, comaster, and approximately 20 faculty associates act as advisers to the students. This system provides students and faculty with a style of living in keeping with the tenets of fine education.

Rice’s approximately 1,000 graduate students work closely with faculty members who are eminent in their fields and conduct innovative research to extend the horizons of current knowledge. Graduate students live off campus or in the University-owned Graduate House. The Graduate Student Association organizes and funds regular social activities and provides graduate students with a separate organization to represent their interests within the University.

A look through the archway of Lovett Hall shows even the casual visitor why the 300-acre Rice campus is widely acclaimed for its dignified yet casual beauty. Approximately 40 permanent buildings are conveniently grouped in quadrangles under graceful live oak trees. The city’s largest stadium, the Fondren Library, the Media Center, the gymnasium, and the computer center as well as its dramatic and musical presentations make Rice “behind the hedges” a community unto itself. Yet, only three miles from downtown Houston, Rice students enjoy all the commercial and cultural advantages of a major metropolitan center.

Rice University Campus Map

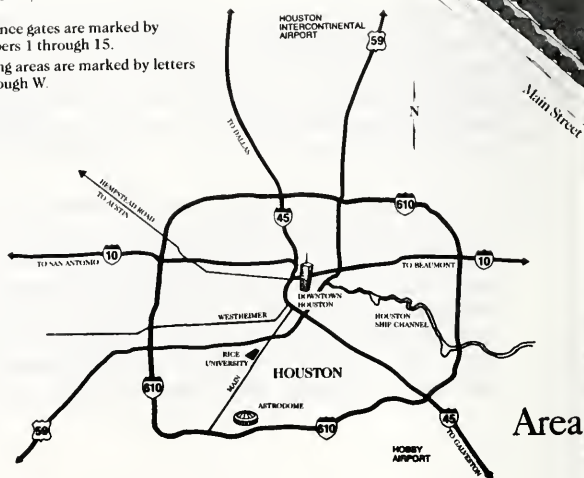


Alphabetical listing of buildings:

Abercrombie Engineering Laboratory, 16
 Allen Center for Business Activities, 34
 Anderson Biological Laboratories, 27
 Anderson Hall, 5
 James A. Baker College, 35
 Baker House, 36
 Bonner Nuclear Research Laboratory, 15
 Margaret Root Brown College, 9
 Herman Brown Hall, 22
 Brown House, 8
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 Chemistry Building, 23
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 Mechanical Engineering Building, 21
 Flammable Chemicals Storage Building, 14
 Fondren Library, 4
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 Gymnasium and Autry Court, 48
 Hamman Hall, 20
 Harry C. Hanszen College, 43
 Hanszen House, 44
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 Institute of Biosciences and Bioengineering Building, proposed site, 24
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 Space Science Building, 25
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- ◆ Entrance gates are marked by numbers 1 through 15.
- Parking areas are marked by letters A through W.





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 Mr. and Mrs. C. Richard Everett
 Mr. and Mrs. Paul J. Eversshade, Jr.
 Mr. and Mrs. Paul Farren
 Mr. and Mrs. Don E. Fizer
 Mr. and Mrs. Larry D. Flournoy
 Mr. and Mrs. Richard P. Ganchan
 Mr. and Mrs. David Kent Gibbs
 Dr. and Mrs. Louis J. Girard
 Mr. and Mrs. L. Henry Gissel, Jr.
 Mr. and Mrs. Melbern G. Glasscock
 Mr. E. Forbes Gordon
 Mr. and Mrs. Matt Gorges
 Dr. J. John Gugenheim
 Mrs. John Hamman, Jr.
 Mr. and Mrs. Ronald C. Hatfield
 Mr. and Mrs. Alex W. Head
 Mr. and Mrs. Neal B. Heaps
 Mr. and Mrs. Robert M. Hermance
 Mr. and Mrs. Irwin C. Herz, Jr.
 Mr. and Mrs. B. B. Hollingsworth, Jr.
 Mr. Fred G. Hollins
 Mr. and Mrs. Howard H. Horne
 Mr. Vester T. Hughes, Jr.
 Mr. and Mrs. Guy W. Jackson, Jr.
 Mr. and Mrs. John C. Jackson, Jr.
 Mr. and Mrs. A. L. Jensen
 Mr. and Mrs. Raleigh W. Johnson, Jr.
 Mr. and Mrs. Robert K. Johnson
 Mr. and Mrs. C. Daniel Jones
 Dr. and Mrs. Charles F. Jones
 Mr. and Mrs. Frank G. Jones
 Mr. and Mrs. T. Robert Jones
 Mr. and Mrs. James L. Ketelsen

Mr. and Mrs. Henry H. King
 Mr. and Mrs. William A. Kistler, Jr.
 Mr. and Mrs. H. Fred Kongabel
 Mr. and Mrs. Ronald C. Lassiter
 Mr. and Mrs. J. Fred Lawrence
 Mr. Hermon Lloyd
 Mr. Ellie W. Long, Jr.
 Mr. and Mrs. H. Malcolm Lovett, Jr.
 Dr. and Mrs. Fred R. Lummis, Jr.
 Mr. James E. Lyon
 Mr. and Mrs. Malcolm T. McCants
 Mr. and Mrs. Joe A. McDermott, Jr.
 Mr. and Mrs. Robert P. McFarland
 Mr. and Mrs. Thomas S. McIntosh
 Mr. and Mrs. Thomas L. McKittrick
 Mrs. Mary Hale Lovett McLean
 Mr. and Mrs. Jay R. McLure
 Dr. and Mrs. G. Walter McReynolds
 Mr. and Mrs. Louis Macey
 Mr. and Mrs. William S. Mackey, Jr.
 Mr. and Mrs. William F. Massey
 Dr. and Mrs. Charles S. Matthews
 Mr. and Mrs. William James Miller
 Mr. and Mrs. Peder Monsen
 Mr. and Mrs. Harvin C. Moore, Jr.
 Mr. and Mrs. Stewart Morris, Jr.
 Mr. and Mrs. W. Carlross Morris, Jr.
 Mr. and Mrs. John G. Mott
 Mr. and Mrs. Fred F. Murray
 Mr. and Mrs. Roy Lemuel Nolen III
 Mr. and Mrs. Roy S. O'Connor
 Mr. and Mrs. C. Michael O'Neal
 Mr. and Mrs. Gwynne E. Old
 Mr. William P. Pannill
 Mr. and Mrs. Phil Peden
 Mr. and Mrs. Denton C. Priest, Sr.
 Mr. and Mrs. John B. Reeder
 Mr. and Mrs. Joseph F. Reilly, Jr.
 Mr. and Mrs. Norman T. Reynolds
 Mr. Morton L. Rich
 Mr. and Mrs. Frank H. Richardson
 Mr. and Mrs. Jim A. Robinson
 Mrs. Evelyn Fink Rosenthal
 Miss Jane L. Rulfs
 Dr. and Mrs. George Rupp
 Mr. and Mrs. Cornelius O. Ryan
 Mr. and Mrs. Patric Savage
 Mr. and Mrs. Gus A. Schill, Jr.
 Mr. and Mrs. Steve J. Shaper
 Mr. and Mrs. Jo E. "Jed" Shaw, Jr.
 Mr. and Mrs. Ted G. Shown

Dr. and Mrs. Howard M. Siegler
 Mr. and Mrs. Matt Simmons
 Mr. and Mrs. David M. Smith
 Mrs. Lorena Steakley
 Mr. and Mrs. Richard D. Steed
 Mr. and Mrs. Dan C. Steiner
 Mr. and Mrs. Herbert L. Stone
 Dr. and Mrs. Earl J. Stoufflet, Jr.
 Dr. and Mrs. John R. Strawn
 Mr. and Mrs. Selby Sullivan
 Mr. and Mrs. Hugh W.
 Thompson III

Mr. and Mrs. John Z. Tomich
 Mr. and Mrs. Joe H. Tydlaska
 Mr. James T. Wagoner
 Dr. and Mrs. Richard E. Wainerdi
 Mr. and Mrs. James V. Walzel
 Mr. and Mrs. Louis A. Waters
 Mr. and Mrs. James A. Whitson, Jr.
 Mr. and Mrs. W. J. Williamson
 Mr. and Mrs. Hugh T. Wilson
 Mr. and Mrs. John Glenn Yeager

Instructional and Research Staff

Emeritus Faculty

- Adams, John Allan Stewart**, 1954-88. Professor of Geochemistry
Ph.B. (1946), B.S. (1984), M.S. (1949), Ph.D. (1951) University of Chicago
- Austin, Walter J.**, 1960-87. Professor Emeritus of Civil Engineering
B.S.C.E. (1941) Rice Institute; M.S. (1946), Ph.D. (1949) University of Illinois
- Awapara, Jorge**, 1957-84. Professor Emeritus of Biochemistry
B.S. (1941), M.S. (1942) Michigan State University; Ph.D. (1947) University of Southern California
- Bale, Allen M.**, 1947-78. Athletic Director Emeritus
B.S. (1930) Rice Institute; M.A. (1939) Columbia University
- Barker, J.R.**, 1949-86. Professor Emeritus of Health and Physical Education
B.S. (1949) Rice Institute; M.Ed. (1954) University of Texas
- Beckmann, Herbert W.K.**, 1957-85. Professor Emeritus of Mechanical Engineering
Cand. Ing. (1939), Dipl. Ing. (1944), Dr. Ing. (1957), Hanover University, Germany
- Bourgeois, Andre Marie Georges**, 1928-72. Favrot Professor of French
Bachelier en lettres (1921), Bachelier en Droit (1923), Certifie d'etudes superieures de lettres (1930) University of Paris, France; M.A. (1934) University of Texas; Docteur de l'universite (1945) University of Paris, France; Commandeur de l'Ordre des Palmes Academiques (1971)
- Brotzen, Franz Richard**, 1954-86. Stanley C. Moore Professor Emeritus of Materials Science
B.S. (1950), M.S. (1953), Ph.D. (1954) Case Institute of Technology
- Brown, Katherine Tsanoff**, 1963-89. Professor Emeritus of Art History and Honorary Associate of Will Rice College
B.A. (1938) Rice Institute; M.F.A. (1940) Cornell University
- Bryan, Andrew Bonnell**, 1957-68. Lecturer Emeritus in Physics
B.A. (1918), M.A. (1920), Ph.D. (1922) Rice Institute
- Camden, Carroll**, 1930-73. Professor Emeritus of English and Honorary Charter Associate of Hanszen College
A.B. (1925) Centre College; Ph.D. (1930) University of Iowa
- Cason, Carolyn**, 1956-74. Lecturer Emeritus in Dietetics
B.S. (1934) University of Texas; M.A. (1939) Columbia University
- Clark, Howard Charles**, 1966-88. Associate Professor of Geology and Geophysics
B.S. (1959) University of Oklahoma; M.A. (1965), Ph.D. (Stanford University)
- Class, Calvin M.**, 1952-85. Professor Emeritus of Physics
A.B. (1943), Ph.D. (1951) Johns Hopkins University
- Dowden, Wilfred Sellers**, 1948-87. Professor Emeritus of English and Honorary Associate of Baker College
B.A. (1939), M.A. (1940) Vanderbilt University; Ph.D. (1949) University of North Carolina
- Evans, Elinor Lucile**, 1964-85. Albert K. and Harry W. Smith Professor Emeritus of Architecture
B.A. (1938) Oklahoma State University; M.F.A. (1954) Yale University
- Fliegel, Raphael**, 1975-89. Professor Emeritus of Violin.

- Fulton, James Street**, 1946-74. Professor Emeritus of Philosophy and Honorary Master of Will Rice College
B.A. (1925), M.A. (1929) Vanderbilt University; Ph.D. (1934) Cornell University
- Gordon, William E.**, 1955-85, Distinguished Professor Emeritus of Space Physics and Astronomy and of Electrical and Computer Engineering
B.A. (1939), M.A. (1942) Montclair State College; M.S. (1946), Ph.D. (1953) Cornell University
- Hackerman, Norman**, 1970-85, President Emeritus and Distinguished Professor Emeritus of Chemistry
A.B. (1932), Ph.D. (1935) Johns Hopkins University
- Hake, Evelyn**, 1932-74, Lecturer Emeritus in Biology
B.A. (1930), M.A. (1932) Rice Institute
- Hale, Elton B.**, 1963-79. Professor Emeritus of Accounting
B.S. (1937), M.A. (1940) Southwest Texas State Teachers College; Ph.D. (1948) University of Texas
- Hartsook, Arthur J.**, 1921-61. Professor Emeritus of Chemical Engineering
A.B. (1911) Nebraska Wesleyan University; B.S.Ch.E. (1920), M.S. (1921) Massachusetts Institute of Technology
- Higginbotham, Sanford Wilson**, 1961-83. Professor Emeritus of History
B.A. (1934) Rice Institute; M.A. (1941) Louisiana State University; Ph.D. (1949) University of Pennsylvania
- Hodges, Lee**, 1930-71. Professor Emeritus of French
B.S. (1930) Harvard University; M.A. (1934) Rice Institute
- Jitcoff, Andrew N.**, 1950-72. Professor Emeritus of Russian
Bachelor (1928), Master (1931) Prague Institute of Technology, Czechoslovakia
- Kilpatrick, John E.**, 1947-85. Professor Emeritus of Chemistry and of Mathematical Sciences
B.A. (1940) Stephen F. Austin State University; A.M. (1942) University of Kansas; Ph.D. (1945) University of California, Berkeley
- Krzyszaniak, Marian**, 1964-81. Professor Emeritus of Economics
B.A. (1932) University of Poznan, Poland; M.A. (1954) University of Alberta, Canada; Ph.D. (1959) Massachusetts Institute of Technology
- Lecuyer, Maurice Antoine**, 1962-79. Professor of French
Baccalaureat es lettres (1937), Licence es lettres (1943), Diplome d'etudes superieures (1944) Universite de Paris, France; Ph.D. (1954) Yale University
- Manschreck, Clyde L.**, 1983-86. Harry and Hazel Chavanne Professor Emeritus of Religious Studies
B.A. (1941) George Washington University; B.D. (1944) Garrett Evangelical Seminary; M.A. (1944) Northwestern University; Ph.D. (1948) Yale University
- Morehead, James Caddell, Jr.**, 1940-79. Professor Emeritus of Architecture and Honorary Associate of Baker College
A.B. (1935) Princeton University; B.Arch. (1939) Carnegie Institute of Technology
- Nettleton, Lewis L.**, 1971-76. Lecturer Emeritus in Geology
B.S. (1918) University of Idaho; M.S. (1921), Ph.D. (1923) University of Wisconsin
- Norbeck, Edward**, 1960-81. Professor Emeritus of Anthropology
B.A. (1948), M.A. (1949), Ph.D. (1952) University of Michigan
- Norris, Mary**, 1975-88. Professor of Music
Artists Diploma in Piano (1939) Curtis Institute of Music
- Oliver, Covey.**, 1979-81. Radoslav A. Tsanoff Professor Emeritus of Public Affairs
B.A. (1933), J.D. (1936) University of Texas; LL.M. (1953), S.J.D. (1954) Columbia University; LL.D. (1976) Southern Methodist University

- Oliver-Smith, Philip**, 1969-82. Professor Emeritus of Art History
B.A. (1937), M.A. (1950) University of California, Berkeley; Ph.D. (1969) New York University
- Parsons, David G.**, 1953-81. Professor Emeritus of Art and Honorary Associate of Will Rice College
B.S. (1934), M.S. (1937) University of Wisconsin
- Phillips, Gerald C.**, 1949-88. Professor of Physics
B.A. (1944), M.A. (1947), Ph.D. (1949) Rice Institute
- Raaphorst, Madeleine Rousseau**, 1963-89. Professor of French
Baccalaureat es lettres (1939) Université de Poitiers, France; Licence en droit (1943) Université de Paris, France; Ph.D. (1959) Rice Institute
- Rachford, Henry H., Jr.**, 1964-82. Professor Emeritus of Mathematical Sciences
B.S. (1945), M.A. (1947) Rice Institute; Sc.D. (1950) Massachusetts Institute of Technology
- Ransom, Harry Steelsmith, Jr.**, 1954-81. Professor Emeritus of Architecture
B.Arch. (1947) Carnegie Institute of Technology; M.Arch. (1967) Texas A&M University
- Rath, R. John**, 1963-80. Professor Emeritus of History
A.B. (1932) Kansas; M.A. (1934) Berkeley; Ph.D. (1941) Columbia University
- Risser, J.R.**, 1946-81. Professor Emeritus of Physics
A.B. (1931) Franklin and Marshall College; M.A. (1935), Ph.D. (1938) Princeton University
- Rossini, Frederick D.**, 1971-75. Professor Emeritus of Chemistry
B.S. (1925), M.S. (1926) Carnegie Institute; Ph.D. (1928) University of California, Berkeley
- Shelton, Fred Vernon**, 1927-71. Professor Emeritus of French and Honorary Charter Associate of Hanszen College
B.A. (1926), M.A. (1928) Rice Institute; M.A. (1942) University of Mexico; Docteur de l'université (1963) University of Paris, France
- Sims, James R.**, 1942-87. Herman and George R. Brown Professor Emeritus of Civil Engineering
B.S. (1941) Rice Institute; M.S. (1950), Ph.D. (1956) University of Illinois
- Spears, Monroe Kirk**, 1964-86. Libbie Shearn Moody Professor Emeritus of English
A.B., A.M. (1937) University of South Carolina; Ph.D. (1940) Princeton University
- Storck, Roger L.**, 1966-85. Professor Emeritus of Biology
B.S. (1945), M.S. (1946) Institute Fermentations-Meurice Chimie, Belgium; Ph.D. (1960) University of Illinois
- Thomas, Joe David**, 1930-77. Professor Emeritus of English
Ph.B. (1929), A.M. (1930) University of Chicago
- Thrall, Robert**, 1969-84. Noah Harding Professor Emeritus of Mathematical Sciences and Professor Emeritus of Administrative Science
- Tipton, Albert N.**, 1975-87. Professor Emeritus of Music
Artists Diploma (1939) Curtis Institute; B.M. (1952) Washington University; M.M. (1953) St. Louis Institute of Music
- Topazio, Virgil William**, 1965-83. Laurence H. Favrot Professor of French
B.A. (1943) Wesleyan College; M.A. (1947), Ph.D. (1951) Columbia University
- Valdivieso, Mercedes**, 1973-89. Professor Emeritus of Spanish
Bachillerato (1946) University of Chile; M.A. (1969) University of Houston
- Wadsworth, Philip A.**, 1964-73. Professor Emeritus of French
A.B. (1935), Ph.D. (1939) Yale University

Wall, Frederick T., 1972-79. Professor Emeritus of Chemistry

B.C. (1933), Ph.D. (1937) University of Minnesota

Wilhoit, James Cammack, Jr., 1954-81. Professor Emeritus of Mechanical Engineering and Mathematical Sciences

B.S.M.E. (1948) Rice Institute; M.S. (1951) Texas A&M University; Ph.D. (1954) Stanford University

Williams, George Guion, 1924-68. Professor Emeritus of English

B.A. (1923), M.A. (1925) Rice Institute

Instructional and Research Staff

- Aazhang, Behnaam**, 1985. Assistant Professor of Electrical and Computer Engineering and Associate of Lovett College
B.S. (1981), M.S. (1983), Ph.D. (1986) University of Illinois
- Abraham, Abraham**, 1989. Assistant Professor of Administrative Science
B.E. (1975) Indian Institute of Technology; M.A. (1985), M.B.A. (1985), Ph.D. (1989) Boston University
- Addison, Anthony**, 1984. Artist Teacher of Opera, Director of Opera
- Akers, William Walter**, 1947. Professor in the Department of Chemical Engineering and Vice President for Administration
B.S. (1943) Texas Technological College; M.S. (1944) University of Texas; Ph.D. (1950) University of Michigan
- Akin, John Edward**, 1983. Professor of Mechanical Engineering and Mathematical Sciences
B.S. (1964) Tennessee Polytechnic Institute; M.S. (1966) Tennessee Technological University; Ph.D. (1968) Virginia Polytechnic Institute
- Alcover, Madeleine**, 1975. Professor of French
Licence de lettres moderne (1962), Diplome d'etudes superieures (1963), Doctorat de 3^e cycle (1965) France
- Alford, John**, 1985. Associate Professor of Political Sciences and Associate of Hanszen College
B.S. (1975), M.A. (1977) Univ. of Houston; M.A. (1980), Ph.D. (1981) University of Iowa
- Alfrey, Clarence P., Jr.**, 1968. Adjunct Professor in the Biomedical Engineering Laboratory
B.A. (1951) Rice Institute; M.D. (1955) Baylor College of Medicine; Ph.D. (1966) University of Minnesota
- Almes, Guy T.**, 1985. Assistant Professor of Computer Science and Associate of Hanszen College
B.A. (1972), M.E.E. (1972) Rice University; Ph.D. (1980) Carnegie-Mellon University
- Ambler, John S.**, 1964. Professor of Political Science and Associate of Brown College
B.A. (1953) Willamette University; M.A. (1954) Stanford University; Certificat d'etudes politiques (1955) University of Bordeaux, France; Ph.D. (1966) University of California, Berkeley
- Anderson, John B.**, 1975. Professor of Geology and Geophysics
B.S. (1968) University of South Alabama; M.S. (1970) University of New Mexico; Ph.D. (1972) Florida State University
- Andrews, John F.**, 1982. Professor of Environmental Science and Engineering
B.S.C.E. (1951), M.S. (1954) University of Arkansas; Ph.D. (1964) University of California, Berkeley
- Angel, Yves C.**, 1984. Associate Professor of Mechanical Engineering and Associate of Brown College
B.S. (1976) Ecole Centrale De Lyon, France; M.S. (1977), Ph.D. (1980) University of California, Berkeley
- Antoulas, Athanasios C.**, 1985. Associate Professor of Electrical and Computer Engineering
Dip. in Electrical Engineering (1975), Dip. in Mathematics (1975) Ph.D. (1980) ETH Zurich
- Apple, Max I.**, 1971. Gladys Louise Fox Professor of English
B.A. (1963) University of Michigan; M.A. (1965) Stanford University; Ph.D. (1970) University of Michigan

- Arad, Atar**, 1987. Professor of Viola in the Shepherd School of Music
Artist Diploma (1966) The Israely Academy of Music; Diploma (1971) Chapelle Musicale de la Reine Elisabeth, Brussels; Diploma Superieur (1972) Brussels Conservatory.
- Arbiter, Eric A.**, 1977. Assistant Professor of Music
B.M.E. (1972) Oberlin Conservatory of Music; M.Mus. (1973) Cleveland Institute of Music
- Aresu, Bernard**, 1977. Associate Professor of French and Master of Brown College
Licence es lettres (1967) Université de Montpellier, France; Ph.D. (1975) University of Washington
- Armeniadès, Constantine D.**, 1969. Professor in the Department of Chemical Engineering and Associate of Will Rice College
B.S. (1961) Northeastern University; M.S. (1967) Case Institute of Technology; Ph.D. (1969) Case Western Reserve University
- Atherholt, Robert**, 1984. Artist Teacher, Oboe
B.Mus. (1976), M.Mus. (1977) Juilliard School of Music
- Atkinson, E. Neely**, 1985. Adjunct Professor of Statistics
B.A. (1975), M.A., Ph.D. (1981) Rice University
- Austin, Joe Dan**, 1978. Associate Professor of Education and Mathematical Sciences and Associate of Jones College
B.S. in Applied Mathematics (1966) Georgia Institute of Technology; M.S. in Mathematical Statistics (1968), Ph.D. in Mathematics Education (1972) Purdue University
- Avé Lallemand, Hans G.**, 1970. Professor of Geology and Geophysics
B.Sc. (1960), M.Sc. (1964), Ph.D. (1967) Leiden University, Netherlands
- Babikian, Virginia**, 1982. Professor of Voice
B.Mus. (1951), M.Mus. (1952) Westminster Choir College; Artist's Diploma (1957), Teatro Lirico Sperimentale Di Spoleto, Italy
- Bacon, Thomas**, 1987. Artist Teacher, Horn
B.S. (1975) Oakland University
- Bailar, Benjamin F.**, 1987. Dean of Jesse H. Jones Graduate School of Administration, H. Joe Nelson, III Professor of Administration, and Associate of Sid Richardson College
B.A. (1955) University of Colorado; M.B.A. (1959) Harvard Graduate School of Business Administration; D.P.A. (1976) Monmouth College (hon.); D.H.L. (1989) University of Colorado (hon.)
- Bailey, Walter B**, 1982. Associate Professor of Music
B.Mus. (1976) Lewis and Clark College; M.A. (1979), Ph.D. (1982) University of Southern California
- Baker, Donald Roy**, 1966. Professor of Geology and Geophysics and Honorary Associate of Brown College
B.S. (1950) California Institute of Technology; Ph.D. (1955) Princeton University
- Baker, Lovett**, 1986. Lecturer on Administrative Science
A.B. (1952) Princeton University
- Baker, Stephen D.**, 1963. Professor of Physics and Honorary Associate of Hanszen College
B.S. (1957) Duke University; M.S. (1959), Ph.D. (1963) Yale University
- Balfour, Alan**, 1989. Professor of Architecture and Associate Dean of the School of Architecture
Diploma Arch. (1961) School of Architecture, Edinburgh, Scotland; M.F.A. (1965) Princeton University
- Bally, Albert W.**, 1981. Harry Carothers Wiess Professor of Geology
Ph.D. (1953) University of Zurich, Switzerland

- Barnea, Amir**, 1989. Professor of Administrative Science
B.A. (1964), M.Soc.Sc. (1967) Hebrew University; Ph.D. (1972) Cornell University
- Barry, David**, 1987. Lecturer on German
B.A. (1977) Pembroke College; M.A. (1978), Ph.D. (1983) Queen's University, Canada
- Batsell, Richard R.**, 1980. Associate Professor of Administrative Science and Associate of Hanszen College
B.A., B.B.A. (1971), Ph.D. (1976) University of Texas
- Bavinger, Bill Allen**, 1977. Assistant Professor of Architecture
B.A. (1973), M.Arch. (1976) Rice University
- Bayazitoglu, Yildiz**, 1977. Professor of Mechanical Engineering and Associate of Will Rice College
B.S. (1967) Middle East Technological University; M.S. (1969), Ph.D. (1974) University of Michigan
- Bearden, Frank W.**, 1954. Professor of Human Performance and Health Sciences
B.S. (1947) Texas Technological College; M.A. (1949), Ed.D. (1954) Columbia University
- Beckingham, Kathleen**, 1980. Associate Professor of Biochemistry and Cell Biology
B.A. (1967), Ph.D. (1972) Cambridge University, England
- Bedient, Philip B.**, 1975. Professor of Environmental Science and Engineering
B.S. (1969), M.S. (1972), Ph.D. (1975) University of Florida
- Benjamin, Don C., Jr.**, 1978. Lecturer in Religious Studies and Associate of Sid Richardson College
B.A. (1964) St. Bonaventure University; M.A. (1968) Catholic University of America; Ph.D. (1981) Claremont Graduate School
- Bennett, George N.**, 1978. Associate Professor of Biochemistry and Cell Biology and Associate of Lovett College
B.S. (1968) University of Nebraska; Ph.D. (1974) Purdue University
- Bennett, John K.**, 1988. Assistant Professor of Electrical and Computer Engineering and Associate of Wiess College
B.S.E.E. (1973), M.E.E. (1974) Rice University; M.S. (1983), Ph.D. (1987) University of Washington
- Berry, Michael J.**, 1980. Robert A. Welch Professor of Chemistry
B.S. (1967) University of Michigan; Ph.D. (1970) University of California, Berkeley
- Bickers, Kenneth N.**, 1987 Assistant Professor of Political Science and Resident Associate of Jones College
B.A. (1981) Texas Christian University; M.A. (1983) University of Wisconsin-Madison
- Bilger, David, E.**, 1988. Artist Teacher of Trumpet
B.Mus. (1983) University of Illinois; M.Mus. (1984) Juilliard School of Music
- Billups, W. Edward**, 1970. Professor of Chemistry
B.S. (1961), M.S. (1965) Marshall University; Ph.D. (1970) Pennsylvania State University
- Bixby, Robert E.**, 1984. Professor of Mathematical Sciences, Administrative Science, and Associate of Baker College
B.S. (1968) University of California; M.S. (1971), Ph.D. (1972) Cornell University
- Blackburn, James B.**, 1975. Lecturer on Architecture and Environmental Science
B.A. (1969), J.D. (1972) University of Texas; M.S. (1974) Rice University
- Bland, Jonathan**, 1988. Assistant Professor of Space Physics and Astronomy
B.S. (1981) University of Aston, Birmingham, England; Ph.D. (1984) Anglo-Australian Observatory, Sydney, Australia

- Bland, Robert L.**, 1954. Associate Professor of Human Performance and Health Sciences
Central Washington State College; M.A. (1954) Columbia University
- Blumberg, Mitchell**, 1981. Adjunct Professor of Administrative Science
A.B. (1965), J.D. (1968) University of Pennsylvania; M.B.A. (1973) Harvard University
- Boehm, Hans-Juergen**, 1985. Associate Professor of Computer Science
B.S. (1978) University of Washington; M.S. (1980), Ph.D. (1984) Cornell University
- Boles, John B.**, 1981. Professor of History and Associate of Will Rice College
B.A. (1965) Rice University; Ph.D. (1969) University of Virginia
- Bonner, Billy E.**, 1985. Professor of Physics and Director of T. W. Bonner Nuclear Laboratories
B.S. (1961) Louisiana Polytechnic Institute; M.A. (1963), Ph.D. (1965) Rice University
- Bordelon, Cassius B., Jr.**, 1972. Lecturer on Human Performance and Health Sciences
Physical Education
B.S. (1964) Louisiana State University; Ph.D. (1972) Baylor College of Medicine
- Boshernitzan, Michael**, 1982. Associate Professor of Mathematics
B.A. (1971) Moscow University, U.S.S.R.; M.A. (1974) Hebrew University, Israel; Ph.D. (1981) Weizmann Institute of Science, Israel
- Boterf, Chester Arthur**, 1973. Associate Professor of Art
B.A. (1959) Kansas University; M.F.A. (1965) Columbia University
- Bougen, Philip D.**, 1988. Visiting Assistant Professor of Accounting
B.A. (1977), M.Phil. (1980) Huddersfield Polytechnic, England; Ph.D. (1987) University of London
- Bourland, Hardy. M.**, 1961. Lecturer in Electrical and Computer Engineering, Director of Rice Engineering Design and Development Institute, Assistant Dean of Engineering for Student Development, and Associate of Wiess College
B.S. (1955) Texas Technological College; S.M.E.E. (1957) Massachusetts Institute of Technology
- Boyd, E. Andrew**, 1987. Assistant Professor of Mathematical Sciences and Associate of Brown College
A.B. (1981) Oberlin College; Ph.D. (1987) Massachusetts Institute of Technology
- Boyd, Harold B.**, 1979. Adjunct Professor in the Department of Chemical Engineering
B.A. (1959) Drexel University; M.Ch.E. (1962) New York University
- Brelsford, John W., Jr.**, 1970. Professor of Psychology and Master of Jones College
B.A. (1960), M.A. (1961) Texas Christian University; Ph.D. (1965) University of Texas
- Bridges, Eileen**, 1987. Assistant Professor of Administrative Science and Associate of Sid Richardson College
B.S. (1977) California Institute of Technology; M.E.E. (1978) Rice University; M.B.A. (1982) University of Santa Clara; Ph.D. (1987) Northwestern University
- Briggs, Fayé**, 1982. Adjunct Associate Professor of Computer Science in the Department of Electrical and Computer Engineering and Associate of Baker College
B.S.E.E. (1971) Ahmedu Bello University, Nigeria; M.A. (1974) Stanford University; Ph.D. (1977) University of Illinois
- Brito, Dagobert L.**, 1984. George A. Peterkin Professor of Political Economy and Associate of Wiess College
B.A. (1967), M.A. (1970), Ph.D. (1970) Rice University

- Brody, Baruch**, 1975. Professor of Philosophy
B.A. (1962) Brooklyn College; M.A. (1965), Ph.D. (1967) Princeton University
- Broker, Karin L.**, 1980. Associate Professor of Art and Associate of Lovett College
B.F.A. (1972) University of Iowa; M.F.A. (1980) University of Wisconsin
- Brooks, Philip R.**, 1964. Professor of Chemistry and Associate of Lovett College
B.S. (1960) California Institute of Technology; Ph.D. (1964) University of California, Berkeley
- Brooks, Wayne**, 1985. Artist Teacher, Viola
Diploma (1977) Curtis Institute of Music
- Brown, Barry W.**, 1970. Adjunct Professor of Statistics
B.S. (1959) University of Chicago; M.S. (1961), Ph.D. (1963) University of California, Berkeley
- Brown, Bryan W.**, 1983. Professor of Economics and Statistics and Associate of Will Rice College
B.A. (1969), M.A. (1972) Texas Tech University; Ph.D. (1977) University of Pennsylvania
- Brown, Peter Thomson**, 1978. Assistant Professor of Art and Art History and Associate of Brown College
B.A. (1971), M.F.A. (1977) Stanford University
- Brown, Richard**, 1984. Assistant Professor of Percussion
B.M.E. (1969) Temple University; M.Mus. (1971) Catholic University of America
- Bryan, William J.**, 1982. Adjunct Professor of Human Performance and Health Sciences
B.A. (1971) Johns Hopkins University; M.D. (1975) Baylor College of Medicine
- Bryant, John**, 1981. Henry S. Fox Sr. Professor of Economics, Professor of Administrative Science and Associate of Wiess College
B.A. (1969) Oberlin College; M.S. (1973), Ph.D. (1975) Carnegie-Mellon University
- Bufler, Richard T.**, 1984. Adjunct Professor of Geology and Geophysics
B.S. (1959) University of Texas; Ph.D. (1967) University of California, Berkeley
- Burgess, Kevin**, 1986. Assistant Professor of Chemistry and Associate of Will Rice College
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- Sachs, Michael**, 1987. Artist Teacher of Trumpet
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- Winningham, Geoffrey L.**, 1969. Professor of Art and Honorary Associate of Wiess College
B.A. (1965) Rice University; M.S. (1968) Illinois Institute of Technology
- Wisoff, Peter Jeffrey K.**, 1987. Assistant Professor in Electrical and Computer Engineering and Associate of Jones College
B.S. (1980) University of Virginia; M.S. (1982), Ph.D. (1986) Stanford University
- Wittenberg, Gordon G., Jr.**, 1979. Associate Professor of Architecture and Associate of Richardson College
B.F.A. (1968) Trinity College, Connecticut; M.Arch. (1972) Washington University
- Wolf, Michael**, 1988. Assistant Professor of Mathematics
B.S. (1981) Yale University; Ph.D. (1986) Stanford University
- Wolf, Richard A.**, 1967. Professor of Space Physics and Astronomy
B.Eng.Phys. (1962) Cornell University; Ph.D. (1966) California Institute of Technology
- Wolin, Richard**, 1984. Associate Professor of History
B.A. (1974) Reed College; M.A. (1976), Ph.D. (1980) York University
- Wood, Susan**, 1981. Associate Professor of English and Master of Sid Richardson College
B.A. (1968) East Texas State University; M.A. (1970) University of Texas, Arlington
- Wright, Anthony A.**, 1980. Adjunct Associate Professor of Psychology
B.A. (1965) Stanford University; M.A. (1970), Ph.D. (1971) Columbia University
- Wright, James E.**, 1989. Associate Professor of Geology and Geophysics
B.S. (1971) Clemson University; M.S. (1974) Virginia Polytechnic Institute; Ph.D. (1980) University of California

- Wu, Kenneth K.** 1984. Adjunct Professor in the Biomedical Engineering Laboratory
M.D. (1966) National Taiwan University; M.S. (1968) Yale
- Wunder, R. Stephen**, 1984. Adjunct Assistant Professor of Psychology
B.A. (1970) Creighton University, M.A. (1976), Ph.D. (1979) Wayne State University
- Yamal, Ricardo**, 1986. Associate Professor of Spanish and Associate of Jones College
B.A. (1979) Universidad Catolica, Chile; M.A. (1978), Ph.D. (1982) University of Pittsburgh
- Yang, Deane**, 1983. Associate Professor of Mathematics and Associate of Hanszen College
B.A. (1979) University of Pennsylvania; Ph.D. (1983) Harvard University
- Yatsu, Frank M.**, 1984. Adjunct Professor in the Biomedical Engineering Laboratory
A.B. (1955) Brown University; M.D. (1959) Case-Western Reserve University
- Yi, Kei-Mu**, 1989. Assistant Professor of Economics
B.S. (1983) Massachusetts Institute of Technology; M.A. (1985), Ph.D. (1989) University of Chicago
- Yim, Bennett C.K.**, 1989. Assistant Professor of Administrative Science
B.B.A. (1983) Chinese University of Hong Kong; Ph.D. (1989) Purdue University
- Young, Richard D.**, 1965. Professor of Economics and Mathematical Sciences
B.A. (1951), M.A. (1954) University of Minnesota; Ph.D. (1965) Carnegie Institute of Technology
- Yunis, Harvey E.**, 1987. Assistant Professor of Ancient Studies
B.A. (1978) Dartmouth College; B.A. (1982) M.A. (1985) University of Cambridge; Ph.D. (1987) Harvard University
- Zdatny, Steven**, 1986. Floyd Seward Lear Lecturer on History and Resident Associate of Hanszen College
B.A. (1972), M.A. (1974) State University of New York at Buffalo; Ph.D. (1982) University of Pennsylvania
- Zeff, Stephen A.**, 1978. Herbert S. Autrey Professor of Accounting and Executive Associate of Richardson College
B.S. (1955), M.S. (1957) University of Colorado; M.B.A. (1960), Ph.D. (1962) University of Michigan
- Zimmerman, Stuart D.**, 1971. Adjunct Professor of Statistics
B.A. (1955), Ph.D. (1961) University of Chicago
- Zodrow, George**, 1979. Associate Professor of Economics and Associate of Lovett College
B.A., M.M.E. (1973) Rice University; M.A. (1977) Ph.D. (1980) Princeton University
- Zwaenepoel, Willy E.**, 1984. Assistant Professor of Computer Science and Associate of Lovett College
B.S. (1979) Ghent, Belgium; M.S. (1980), Ph.D. (1984) Stanford
- Zygourakis, Kyriacos**, 1980. Associate Professor in the Department of Chemical Engineering and Associate of Jones College
Diploma of Chemical Engineering (1975) National Technical University of Athens; Ph.D. (1981) University of Minnesota

Professional Research Staff

- Adams, David**, 1988. Assistant Research Scientist in the Bonner Nuclear Lab
B.S. (1980) California Institute of Technology; M.S. (1981); Ph.D. (1986) UCLA

- Barnes, Marguerite Johnston**, 1986. Complimentary Research Associate in History
A.B. (1938) Birmingham Southern College
- Bergmann, Rachelle**, 1985. Senior Research Associate in Space Physics and Astronomy
A.B. (1977); M.A. (1980); Ph.D. (1985) University of California, Berkeley
- Buchanan, J.A.**, 1961. Senior Research Scientist in Physics
B.S. (1970) University of Houston
- Chakerian, Artemis E.**, 1987. Research Associate in Biochemistry
B.S. (1977) University of New Mexico; Ph.D. (1987) Rice University
- Chow, Thomas Wing-Yuk**, 1984. Research Associate in Biomedical Engineering
B.S. (1978) Rice University; Ph.D. (1984) Rice University
- Clement, J.M., Jr.** 1974. Research Scientist in Physics
B.S. (1965), M.S. (1966) Cornell University; Ph.D. (1972) Rensselaer Polytechnic Institute
- Cooper, Keith D.**, 1983. Senior Research Associate in Computer Science
B.S. (1978) Rice University; M.A. (1982) Rice University Ph.D. (1983) Rice University
- Emmons, Gary T.**, 1985. Research Scientist in Biochemistry
B.S. (1977) Michigan State University; Ph.D. (1982) University of Pittsburgh
- Gao, Ru-Shan**, 1987. Research Associate in Space Physics and Astronomy
B.S. (1982); M.A. (1985); Ph.D. (1987) Rice University
- Gordy, Virginia R.**, 1986. Research Scientist in Environmental Science & Engineering
B.S. (1963) Abilene Christian University; M.A. (1969) University of Colorado; Ph.D. (1972) University of Houston
- Harcombe, Elnora (Nonie)**, 1989. Project director, Center for Education
B.S. (1967) University of Michigan; M.Phil. (1969) Yale University; Ph.D. (1975) Yale University
- Hauge, R.H.**, 1967. Research Scientist in Chemistry
B.A. (1960) Loras College; Ph.D. (1965) University of California at Berkeley
- He, Jing-Ju**, 1985. Visiting Scholar in Biochemistry
B.A. (1967) Beijing Agricultural University
- Hill, Thomas W.**, 1979. Senior Research Scientist in the Center for Space Physics and Astronomy
B.A. (1967); M.S. (1971); Ph.D. (1973) Rice University
- Hinterberger, Henry**, 1985. Senior Research Scientist in Physics
B.S.M.E. (1948) City College of New York
- Hoffman, Marvin**, 1988. Clinical Professor of Education and Director, School Writing Project.
B.S. (1960) College of the City of New York; Ph.D. (1965) Harvard University
- Hollands, Michele Thomas**, 1984. Senior Research Associate in Environmental Science and Engineering
B.S. (1976) American University; M.S. (1980); Ph.D. (1983) Cornell University
- Hong, Jane H.**, 1978. Research Associate in Chemical Engineering
B.S. (1962) National Taiwan Normal University; Ph.D. (1973) University of Detroit
- Hughes, Colin R.**, 1986. Research Associate in Biology
M.A. (1979) Cambridge University; Ph.D. (1986) Rice University
- Jeng, Jyi-Feng**, 1987. Research Associate in Chemical Engineering
B.S. (1976) National Taiwan University; M.S. (1979) Auburn University; Ph.D. (1986) Rice University

- Johnson, Bruce**, 1988. Research Scientist in Chemistry
B.A. (1975) University of Minnesota; Ph.D. (1981) University of Wisconsin
- Johnson, Lee**, 1987. Research Associate in Space Physics and Astronomy
B.S. (1982) Harvey Mudd College; M.A. (1985); Ph.D. (1987) Rice University
- Kan, Amy T.**, 1985. Research Associate in Environmental Science and Engineering
B.Sc. (1975) Fu-Jen Catholic University, Taipei, Taiwan; M.S. (1978); Ph.D. (1982) Cornell University
- Killen, Rosemary M.**, 1986. Research Associate in Space Physics and Astronomy
B.S. (1975) Southwestern University; M.A. (1975) University of Texas; Ph.D. (1986) Rice University
- Kisic, A.**, 1973. Senior Research Scientist and Departmental Administrator in Biochemistry
B.S. (1954); Ph.D. (1961) University of Zagreb, Yugoslavia
- Kittrell, Carter**, 1988. Research Scientist in Chemistry
B.S. (1971) Allegheny College
- Ko, Chi-Ren C.**, 1980. Research Associate in Mechanical Engineering & Materials Science
B.S. (1968) National Taiwan Normal University; M.S. (1975) Texas A & M; Ph.D. (1980) University of Houston
- Kook, Alan Mark**, 1985. NMR Manager in Chemistry
B.S. (1974) SUNY at Stonybrook; Ph.D. (1984) University of Kentucky
- Kruk, Jeffrey W.**, 1983. Assistant Research Scientist in Bonner Nuclear Lab
B.A. (1977) Princeton University; M.S. (1981) Yale University; Ph.D. (1983) Yale University
- Kulkarni, Anil D.**, 1985. Complimentary Research Associate in Biochemistry
B.S. (1963); M.S. (1970) University of Bombay
- Kumar, Anil**, 1986. Welch Fellow in Physics
B.Sc. (1970); M.Sc. (1973); Ph.D. (1980) Bihar University, India
- Kunz, Terry**, 1986. Complimentary Research Associate in Chemistry
A.B. (1979) Washington University; Ph.D. (1986) Rice University
- Ledley, Tamara A.S.**, 1985. Assistant Research Scientist in the Center for Space Physics and Astronomy
B.S. (1976) University of Maryland; Ph.D. (1983) Massachusetts Institute of Technology
- Levine, Leanna**, 1987. Complimentary Research Associate in Chemistry
B.A. (1980); B.S. (1980) University of Missouri; Ph.D. (1986) Washington University
- Liao, Quang-ling**, 1986. Visiting Scholar in Biochemistry
M.S. (1983) Chinese Academy of Sciences; B.S. (1986) Peking University
- Lin, Yu-Hsu**,
B.S. (1976), M.S. (1978) Cheng Kung University; Ph.D. (1987) Rice University; MCE (1987) Rice University
- Lu, Ming**, 1987. Research Associate in Physics
B.A. (1968), M.A. (1986) Shanghai Jiao-Tong University
- Mann, Thomas**, 1985. Senior Research Engineer in Physics
B.M.E. (1965) Georgia Institute of Technology
- Marriott, Terry D.**, 1978. Scientist and Instrument Manager in Chemistry
B.S. (1969), Ph.D. (1976) Oklahoma State University
- Mathews, Antony James**, 1986. Welch Fellow in Biochemistry
B.S. (1980); M.Sc. (1981); Ph.D. (1986) University of Auckland, New Zealand
- Misra, Lalith K.**, 1983. Complimentary Research Associate in Physics
B.B.Sc. and A.H. (1969) Hyderabad Veterinary College, India; M.S. (1973) University of Georgia; Ph.D. (1977) Texas A&M University

- Nelson, Stephen O.**, 1984. Research Scientist in Biochemistry
B.S. (1967), M.S. (1970) Northeast Louisiana State University; Ph.D. (1974) Texas A&M University; Ph.D. (1980) University of Amsterdam
- Nessi, Francesca T.**, 1986. Senior Research Associate in Physics
M.A. (1981); Ph.D. (1985) ETH-Zuerich
- Nessi, Marzio**, 1986. Senior Research Associate in Physics
M.A. (1981); Ph.D. (1985) ETH Zuerich
- Nollert, Matthias U.**, 1987. Research Associate in Biomedical Engineering
B.S. (1981) University of Virginia; Ph.D. (1986) Cornell University
- Payandeh, Behnaz**, 1987. Complimentary Senior Research Associate in Physics
Diploma (1973); Ph.D. (1978) Swiss Federal Institute of Technology
- Pelley, Ronald P.**, 1985. Research Scientist in Biochemistry
B.S. (1968) Michigan State University; Ph.D. (1975), M.D. (1976) Case Western Reserve University
- Pinkerton, Frederick D.**, 1984. Senior Research Scientist in Biochemistry
B.S. (1969) Eastern Montana College; Ph.D. (1976) Montana State University
- Pyrek, Jan S.**, 1984. Research Scientist in Biochemistry
M.S. (1965) Warsaw University, Poland; Ph.D. (1971) Polish Academy of Sciences
- Reiff, Patricia H.**, 1981. Senior Research Scientist in the Center for Space Physics and Astronomy
B.S. (1971) Oklahoma State University; M.S. (1974), Ph.D. (1975) Rice University
- Schoonover, Jon**, 1986. Welch Fellow in Biochemistry
B.S. (1981) Hampden-Sydney College, Virginia; Ph.D. (1986) University of Texas
- Sisson, Virginia B.**, 1986. Research Associate in Geology and Geophysics
A.B. (1979) Bryn Mawr; M.A. (1981); Ph.D. (1985) Princeton University
- Smith, Darwin D.**, 1981. Senior Research Associate in Biology
B.S. (1975); Ph.D. (1981) North Texas State University
- Smith, Ken A.**, 1984. Executive Director of the Rice Quantum Institute and Associate Research Scientist in the Center for Space Physics and Astronomy
B.A. (1970); M.S. (1973); Ph.D. (1975) Rice University
- Smith, Wayne A.**, 1966. Contracts and Administrative Manager and Data Systems Administrator in Space Physics and Astronomy
B.S.E.E. (1958) University of Southern California
- Song, Kyoo Y.**, 1978. Senior Research Associate in Chemical Engineering
B.S. (1971) Han Yang University; M.S. (1973) University of New Mexico; Ph.D. (1978) Clemson University
- Spiro, Robert W.**, 1978. Research Scientist III in Space Physics and Astronomy
B.A. (1968) University of Dallas; Ph.D. (1978) University of Texas—Dallas
- Street, Evan H., Jr.**, 1987. Research Scientist in Environmental Science & Engineering
B.A. (1949); M.S. (1951), Ph.D. (1955), University of Pennsylvania
- Tang, Fu-Ching**, 1986. Research Associate in Physics
B.S. (1976) National Central University; Ph.D. (1986) City College of New York
- Tang, Yu**, 1986. Research Associate in Civil Engineering
B.S. (1977) National Cheng-Kung University, Taiwan; M.S. (1979) National Taiwan University; Ph.D. (1986) Rice University
- Toffoletto, Frank R.**, 1987. Research Associate in Space Physics and Astronomy
B.Sc. (1981) Latrobe University, Melbourne, Australia; Ph.D. (1987) Rice University
- Torczon, Linda M.**, 1985. Research Associate in Computer Science
B.S. (1980); M.S. (1984); Ph.D. (1985) Rice University

- Van Buren, Charles T.**, 1985. Complimentary Research Associate in Biochemistry
B.S. (1968) College of Wooster; M.D. (1972) University of Pennsylvania
- Vermilion, Janice L.**, 1979. Senior Research Scientist in Biochemistry
B.S. (1971) University of Illinois; Ph.D. (1976) University of Michigan
- Voigt, Gerd-Hannes**, 1980. Senior Research Scientist in the Center for Space
Physics and Astronomy
Diploma of Physics and Geophysics (1970), Ph.D. (1975) University of Braunschweig,
Germany
- Wang, Tong**, 1985. Senior Research Associate in Mechanical Engineering
Ph.D. (1985) Rice University
- Wilson, William K.**, 1982. Research Scientist in Biochemistry
B.A. (1970) Earlham College; Ph.D. (1982) University of New Mexico
- Wise, J.D.**, 1978. Research Engineer in Electrical Engineering
B.A. (1970). M.E.E. (1971), Ph.D. (1977) Rice University

Continuing Studies and Special Programs

Program Development Staff

- Carlson-Abbey, Edith**, 1978. Director of Programs
B.S. (1976) Georgia Tech
- Hsu, Laura**, 1980. Director of Programs
Ph.D. (1980) University of Miami
- McIntire, Mary**, 1975. Dean
Ph.D. (1975) Rice University
- Sayers-Olivares, Kathleen**, 1983. Director of Language Programs
Ph.D. (1981) University of Texas

Professional Staff of the Fondren Library

- Adler, Marianne G.**, 1974. Director Emerita, Division of Processing Services
B.A. (1973) Rice University; M.L.S. (1974) University of Texas; M.A. (1977) Rice
University
- Baber, Elizabeth Ann**, 1965. Data Base Management Librarian
B.A. (1960) Rice University; M.L.S. (1961) University of California at Berkeley
- Boothe, Nancy L.**, 1965. Director of the Woodson Research Center and University
Associate of Brown College
B.A. (1952) Rice Institute; M.S.L.S. (1965) Catholic University of America; M.A.
(1979) Rice University
- Burgett, Mary L.**, 1989. Director, Division of Processing Services
B.S. (1974) University of Wisconsin at Whitewater; M.L.S. (1975) University of
Kentucky
- Cargill, Jennifer**, 1988. Associate University Librarian.
B.A. (1965) Louisiana Tech; M.S.L.S. (1967) Louisiana State University; M.Ed.
(1975) Miami University (Ohio).
- Carrington, Samuel M., Jr.** 1967. Professor of French, University Librarian,
University Associate of Jones College
A.B. (1960), M.A. (1962), Ph.D. (1965) University of North Carolina
- Caswell, Jean L.**, 1986. Automation Librarian
B.A. (1974) New Mexico Institute of Mining and Technology; M.A.L.S. (1976) North-
ern Illinois University

- Charles, Elizabeth D.**, 1983. Executive Director, Friends of Fondren
B.A. (1963) University of Texas
- Edwards, Sandra E.**, 1985. Humanities Librarian
B.A. (1980) Grinnell College; M.A. (1982), M.A.L.S. (1984) University of Missouri
- Flowers, Kay A.**, 1978. Assistant University Librarian for Automated Services
B.A. (1977) Rice University; M.S. (1984) University of Illinois
- Follet, Robert E.**, 1989. Music Librarian
B. Mus. (1964) Oberlin College; M. Mus. (1966) University of Illinois; M.L.S. (1979) University of Texas
- Gourlay, Una M.**, 1986. Director, Division of Community Services
B.Sc. (1958) University of Glasgow
- Halbert, Martin D.**, 1988. Automation and Reference Librarian
B.A. (1984) Rice University; M.L.I.S. (1987) University of Texas
- Hatfield, Joseph W.**, 1984. Director of Access Services
A.A. (1966) Lon Morris College
- Heagy, Phillip T.**, 1988. Information Specialist Librarian.
B.A. (1973) Temple University; M.A. (1978) Indiana University; MLS (1979) Indiana University.
- Hyman, Ferne B.**, 1968. Assistant University Librarian for Collection Management and University Associate of Baker College
B.A. (1948) University of California at Los Angeles; M.A. (1969) Loyola University of Los Angeles; M.S.L.S. (1969) University of Illinois
- Keck, Kerry A.**, 1985. Government Publications Librarian
B.A. (1980) University of Colorado; M.S.L.S. (1982) University of Illinois
- Kile, Barbara**, 1971. Director, Division of Government Publications and Special Resources
B.A. (1967), M.S.L.S. (1968) University of Illinois
- Kuo, Jiun-Huei Chern**, 1985. Catalog Librarian
B.A. (1978) National Taiwan University; A.M.L.S. (1982) University of Michigan
- Lowman, Sara**, 1985. Coordinator for Collection Development and Pure and Applied Sciences Librarian
B.A. (1984) Carleton College, M.A.L.I.S. (1985) University of Iowa
- Marsales, Rita**, 1973. Catalog Maintenance Librarian
B.A. (1957) Louisiana State University; M.L.S. (1973) University of Texas
- Perrine, Richard H.**, 1960. Assistant University Librarian for Planning and Adjunct Associate Professor of Architecture, Emeritus
B.F.A. (1940) Yale University; M.L.S. (1961) University of Texas
- Prendeville, Jet Marie**, 1979. Art and Architecture Librarian
B.A. (1972) Memphis State University; M.A. (1975) University of Michigan; M.S.L.S. (1979) University of Illinois
- Redmon, Alice Jane**, 1962. Special Processing Librarian Emerita
B.A. (1937) University of Denver
- Robnett, William E.**, 1982. Director, Division of Reader Services
B.S. (1971), M.S. (1973) Texas Tech University; M.L.S. (1980) University of Texas
- Rodell, Elizabeth**, 1947. Assistant University Librarian for Technical Services Emerita
B.A. (1932) Rice Institute; B.S.L.S. (1940) University of Denver
- Sabin, Robert G.**, 1988. Science and Engineering Librarian
B.S. (1967) University of North Dakota; M.S.L.S. (1968) Clarion University.

- Schwartz, Charles A.**, 1987. Social Sciences Librarian
B.A. (1968) Denison University; Ph.D. (1972) University of Virginia; M.L.S. (1985) Indiana University.
- Shaw, Peggy A.**, 1986. Business Librarian
B.A. (1970), B.S. (1972) Louisiana State University; M.L.S. (1982) North Texas State University
- Silversteen, Sophy**, 1965. Catalog Librarian
B.A. (1952) Rice Institute; M.S.S.W. (1954), M.L.S. (1965) University of Texas
- Tibbits, Randolph K.**, 1987. Information Librarian
B.A. (1970), M.A. (1977) Washington University; M.L.S. (1980) University of Texas
- Wetzel, Shirley**, 1983. Cataloging Librarian
A.A. (1960) Navarro College; B.A. (1968) Texas Technological College; M.A. (1980) Rice University
- Zingler, Gilberta**, 1953. Acquisitions Librarian Emerita
A.B. (1932) Butler University; B.L.S. (1935) University of Illinois

Professional Staff of Information Systems

- Akiboh, Michael**, 1980. Programmer/Analyst
B.S. (1984) Sacred Heart University
- Boyes, David E.**, 1989. Systems Programmer
B.A. (1988) University of Oregon
- Campbell, Jay A.**, 1979. Technical Support Specialist
- Chien, Jien-Cheng**, 1989. Computer Operator
B.S. (1972) Chung-Hsing University
- Cohn, Sheldon**, 1973. Computer Operator
- Deuel, John R.**, 1987. Systems Programmer
- Doyle, James E.**, 1988. Assistant Business Director
B.S. (1969) Southern Illinois University
- Gerbode, Farrell E.**, 1974. Director, Office of Networking & Computing Systems
B.A. (1973) Rice University, Master of Applied Mathematical Sciences (1977) Rice University
- Goodman, Sara L.**, 1979. Systems Programmer
B.S. (1965) Brooklyn College
- Halbert, Martin D.**, 1988. Computing Resources Librarian
B.A. (1984) Rice University. M.L.S. (1987) University of Texas (Austin)
- Humphrey, Patrick L.**, 1989. Computer Operator
B.A. (1977) University of Houston
- Huston, Priscilla Jane**, 1969. Director, Office of Computing Information Services
B.A. (1964) Mount Holyoke College
- Istre, Mitchell**, 1988. Programmer/Analyst
A.A.S. (1983) Texas State Technical Institute
- Linscott, Stephen**, 1989. Programmer/Trainer
B.A. (1960) University of Texas
- Martin, Andrea M.**, 1979. Manager, Resource Center
B.S.E.E. (1979), M.Mus. (1984) Rice University
- Matthews, Pamela**, 1989. CRC Consultant
B.S. (1987) University of Texas
- McKinin, Katherine**, 1985. Resource Center Programmer
B.A. (1976), M.A. (1978) Indiana University, M.B.A. (1983) University of Missouri

- Nichols, Patricia**, 1978. Computer Operator
- Palkowski, David**, 1978. Computer Operator
- Porras, Francisco**, 1989. Director, Office of Administrative Computing
B.S. (1972) Universidad Central de Venezuela; B.S. equiv. (1986) Kensington University
- Richard, Charles A.**, 1973. Manager, Operations
- Richardson, J.R.**, 1985. Resource Center Programmer
B.S.C.E. (1974), M.Ch.E. (1974) M.B.A. (1986) Rice University
- Robertson, Donald**, 1988. Programmer/Analyst
B.A. (1983) University of Texas
- Rodriguez, Arthur A.**, 1988. Technical Support Specialist
A.S. (1982) New York Regents
- Russell, Kenneth**, 1988. Resource Center Programmer
B.S. (1978) Prairie View
- Schafer, Richard A.**, 1974. Manager, Systems Support
B.A. (1973) M.A.M.S. (1974) Rice University
- Shapiro, Steven**, 1989. Programmer/Analyst
B.S. (1983) Cornell University
- Siddiqui, Zahoor**, 1989. Computer Operator
B.S. (1981) University of Washington
- Simon, Thelma I.**, 1981. Data Control Coordinator
- Smith, James H.**, 1986. Computer Operator
- Smith, Nina E.**, 1987. Resource Center User Assistant
B.A. (1985) University of Delaware
- Troth, Richard**, 1989. Systems Programmer
- Tunison, Jeffrey**, 1989. Systems Programmer
- Vasquez, Michael**, 1978. Computer Operator
- Wetstone, Evan**, 1988. Network Specialist
B.A. (1988) Rice University
- White, Carolynne M.**, 1988. Training Coordinator
B.S. (1964) Springfield College
- Williamson, Mark R.**, 1971. Assistant to the Director for Technical Affairs

Staff of the Health Service

- Deen, L. Stanley, M.D.**, 1982. Director, Counseling and Psychiatric Service
B.A. (1974), M.D. (1978) University of Arkansas
- Medford, Pam**, 1985. Nurse
- Novak, Dain, M.D.**, 1981. Codirector of the Student Health Service
M.B.B.Ch. (1969) University of Witwatersrand, South Africa
- Olinga, Anita, R.N.**, 1989. Nurse
- Schnee, Amanda M., M.D.**, 1981. Codirector of the Student Health Service
M.B., Ch.B. (1968) St. Andrews University, Scotland

Staff of the Athletic Department

- Blankenship, D. Paul**, 1980. Women's Tennis Coach
B.A. (1972) Texas Christian University

- Butler, James E., M.D.**, 1977. Chief Team Physician
B.S. (1956) Sewanee College; M.A. (1957) Southwest Texas State; M.D. (1962) University of Texas
- Castaneda, James A.**, 1961. Faculty Representative and Golf Coach
B.A. (1954) Drew University; M.A. (1955) Yale University; Ph.D. (1958) Yale University
- Cordelli, Mark A.**, 1989. Recruiting Coordinator
B.S. (1986), M.A. (1988) University of Arkansas
- Cousins, William A.**, 1983. Assistant Athletic Director/Media Relations
B.S. (1971) New Mexico State
- Dunavant, S. Michael**, 1989. Head Women's Basketball Coach
B.A. (1977) Bridgewater College
- Eggert, Allen**, 1968. Head Athletic Trainer
B.S. (1963) Rice University; M.A. (1967) California Western University
- Goldsmith, Fred H.**, 1989. Head Football Coach
B.S. (1967), M.Ed. (1972) University of Florida
- Griswold, Julie L.** 1986. Academic Coordinator.
B.A. (1981) Miami University; B.S. (1981) Miami University; M.S. (1986) Indiana University
- Hall, David H.**, 1980. Head Baseball Coach
B.S. (1971) University of Texas
- Harris, James E.**, 1986. Assistant Athletic Director/Development
B.S. (1971) Bowling Green State University
- Hawthorne, Martha E.**, 1979. Assistant Athletic Director for Women
B.A. (1960), B.S. (1961), M.S. (1964) Louisiana State University
- Irwin, Keith**, 1983. Weight and Strength Coach
B.S. (1979) Fort Hays State University
- Lopez, Victor M.**, 1980. Head Women's Track and Field Coach
B.S. (1971) University of Houston; M.S. (1975) Texas Southern University
- May, John Robert**, 1967. Director of Athletics
B.Comm. (1965) Rice University
- Moniaci, Steve**, 1980. Assistant Athletic Director for Administration
B.S. (1975) Ball State University; M.S. (1976) Ohio University
- Scheid, Mark**, 1984. Academic Advisor for Student Athletes
B.A. (1967), Ph.D. (1972) Rice University
- Sokol, Debra L.**, 1980. Head Volleyball Coach
B.A. (1980) University of Houston
- Steele, David B.**, 1984. Assistant Athletic Director/Business
B.A. (1982) Rice University; M.A. (1984) Ohio University
- Straub, Stephen M.**, 1974. Head Men's Track and Field Coach
B.Comm. (1972) Rice University
- Thompson, G. Scott**, 1987. Head Men's Basketball Coach
B.A. (1976) University of Iowa
- Turville, Lawrence C.**, 1979. Men's Tennis Coach
B.S. (1971) Georgia Tech
- Wingenroth, Kristin B.**, 1983. Swimming Coach
B.A. (1976) Rice University; M.Ed. (1983) University of Houston

University Standing Committees for 1988-89

The president is an ex officio member of all committees.

Committee on Admission
 Committee on Affirmative Action
 Committee on Campus Safety
 Committee of the College Masters
 Committee on Community Affairs
 Committee on Computers
 Education Council
 Committee on Examinations and Standing
 Committee on Fringe Benefits
 Faculty Council
 Graduate Council
 Committee on the Library
 Committee on Public Lectures
 Committee on Religious Activities
 Research Council
 Residential College Management Advisory Committee
 Rice University Athletics Committee
 Rice University Marshals
 Rice University Press Review Board
 ROTC Committee
 Committee on Scholarships and Awards
 Committee on Student Affairs
 Committee on Student Financial Aid
 Committee on Student Health
 Committee on the Undergraduate Curriculum
 Committee on Undergraduate Teaching
 University Council
 University Review Board

Chairs and Lectureships

Throughout its history, Rice University has been especially fortunate in the number of its friends and benefactors. Some of these are memorialized in the names of buildings and special physical facilities; others have generously provided for the enrichment of the University's intellectual life by establishing chairs and lectureships either on a temporary or permanent basis. Rice takes pleasure in recognizing on these pages some of these contributors to its academic excellence.

J. S. Abercrombie Chairs in the School of Engineering

- Agnes Cullen Arnold Chair in Humanities
- Herbert S. Autrey Chair in Administration
- Herbert S. Autrey Chair in Humanities
- Lynette S. Autrey Chairs in Humanities
- Herbert S. Autrey Chairs in Social Sciences
- Lynette S. Autrey Chair in Social Sciences
- Lynette S. Autrey Chair in Humanities — Music
- Lynette S. Autrey Chair in Management
- Brown and Root Chair in Engineering
- George R. Brown Chair in Administration
- Herman and George R. Brown Chair in Civil Engineering
- Andrew Hays Buchanan Chairs in Astrophysics
- D. R. Bullard — Welch Foundation Chair in Science
- E. D. Butcher Chairs
- Louis Calder Chair in Chemical Engineering
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- Allyn R. and Gladys M. Cline Chair in Economics and Finance
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- Carey Croneis Chair in Geology
- Craig Francis Cullinan Chair
- G. C. Evans Instructorships in Mathematics
- W. Maurice Ewing Chair in Oceanography
- Laurence H. Favrot Chair in French
- Henry S. Fox, Sr., Chair in Economics
- Gladys Louise Fox Chair in English
- Lena Gohlman Fox Chair in Political Science
- Foyt Family Chair in Engineering
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- Noah Harding Chair in Computer Science
- Reginald Henry Hargrove Chair in Economics
- A. J. Hartsook Chair in Chemical Engineering
- William Pettus Hobby Chair in American History
- Jesse H. Jones Chair in Management
- Mary Gibbs Jones Chair in History
- W. M. Keck Foundation Chair in Geophysics
- William Alexander Kirkland Chair in Administration
- Ralph and Dorothy Looney Chair
- Edgar Odell Lovett Chair in Mathematics
- Henry R. Luce Chair in Engineering Psychology
- Samuel G. McCann Chair in History
- Carolyn and Fred McManis Chair in Philosophy
- Burton J. and Ann M. McMurtry Chair in the School of Engineering
- Harris Masterson, Jr., Chair in History
- Andrew W. Mellon Junior Humanities Scholars
- Andrew W. Mellon Chair in the Humanities
- Libbie Shearn Moody Chair in English
- W. L. Moody, Jr., Chair in Mathematics
- Stanley C. Moore Chair in Engineering

Joseph and Joanna Nazro Mullen Chair in Fine Arts

H. Joe Nelson III Chair in the Jesse H. Jones Graduate School of
Administration

George A. Peterkin Chair in Political Economy

Milton B. Porter Chair in Mathematics

J. Newton Rayzor Chair in Philosophy and Religious Thought

Lewis B. Ryon Chair in Engineering

The Schlumberger Chair in Advanced Studies and Research

Elma Schneider Chair in Music

Harry K. and Albert K. Smith Chair in Architecture

Dorothy Richard Starling Chair in Classical Violin

Henry Gardiner Symonds Chair in Administration

Albert Thomas Chair in Political Science

Radoslav A. Tsanoff Chair in Public Affairs

William Gaines Twyman Chair in History

Isla and Percy Turner Chair in Biblical Studies

Robert A. Welch Chair in Chemistry

Harmon Whittington Chair in Administration

Harry Carothers Wiess Chair in Geology

Sam and Helen Worden Chair in Physics

Gus Sessions Wortham Chair in Architecture

Brown Foundation — J. Newton Rayzor Lectures

Carroll Camden Lectureship in English Literature

William Wayne Caudill Lecture Series in Architecture

English Department Distinguished Professor Lectureship

Joe L. Franklin Lectureship in Physical Chemistry

Hanszen College Fund for Aaron Seriff Lectures

W. V. Houston Lectureship

Ervin Frederick Kalb Lectureship in History

Thomas W. Leland Visiting Lectureship in Chemical Engineering

W. Oscar Neuhaus Memorial Lectures in the Jones School

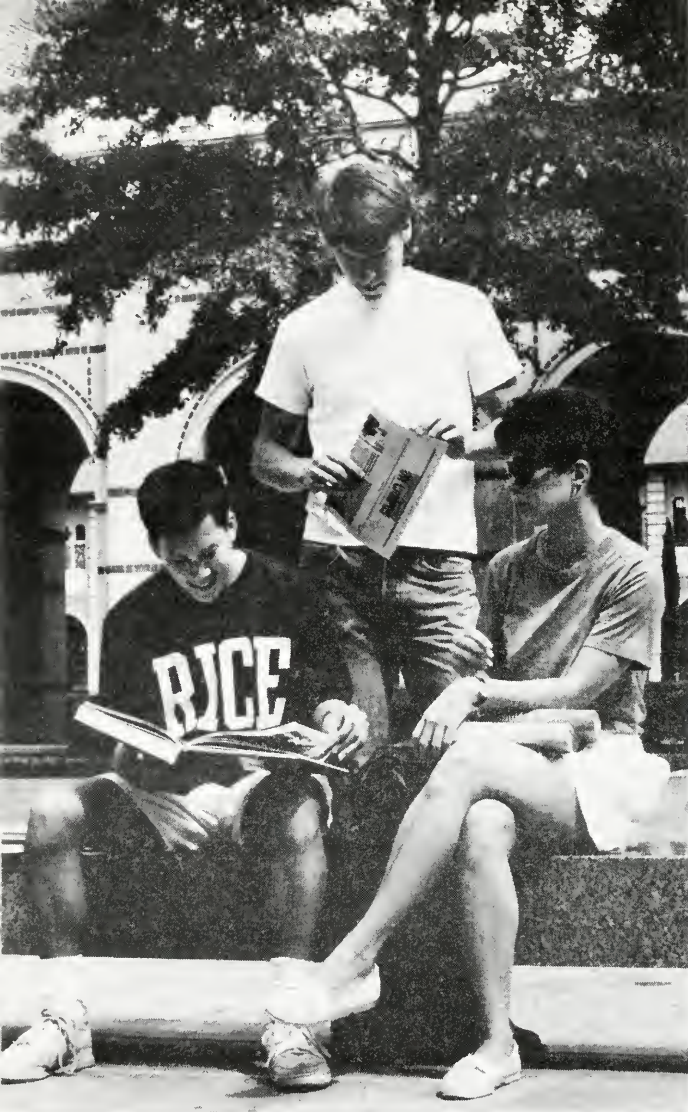
The Rockwell Lectures

The Harold E. and Margaret R. Rorschach Memorial Lectures in Legal History

Tsanoff Lectureship in the Humanities

Dr. Thomas J. and Jane A. Vanzant Lectureship

Paul C. Wilber Lectureship in Chemical Engineering



Information for
Undergraduate
Students

Information for Undergraduate Students

Degree Requirements, Majors, and Curricula

All degrees conferred by Rice University, both graduate and undergraduate, are awarded solely in recognition of educational attainments, not as warranty of future employment or admission to other programs of higher education.

The Bachelor of Arts degree at Rice is awarded with a designated major in some field of architecture, the humanities, music, social sciences, science, engineering, or with an interdepartmental major in managerial or policy studies, or with an approved area major. The general university requirements for the B.A. degree, as well as the options open to students in their choice of majors, are described below.

The Bachelor of Music, which is offered by the Shepherd School of Music, may be taken as a separate undergraduate degree or in conjunction with the Master of Music when both are awarded simultaneously on completion of a five-year program of professional studies.

The Jesse H. Jones Graduate School of Administration offers accelerated "five-year" master's degree plans in accounting and management which may be combined with any undergraduate major. Rice undergraduates may also complete the Master of Accounting program in one year of graduate study if they have taken a prescribed set of prerequisite courses by the end of their senior year.

The various engineering departments also offer the Bachelor of Science degree which, like the B.A., normally requires four years for completion.

For students interested in teaching in secondary schools, a program of teacher training leading to certification in the State of Texas may be completed together with the B.A. degree. This program is administered by the Department of Education.

Programs that satisfy the requirements for admission to medical, dental, or law school are available in conjunction with the various majors.

Degree Requirements and Majors

Graduation and University Credit Requirements

Students completing a Bachelor of Arts degree must pass a minimum of 120 semester hours. In establishing an undergraduate major for the Bachelor of Arts

degree, departments must specify a minimum of 18 semester hours for majors in the humanities and social sciences and a minimum of 24 semester hours for majors in science. No department may specify more than 80 semester hours (related laboratories, required courses, and prerequisites included). For a Bachelor of Arts degree in any discipline other than architecture students must pass a minimum of 60 semester hours in addition to major requirements specified by their department. Architecture majors must pass at least 38 semester hours in addition to their major requirements.

To fulfill the requirements for the degree of Bachelor of Science in one of the several branches of engineering, with the exception of chemical engineering, students must pass no fewer than 134 semester hours. Students fulfilling the requirements for the Bachelor of Science in chemical engineering must pass up to 137 semester hours, depending on accreditation requirements. In establishing a departmental major for the degree of Bachelor of Science in one of the various branches of engineering, with the exception of chemical engineering, no department may specify more than 92 semester hours (required courses, prerequisites, and related laboratories included). In establishing the departmental major for the B.S. in chemical engineering, the department may specify no more than the semester hours necessary to meet the requirements of the accrediting agency, up to a maximum total of 104 semester hours (required courses, prerequisites, and related laboratories included).

For either bachelor's degree, no fewer than 48 semester hours completed in fulfillment of the degree requirements must be on an advanced level (numbered 300 or higher) and more than 50 percent of these hours must be completed at Rice. Furthermore, students must complete more than 50 percent of the advanced level requirements in their major field at Rice. Within major requirements, departments may specify that a higher proportion of advanced level work must be taken at Rice.

After students have fulfilled University distribution requirements, the major requirements, the physical education requirement, and the English composition requirement, all remaining courses in their degree programs are free electives.

Transfer students must be registered at Rice for at least four full semesters during the fall and spring terms and must complete not less than 60 semester hours at Rice for a Rice degree.

To be recommended for graduation, all students must complete their degree requirements with a minimum GPA of 1.67 in all Rice courses and a minimum GPA of 2.00 for those courses presented in fulfillment of their major requirements. Students must be registered with the University in the semester immediately preceding the awarding of their degrees. Students who have completed their degree requirements in the summer or fall prior to that semester or who are completing their senior year at another college or university by special arrangement with the Committee on Examinations and Standing must register in order to be listed as degree candidates.

The Committee on Examinations and Standing reviews student records at the time of graduation and recommends to the faculty outstanding students to be granted degrees *cum laude*, *magna cum laude*, or *summa cum laude*.

University Distribution Requirements

In April 1987 the faculty of the University approved a new set of distribution requirements which came into effect in the fall of 1988. Students entering prior to that time may elect to fulfill the new requirements or those that were in effect at the time of their matriculation.

Students who entered Rice University in the fall of 1988 with at least 30 hours of credit may qualify for graduation under the 1987 or 1988 distribution requirements. Students who enter in the fall of 1989 with at least 60 semester hours of credit may elect the 1987 distribution requirements.

Distribution Requirements for Students Entering in 1988 and Subsequently

1. Students entering Rice University in the fall of 1988 and thereafter must, except as described above, satisfy a new set of distribution requirements for the purposes of graduation. These requirements are designed to improve the general education of undergraduates by providing exposure to widely varying academic disciplines. To this end, each student must successfully complete foundation courses in areas that lie outside his or her major. In addition, each student must choose from designated subject groups a prescribed number of courses, either by electing them all for their individual interest or by electing those in a related sequence (a coherent minor).

2. Students will satisfy distribution requirements by taking approved distribution courses in the following subject groups:

Group I. Literature and language, art and art history, classics, philosophy (except logic), religion, music, and humanities.

Group II. Economics, history, political science, anthropology, linguistics, psychology, and sociology.

Group III. Biological science, physical science, engineering, mathematics, mathematical sciences, logic, statistics, and computer science.

3. Coherent minors will be in place beginning in the fall of 1989. They comprise a related sequence of three or more courses and are designed to encourage students to explore subjects in depth and to appreciate the cumulative or interrelated character of knowledge. The approved list of minors, updated annually, is available in the Registrar's Office and in the Office of Student Advising. The minors may involve related courses that are all in one department or that cross several departments and even divisions; some may also require prerequisites. Coherent minors that include courses from more than one subject group should, for purposes of satisfying distribution requirements, be considered on a course-by-course basis. No courses submitted for a coherent minor can be taken on a *pass/fail* basis, and to receive credit for the minor an average grade of 2.00 or higher must be obtained across all the courses in the sequence. Successful completion of a coherent minor will be noted on a student's transcript.

4. Distribution Requirements by Major.

- A. Majors in Group I and Group II Subjects.

1. Foundation Courses (6 semester hours).

Natural Science 101, 102. These courses will provide an introduction to the principles underlying physics, chemistry, and mathematics. Students who have successfully completed one semester of Mathematics (any calculus course), one semester of Physics (101, 102, 121, 122), and one semester of Chemistry (101, 102) — or who have received three hours of advanced placement in each of these three areas are not required to take Natural Science 101, 102. Students who have successfully completed two semesters (or six hours of advanced placement credit) in any two of these three areas are also not required to take Natural Science 101, 102.

2. Additional Distribution Requirements for Group I Majors (18 semester hours).

Option (a): Students not electing a coherent minor must successfully complete any two approved courses in Group III and any four approved courses in Group II.

Option (b): Students electing a coherent minor must successfully complete an approved sequence of three related courses in Group III and any three approved courses in Group II.

3. Additional Distribution Requirements for Group II Majors (18 semester hours).

Option (a): Students not electing a coherent minor must successfully complete any two approved courses in Group III and any four approved courses in Group I.

Option (b): Students electing a coherent minor must successfully complete an approved sequence of three related courses in Group III and any three approved courses in Group I.

B. Majors in Group III Subjects.

1. Foundation Courses (9 semester hours).

(a) Humanities 101 and 102 (6 semester hours). These courses will introduce students to disciplines in the humanities and arts by studying representative works of Western culture from ancient Greece through the modern era.

(b) Social Science 102 (3 semester hours). This course will offer a broad historical introduction to thought about human society.

2. Additional Distribution Requirements (15 semester hours).

Option (a): Students not electing a coherent minor must successfully complete any three approved courses from Group II and any two approved courses from Group I.

Option (b): Students electing a coherent minor have three choices. They may:

(1) choose an approved sequence of three related courses in Group I, plus any two approved courses in Group II,

(2) choose an approved sequence of four courses in Group II, plus any one approved course in Group I,

(3) choose an approved sequence of courses drawn from both Group I and Group II, plus additional courses as necessary for a total of three approved courses in Group II and two approved courses in Group I.

C. Architecture and Music Majors.

1. Foundation courses (15 semester hours).
 - (a) Humanities 101, 102
 - (b) Social Science 102
 - (c) Natural Science 101, 102
2. Additional Distribution Requirements (21 semester hours).

Option (a): Students not electing a coherent minor must successfully complete any two approved courses in Group I, any three approved courses in Group II and any two approved courses in Group III. Music students may use music courses to satisfy the Group I requirements.

Option (b): Students may elect a coherent minor from either Group I, Group II, or Group III.

(1) Students electing a Group I coherent minor of three related courses must also successfully complete any two approved courses in Group II and any two approved courses in Group III. Music students may not include music courses in a Group I coherent minor.

(2) Students electing a Group II coherent minor of four related courses must also successfully complete any one approved course in Group I (automatically satisfied for music majors) and any two approved courses in Group III.

(3) Students electing a Group III coherent minor of three related courses must also successfully complete either

 - (a) two approved courses in Group I (automatically satisfied for music majors) and two in Group II *or*
 - (b) one approved course in Group I (automatically satisfied for music majors) and three in Group II.

D. Other Majors

1. Human Performance/Health Sciences.
Same as Group I majors.
2. Ancient Mediterranean Civilizations.
Same as Group I majors.
3. Policy and Managerial Studies.
Same as Group II majors.
4. Area majors. To be determined at the time of approval.

4. The list of individual courses approved for distribution is updated annually. Approved courses are designated in the Schedule of Courses offered, published by the Registrar. A complete list of approved distribution courses is also available in the Registrar's Office and in the Office of Student Advising. Courses fulfill distribution requirements provided they are taken at the time they are on the approved list. Individual appeals are heard by the Committee on Examinations and Standing.

5. The first semester of a beginning language course will not count toward the distribution requirements unless the second semester is also completed. If a student has sufficient background to begin with the second semester course, distribution credit will be granted for that course.

6. A student who double majors in a Group I or Group II discipline and a Group III discipline is not required to take any of the foundation courses. Such students must successfully complete four courses each in Group I, Group II, and Group III to satisfy the distribution requirement.

Skills

English Competency Requirement. Every Rice student must demonstrate competency in English comprehension and composition. This requirement is satisfied by passing the English composition examination administered by the Department of English to all entering students during orientation week. Students who fail to pass this test are required to enroll in English 103, a one-semester course in composition which carries both degree and distribution credit. Satisfactory completion of this course then fulfills the English competency requirement.

Physical Education. Each student must pass two semester courses in basic health and physical education, although these courses do not count toward the semester hours required for a degree. Handicapped students may satisfy this requirement by taking individual instruction or classes arranged specifically to meet their needs.

Departmental Majors and Honors Programs

Students normally designate a major before preliminary registration for the junior year. To assist students with this selection, Majors Day is held early in the spring semester. Departments and preprofessional offices provide information about their programs at a central location. Once a student declares a major, the department or title of the major is then noted on the student's transcript and a faculty adviser is assigned. Introductory courses taken before formal designation of a major may be counted in fulfilling the major requirements.

In order to receive a bachelor's degree, a student must complete the requirements for at least one major. Students declare their major using a form provided by the Registrar. The department chair or designee must sign the form acknowledging the declaration. It is expected that the department will counsel the student about the requirements that must be met and the likelihood the student will be able to meet them. If the department believes a student is not well prepared for success in its major, it may express its reservations on the form. No department or program may, however, refuse to admit an undergraduate as a major, with the exception of the School of Architecture and the Shepherd School of Music or in the case of limitations of resources. In such cases departments must publish criteria they will use to limit the number of majors together with their major requirements. Students normally declare a major by the time of preregistration for the spring semester of their sophomore year and will not be permitted to register for the fall semester of the junior year without having declared a major. Students are always free to change departmental majors in the junior or senior year, although this may entail one or more additional semesters at the University. Students and their advisers should regularly review progress toward their degrees.

For information on the specific requirements for any departmental major, students should consult the departmental listings under Courses of Instruction and seek the advice of a faculty member in the department.

Undergraduate honors programs are open to qualified students, with departmental approval, in several departments. Through small classes and seminars, independent reading or research projects, and close contact with faculty research, students in an honors program may accelerate study in their major fields and, in some cases, enter graduate courses. Information on the qualifications for admission and the content of honors programs may be found in the departmental listings under Courses of Instruction.

Second Four-year Bachelor's degree

Both currently enrolled and former Rice students already holding a bachelor's degree from Rice may earn a *second* different four-year bachelor's degree from Rice.

Students already enrolled at Rice may begin work on a second four-year bachelor's degree before completion of the first:

1. by being accepted for the second major by the major department and fulfilling all requirements for the second degree;
2. by completing a minimum of 30 additional semester hours at Rice beyond the hours required for their first degree, to be applied to the second degree.

Current Rice students seeking admission to this program should apply to the Registrar. The application should include a written statement of both proposed majors, and a course program for each. This statement should also contain a notation of approval from the chairman or undergraduate advisor from each department concerned, indicating that all major degree requirements will be satisfied with the proposed course program. Students holding a bachelor's degree from Rice may earn a different four-year bachelor's degree from Rice:

1. by being accepted for the major by the major department and fulfilling all requirements for the second degree;
2. by completing a minimum of 30 additional semester hours at Rice beyond their first bachelor's degree to be applied to the second degree;
3. by attending in full-time residence at Rice for at least two semesters during the fall or spring terms beyond their first bachelor's degree.

For Rice graduates who enroll for a second undergraduate degree, the entire undergraduate record continues cumulatively.

Former Rice students seeking admission to this program should apply to the Registrar. The application should include a written statement of the proposed major and course program for the second degree, a supporting letter from the chairman of the major department, and an explanation of the student's reasons for seeking a second degree.

Students with a bachelor's degree from schools other than Rice may earn a four-year bachelor's degree in a different major from Rice.

1. by being accepted for the major by the major department and fulfilling all requirements for the second degree;
2. by completing a minimum of 60 semester hours at Rice to be applied to their Rice degree;
3. by attending in full-time residence at Rice for at least four semesters during the fall or spring term.

Students with a bachelor's degree from schools other than Rice should apply for admission to the admission office and will be considered according to the procedures and criteria for transfer students. Their application for admission must include all the materials listed above for applicants who are former Rice students plus an official transcript of the first degree.

Courses completed at Rice as a Class III student may be applied to a second undergraduate degree only on approval by the major department for that degree.

Information concerning financial aid available to participants in the second degree program may be secured from the financial aid office. Students admitted to the second degree program may request to be assigned to a College but will have lower priority for on-campus housing than students enrolled for a first four-year bachelor's program. The expectation is that such space will probably not be available.

Summer School

Rice Summer School offers a variety of credit programs for Rice students, visiting undergraduates, graduate students and Class III students (non-degree graduate program). Admission is automatic for any Rice undergraduate or graduate student in good standing. Other students will need to send official transcripts (mailed directly from their universities and colleges to the Office of Continuing Studies) and to complete an application. Six to eight credit hours is considered to be a full load. All applicants should submit their applications with a \$25 fee and a \$15 per credit hour deposit by the May 15 deadline (earlier for certain courses and trips). Because the Summer Program operates on a cost-return basis it is essential that students apply by the deadline. Courses that do not generate an enrollment sufficient to pay costs by the deadline may be canceled. Students will have the option of enrolling in another comparable course or receiving a refund. Applications will be accepted through late May, with an additional \$25 late fee.

Tuition (\$165 per credit hour in 1989) must be paid before classes begin. The session begins the second week of June for most courses. Very limited financial aid is available for Rice students only. Auditing is permitted only with full payment of tuition and fees.

For more information, please contact the Rice Summer Program at (713) 520-6022 or 527-4803.

Areas of Study

Architecture

Students interested in architecture may choose from programs leading to either the Bachelor of Arts or the Bachelor of Architecture degree. The Bachelor of Arts requires four years of study with a major in architecture. Students who have completed or will complete the four-year B.A. with a major in architecture may apply for admission to the Bachelor of Architecture program. An architectural studies major is available to students who have alternate career goals after their second year of study.

Students accepted into the Bachelor of Architecture program in their fifth year are assigned to a working preceptorship with an architectural firm and return to Rice to complete a sixth year of architectural study for the degree. (Note that the major in architectural studies does not lead to the B.Arch.) Further information on these programs may be found under Architecture in the Courses of Instruction section.

Engineering

The George R. Brown School of Engineering at Rice offers, through its seven departments, opportunities for a variety of curriculum and degree choices. Students interested in the engineering profession may major in chemical engineering, civil engineering, computer science, electrical and computer engineering, mathematical sciences, mechanical engineering, or materials science and engineering for both undergraduate and graduate degrees. They may also take a double major combining environmental science with another science or engineering field. These programs lead to either the B.A. or B.S. degree and may qualify students for further study leading to a fifth-year professional master's degree, a Master of Science degree, or a Doctor of Philosophy degree.

During the first two years, engineering students should consult with the chairs of the departments of interest or with the special first and second-year advisers appointed by each department for information and advice about details of the programs and choice of electives and about engineering as a profession.

Students may take a program of study during their first year which satisfies the first year requirements for all engineering departments. A listing of these courses and other information regarding the first two years of study is found under Engineering and Applied Science in the Courses of Instruction section of this catalog. Degree requirements and advanced courses are listed under the separate departmental listings in the same section.

Humanities

In the School of Humanities, majors are offered in art and art history, classics, English, French, German, health and physical education, history, linguistics, philosophy, religious studies, Russian, and Spanish.

An interdepartmental major in policy studies, which combines courses from the School of Humanities and the School of Social Sciences, is described on page 73.

The requirements of each major may be found in the departmental listings under Courses of Instruction and are also available from the department chair and from the Registrar's Office.

Two special programs, the Program in the Humanities and the Joint Venture Program, sponsored by the Career Services Center, are also described in the Courses of Instruction under the heading Humanities.

Managerial Studies

The managerial studies major is a preprofessional program for students planning management careers in either the private or public sector. The program is interdepartmental and leads to the degree of Bachelor of Arts, either as a terminal degree or as preparation for graduate professional studies in accounting, law, business, or public management. Courses are drawn from the Departments of Economics, Computer Science, Mathematical Sciences, Statistics, Political Science, and Psychology and include accounting courses offered as a service by the Jesse H. Jones Graduate School of Administration.

The program is designed to provide students with a comprehensive understanding both of the environment in which business firms operate and of the tools employed by management in making decisions. To major in managerial studies, students must complete 45 semester hours of approved coursework in the following subject areas: (1) accounting, (2) economics, (3) finance, (4) statistics, (5) quantitative methods, (6) computing, (7) business law, and (8) psychology. A list of approved courses is available from the program director, Professor Stephen A. Zeff, 352 Herring Hall, or from the managerial studies program advisers in each of the participating departments.

An honors program is available in managerial studies. This program is designed (1) to provide students with the opportunity to enrich and to expand their knowledge of the managerial disciplines by means of specified advanced course work and/or independent research and writing and (2) to provide recognition for students who have demonstrated unusual competency in managerial studies. Students admitted to the honors program may elect certain graduate courses in accounting and administration as part of their major requirements.

The managerial studies program is administered by a committee consisting of faculty from the Departments of Computer Science, Economics, Mathematical Sciences, Statistics, Political Science, Psychology, and the Jones Graduate School of Administration as well as student representatives. The program director chairs this committee. Student records for all managerial studies majors are maintained in the office of the program director. The managerial studies program director assigns students an adviser closely related to the area in which they intend to specialize. Students should consult with their adviser as early as possible to ensure establishment of an appropriate plan of study.

While Rice does not offer an undergraduate degree in either accounting or business administration, there is a special "five-year" plan by which Rice undergraduates can apply to enter accelerated degree programs for the Master of Business Administration (which includes concentration programs in accounting and in public and nonprofit management) or Master of Accounting (see Accounting and Administrative Science). Rice undergraduates may also complete the Master of Accounting program in one year of graduate study if they have taken a prescribed set of prerequisite courses by the end of their senior year. For details, contact the Jesse H. Jones Graduate School of Administration in Herring Hall.

Music

The Shepherd School of Music offers four degrees: the Bachelor of Arts degree in music; the Bachelor of Music degree in performance, composition, music

history, and music theory; the Master of Music degree in performance, composition, choral and instrumental conducting, musicology and music theory; and the Doctor of Musical Arts degree in composition and selected areas of performance. Normally, four years are required for the bachelor's degrees and two years for the master's. Qualified students may elect an honors program that leads to the simultaneous awarding of the Bachelor of Music and Master of Music degrees after five years of study. The final two years of the B.Mus./M.Mus. program are devoted to specialization and can be entered only upon passing qualifying examinations administered in the fifth or sixth semester.

More detailed information about the Shepherd School and the requirements for degrees is given under Music in the Courses of Instruction section of this catalog.

Natural Sciences

The Wiess School of Natural Sciences comprises the Departments of Biochemistry and Cell Biology, Chemistry, Ecology and Evolutionary Biology, Geology and Geophysics, Mathematics, Physics, and Space Physics and Astronomy. All but the Space Physics and Astronomy Department offer programs leading to the B.A. degree. Students may also elect double majors combining one of the programs in natural sciences with another science, the humanities, or an engineering field. The requirements for each major may be found in the departmental listings under Courses of Instruction, and are also available from the department chair and from the Registrar's Office.

Policy Studies

Policy studies is a liberal arts oriented interdisciplinary major focusing on policy issues that are of public interest. Evaluation and analysis of the determinants and effects of policy decisions are the central subject matter. It is a course of study concerned with theoretical issues as well as applied and prescriptive policy questions.

The policy studies major represents an area of concentration which can be taken only as a second major, complementary to a major in any University department. The intent of the major is to provide students from a wide variety of academic backgrounds with an understanding of the policy-making process and an intellectual foundation in the skills of policy makers and evaluators. Students in the fields of engineering and basic sciences considering professions in business and/or government would benefit from an understanding of how technical innovations or regulations are adopted and implemented as matters of public policy. Students in humanistic fields such as languages or English would receive systematic exposure to areas of study which have high intellectual appeal and in which their language skills might prove to be particularly valuable. Students should consult the Policy Studies section under Courses of Instruction for the list of requirements.

The administration of the program is in the hands of a committee consisting of representatives from the Departments of Anthropology (Professor Marcus) Economics (Professor Rimlinger), Philosophy (Professor Brody), Political Science (Professor Stein), Psychology (Professor Dipboye), Sociology (Professor Davidson), Mathematical Sciences (Professor Scott), and History (Professor Wiener).

The chair of the committee is Professor Stein. Students interested in policy studies should see Professor Stein, who will assign them an adviser closely related to their field of interest.

Social Sciences

The School of Social Sciences offers majors in anthropology, behavioral science, economics, political science, psychology, sociology, and statistics.

The interdepartmental major policy studies, which overlaps the School of Social Sciences, the School of Engineering, and the School of Humanities, is outlined below. The managerial studies major, which overlaps the School of Social Sciences, the Jones School, and the School of Engineering, is described below.

The requirements of each major may be found in the departmental listings under Courses of Instruction and are also available from the department chair and from the Registrar's Office.

Other Options for Undergraduate Majors

In deciding on a major, students are encouraged to select a course of study directed toward their personal goals. Several options are available besides the normal major in most departments. Further information on these may be found in the departmental listings.

1. **Areas of concentration** within departmental majors. Certain majors, including architecture, electrical engineering, German, physics, and Spanish, but not limited to these, have a choice of different areas of concentration with different course requirements within the department major.
2. **Double or triple majors** that fulfill the major requirements of two or three departments. The majors may, but need not, be in related fields: for example, computer science/math science or biology/English.
3. **Interdepartmental majors.** Interdepartmental majors are offered in chemistry with materials science or physics. Geophysics, behavioral science, managerial studies, and policy studies are examples of majors combining courses taught by faculty from several departments.
4. **Area majors.** Instead of selecting an established departmental major or program, students have the option of developing an area major which is closer to their particular interests and career goals. Whereas double majors must conform to the requirements of both departments, an area major is a single major that combines courses from two or more departments and forms a clearly coherent program with its own major requirements. An area major is normally initiated by the student and is worked out in conjunction with the Office of Student Advising and faculty advisers from each of the departments involved. Together they must agree on a title, which will then designate the area major on the student's transcript, followed by the names of cooperating departments: for example, problems of the contemporary city (architecture, sociology, environmental science, and engineering). The requirements for each area major are approved by the faculty advisers and certified by the Office of Student Advising, who are jointly responsible for the validity and acceptability of the program as a degree plan. In addition, students who elect to take an

area major must also complete all other University graduation requirements.

Students who might want to develop an area major but are uncertain which departments to approach should consult with the Office of Student Advising during the sophomore year. Area majors may not be formulated and approved within three semesters of graduation other than in exceptional circumstances which would be determined by the Committee on Examinations and Standing. Under no circumstances may an area major be declared in the final semester before graduation.

All applications for area majors must be certified by the Office of Student Advising before they are accepted by the Registrar. A student who chooses an area major may not double major in any other major.

Premedical, Prelaw, and Prebusiness Programs

In addition to the preprofessional and professional programs offered by Rice in accounting, architecture, business administration, engineering, public and nonprofit management, and music, a student may pursue a program which will satisfy the requirements for admission to graduate professional schools in business, dentistry, diplomacy and foreign affairs, health science, law, or medicine.

The health professions adviser counsels students interested in premedical or predental studies and other areas of the health sciences. Those interested in prelegal studies should consult the prelaw adviser. Information about a career in business, finance, or accounting can be obtained from the prebusiness adviser. These advisers may be contacted through their offices in the Ley Student Center.

Students who plan to enter medical school or other professional or graduate school at the end of their junior year at Rice can arrange to receive a Rice four-year bachelor's degree by submitting to the Committee on Examinations and Standing a degree plan which fulfills all normal University and departmental requirements for the bachelor's degree. The degree plan must be submitted before students begin their graduate or professional training. Transfer credit for courses not to exceed the equivalent of ten courses of three or four semester hours are accepted if the individual courses are acceptable to the student's major department and the registrar according to normal procedures. Students who have entered Rice after their first year must complete the minimum residence and course requirements for transfer students before leaving. The Committee on Examinations and Standing reviews the degree plan submitted by each student and gives final approval of the student's admission to the program.

Premedical and Predental Programs. The entrance requirements for medical and dental colleges of the United States are limited to relatively few courses: one year each of general chemistry, organic chemistry, physics, mathematics, biology, and English and laboratories required by the foregoing science courses. Because medical and dental schools show little or no preference for any one major, students planning a medical or dental career have the opportunity to choose their major on the basis of their interests and capabilities. They should keep two objectives in mind: (1) to secure a broadly based cultural background and (2) to master the necessary skills for an alternative career. Those who elect to concentrate in the

sciences or engineering will automatically satisfy most of the entrance requirements. Students concentrating in the humanities need to make some adjustments in their study plan in order to fulfill the entrance requirements. Premedical and pre dental students are advised to discuss their plans with the health professions adviser.

Prelaw Studies. The academic requirement for admission to law school is satisfied by all degree programs offered at Rice. While many students major in history, political science, or economics, as a base for prelaw studies, no law school specifies particular courses or curricula as prerequisite to admission. Most require only a baccalaureate degree and the Law School Admission Test.

The Prelaw Handbook, published by the Association of American Law Schools and the Law School Admission Council, states that prelegal education should develop oral and written comprehension and expression as well as creative thinking and critical understanding of human values and that no one discipline is uniquely concerned with those objectives. Therefore, prelaw students should strive for development of their own capabilities within the areas of their greatest interest. Although there is no required course of study for the student interested in a legal career, the prelaw adviser recommends expository writing courses and beginning accounting and economics courses as useful to any law student.

Interested students should contact the prelaw adviser early, preferably in their first year at Rice. The prelaw handbook, reference books, and catalog of many leading law schools are available in the prelaw office in the Ley Student Center. Prelaw students are encouraged to discuss their plans with the prelaw adviser.

Prebusiness Studies. Graduate business schools consider a variety of attributes when admitting students to their Master of Business Administration (MBA) programs:

1. Scholastic aptitude, as evidenced by undergraduate grades and the score on the Graduate Management Admission Test (GMAT),
2. extracurricular activities,
3. work experience, and
4. ability to communicate effectively both in writing and orally.

No one undergraduate major is favored over another. Students intending to study accounting or business administration at the graduate level are advised to select an undergraduate major (or majors) in which their academic performance is likely to be the strongest.

Regardless of one's undergraduate major, it would be wise to take Economics 211 and 212 and Accounting 305 as background courses. Since many major business schools prefer students who have relevant full-time experience, these courses will assist graduating seniors in obtaining employment in the private or public sector.

Students who are considering application to a graduate business school are encouraged to consult the prebusiness adviser early in their undergraduate years. Graduate business schools differ in their objectives, curricula, teaching methods, job placement possibilities, and admission standards, and prospective applicants should endeavor to become versed in the programs of different schools before beginning the application process. The prebusiness adviser can also suggest the kinds of work experience which graduate business schools find to be the most useful for prospective students.

Undergraduate students with exceptional academic records may apply for the "five-year" plan offered by the Jesse H. Jones Graduate School of Administration.

Qualified students normally receive their bachelor's degree at the end of their senior year. They then receive either the Master of Business Administration or Master of Accounting degree at the end of their fifth year at Rice.

Rice undergraduates may also complete the Master of Accounting program in one year of graduate study if they have taken the following prerequisite courses by the end of their senior year: Accounting 305, 406, and 411; Economics 211 and 212; Economics 370 or 372; Mathematical Sciences 376; either Statistics 280, Economics 350, or Psychology 339; and Political Science 309 and 310. Additional recommended, but not required, courses are Statistics 381 and 480; Economics 375 and 448; and Psychology 101 and 231. No specific undergraduate major is required for entrance into the program.

Reserve Officers' Training Corps Programs

Rice University hosts a Naval Reserve Officers' Training Corps program. Students may participate in Army ROTC through a cross-enrollment program with the University of Houston. These programs seek to train college students so that upon graduation they may qualify as commissioned officers in a component of the United States Army, Navy or Marine Corps. The Navy has two categories of midshipmen, one working toward a Reserve commission and the other toward a regular commission. The Army normally awards Reserve commissions; however, certain selected distinguished military students may be offered commissions in the regular Army.

Any student suspended by the University for academic failure or other cause is immediately discharged from the ROTC programs. Any student performing unsatisfactory work in military science or naval science courses or lacking satisfactory officer-like qualities may be discharged from the ROTC programs regardless of the quality of academic work. Enrollment in the ROTC programs at Rice University is normally made at the beginning of the fall term. Courses in naval science and military science are open to all students. These courses may be counted as free electives toward satisfying degree requirements, but they may not be used to satisfy any distribution requirements or departmental major requirements. The amount of credit assigned to each course is determined by the Provost, in consultation with the Committee on the Undergraduate Curriculum. All such courses shall, however, count toward the determination of probation, suspension, course load, and grade point average.

Additional information regarding the ROTC programs and available scholarships is given under Military Science and Naval Science in the Courses of Instruction section of this catalog.

Teacher Certification

Programs of study are offered to fulfill the Texas state requirements for teaching certificates on the secondary level in art, biology, chemistry, earth science, economics, English, French, German, health education, history, Latin, mathematics or mathematical sciences, physical education, physics, political science, psychology, Russian, general science, social studies, sociology, and Spanish.

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School Department	Degrees Offered	Additional Options, Areas of Concentration (within majors)
SCHOOL OF HUMANITIES		
Art and Art History	B.A., B.F.A., M.A.	Art history, studio art, archaeology, film and photography
Education	Master of Arts in Teaching	Teacher preparatory programs in 28 subject areas
English	B.A., M.A., Ph.D.	
French and Italian	B.A., M.A., Ph.D. None	
German and Slavic Studies	B.A., M.A., Ph.D. B.A.	
Human Performance and Health Sciences	B.A.	Physical education; sport science, sport medicine, sport management, teaching, coaching; health education as teaching field only
History	B.A., M.A., Ph.D.	
Linguistics	B.A., Ph.D.	Anthropological, English, Germanic, and Romance linguistics; semiotics, cognitive and computational linguistics
Philosophy	B.A., M.A., Ph.D.	
Religious Studies	B.A., M.A., Ph.D.	
Spanish Portuguese and Classics	B.A., M.A., None B.A.	Language and literature, language, Latin American studies
WIESS SCHOOL OF NATURAL SCIENCES		
Biochemistry and Cell Biology	B.A., M.A., Ph.D.	Integrated biosciences curriculum with undergraduate major in biochemistry or biology. Specialization in biochemistry, biophysical chemistry, molecular biophysics, molecular biology, genetics, cell biology, neurobiology, and developmental biology
Chemistry	B.A., M.A., Ph.D.	Chemistry, organic chemistry, physical chemistry, inorganic chemistry, chemical physics
Ecology and Evolutionary Biology	B.A., M.A., Ph.D.	Integrated biosciences curriculum with undergraduate major in biology or biochemistry. Specialization in ecology, animal behavior, evolutionary biology, plant biology and developmental biology
Geology and Geophysics	B.A. in Geology; B.A. in Geophysics; M.A., Ph.D.	Stratigraphy, sedimentation, sedimentary petrology, marine geology-oceanography, carbonate petrology, igneous petrology, geochemistry, meteoritics, structural geology, regional tectonics, rock mechanics, reflection and crustal seismology, and geodynamics.
Mathematics	B.A., M.A., Ph.D.	Complex analysis, partial differential equations, mathematical physics, differential geometry, Lie groups, topological dynamics, ergodic theory, geometric topology, algebraic topology, global analysis
Physics	B.A., M.A., Ph.D.	B.A. options: Physics, applied physics, biophysics, chemical physics, geophysics, and space physics and astronomy. M.A. and Ph.D. areas: Atomic and molecular physics, biophysics, condensed matter and surface physics, nuclear and particle physics, and astrophysics.
Space Physics and Astronomy	M.S., Ph.D. (For B.A. see Physics Department, space physics option)	Experimental and theoretical space physics and astronomy

SCHOOL OF SOCIAL SCIENCES

Anthropology	B.A., Ph.D.	Anthropology; biological, linguistic, social/cultural anthropology
Economics	B.A., M.A., Ph.D.	Economics, Mathematical Economic Analysis
Political Science	B.A., M.A., Ph.D.	
Psychology	B.A., M.A., Ph.D.	
Sociology	B.A.	
Statistics	B.A., M.Stat., M.A., Ph.D.	

GEORGE R. BROWN SCHOOL OF ENGINEERING

Chemical Engineering	B.A., B.S., M.Ch.E., M.S., Ph.D.	Biochemical, petroleum reservoir or biomedical engineering; polymer science; materials, process control, thermodynamics, transport phenomena, heterogeneous catalysis
Civil Engineering	B.A., B.S., M.C.E., M.S., Ph.D.	Structural analysis and design, structural mechanics, environmental engineering
Computer Science	B.A., M.S., M.C.S., Ph.D.	Foundations of computer science, hardware systems, numerical computation, software systems
Electrical and Computer Engineering	B.A., B.S., M.E.E., M.S., Ph.D.	Bioengineering, circuits, control and communications systems, robotics, computer engineering, lasers, and solid-state electronics
Environmental Science and Engineering	M.E.E., M.E.S., M.S., Ph.D. (For B.A. as double major see department; B.S. see Civil Engineering)	Biological, physical, and chemical treatment processes; hydrology and water quality modeling; water resources management; aquatic biology; inorganic and organic chemistry; atmospheric physics; physical-chemical processes, water treatment, membrane filtration
Mathematical Sciences	B.A., M.A., Master in Applied Mathematical Sciences, Ph.D.	Computing, numerical analysis, operations research, physical mathematics, applied probability
Mechanical Engineering And Materials Science	B.A., B.S., M.M.E., M.M.S., M.S., Ph.D.	Computer applications, thermal sciences and energy conversion, gas dynamics, hydrodynamics and ocean engineering, stress analysis and mechanical behavior of materials, aerospace engineering, engineering science, electronic materials

SCHOOL OF ARCHITECTURE

B.A., B.Arch., M.Arch., M.Arch in Urban Design, D.Arch.	Architectural studies
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SHEPHERD SCHOOL OF MUSIC

B.A., B.Mus., B.Mus./ M.Mus. simultaneously, M.Mus., D.M.A.	Composition, conducting, music history, performance, theory
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JESSE H. JONES GRADUATE SCHOOL OF ADMINISTRATION

Master of Business Administration, Master of Accounting, Ph.D. in Accounting. (For B.A. see interdepartmental major in managerial studies. Both M.B.A. and M.Acco. degrees are available on a "5-year" accelerated plan for undergraduates.)	Accounting, business entrepreneurship, finance, management information systems, international management, marketing, operations research, and public and nonprofit management
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School Department	Degrees Offered	Participating Departments
INTERDEPARTMENTAL MAJORS		
Area Majors	B.A.	Two or more departments and the Office of Student Advising
Ancient Mediterranean Civilization	B.A.	Anthropology, Art and Art History, Classics, History, Philosophy, Political Science, Religious Studies.
Behavioral Science	B.A.	Anthropology, psychology, sociology
Chemical Physics	B.A.	Chemistry, Physics
Cognitive Sciences	B.A.	Anthropology, computer science, electrical engineering, linguistics, philosophy, psychology, statistics
Managerial Studies	B.A. Both M.B.A. and M.Acco. degrees are available on a "five-year" accelerated plan for undergraduates (see Accounting and Administrative Science).	Accounting, computer science, economics, mathematical sciences, political science, psychology, statistics
Policy Studies	B.A.	Anthropology, economics, history, mathematical sciences, philosophy, political science, psychology, sociology

Foreign Study Programs and Programs with Other Universities

Institute of European Studies/Institute for Asian Studies

Rice is an affiliate university of the Institute for European Studies/Institute for Asian studies, a system of centers abroad located in Durham, Freiburg, London, Madrid, Milan, Nantes, Paris, Vienna, Singapore, Tokyo and Nagoya, Japan. Each center offers a variety of opportunities to complement Rice major programs or to develop new interests. In most cases, the institute center is associated with a host university, and students may take a combination of courses offered by both the center and the university. Counselors and faculty from IES/IAS and the host university advise students in the selection of appropriate courses, facilitate registration at the university, arrange for university examinations, and provide transcripts to Rice. Students considering foreign study should arrange for prior approval of transfer credit through the academic department(s) involved and the Registrar.

Butler University Institute for Study Abroad

An affiliation between Rice and Butler University Institute for Study Abroad enables Rice students to enroll directly in 26 universities in England and Scotland and 5 universities in Australia, either for the full academic year or for a one- or two-term stay. The universities in Great Britain include a wide array of schools, both in and out of London; the universities in Australia include the University of Melbourne and the University of Sydney. Butler University Institute for Study Abroad also sponsors one- or two-semester thematic INSTEP programs that concentrate on Politics and Law (London), Politics and Strategic Studies (London), and Advanced Economics (Cambridge). The INSTEP program also provides for optional internships with financial institutions in the City of London at the end of the spring term.

Interested undergraduates may obtain brochures, applications, and information about transfer of credit for the Butler programs in the Office of Student Advising.

Beaver College Center for Education Abroad

Rice is also affiliated with Beaver College Center for Education Abroad, which provides direct access to over 15 United Kingdom universities, among them various branches of the University of London, University of Bristol, and the University of Edinburgh. Beaver College also maintains a center in Vienna. These universities offer courses of study for Rice students with majors in science, engineering, the humanities, and the social sciences. Prior approval for transfer credit should be arranged through the academic department(s) and the Registrar.

Intercollegiate Center for Classical Studies in Rome

Another consortial affiliation provided to enhance the Rice undergraduate experience is one centered in Rome, focusing on classical studies. Operated

through Stanford University's Overseas Studies, this semester-or year-long program offers undergraduate courses in Greek and Latin literature, ancient history and archaeology, and ancient art., taught by European and American professors. Majors in Ancient Mediterranean Civilization are particularly encouraged to avail themselves of this program, although other juniors or seniors majoring in art history or classics would benefit, as well. Additional information on this and other foreign programs may be obtained in the Office of Student Advising.

C. D. Broad Exchange Program with Trinity College, Cambridge

This exchange program sponsored by the Student Aid Foundation Enterprises involves both students and faculty from Rice and Trinity College, Cambridge. Student participation, available through receipt of a competitive award, confers one year of study as a visiting student at Rice or at Trinity College in alternate years. Similar but shorter exchanges of Rice and Trinity faculty members will also be arranged through the program. The provost will appoint the Rice faculty member for the exchange program.

Further information on the program may be obtained from the Office of Student Advising.

Rice-University of Lancaster Exchange Program

Rice sophomores majoring or minoring in Economics and/or Managerial Studies and maintaining a minimum GPA of 2.5 may qualify for an exchange program with the University of Lancaster, a notable British university located in northwestern England, just south of the Lake District. Applications should be submitted to the Office of Student Advising early in the spring semester prior to the school year spent abroad; finalists will be selected from among the applicants by the faculty of the Department of Economics, in consultation with the Office of Student Advising. Although recipients should enroll in at least one Economics course while at the University of Lancaster, they may choose from a wide range of other courses, as well.

The Rice-Lancaster exchange occurs on a one-for-one basis, and each student pays tuition, room, and board to his or her home institution. The program must be undertaken for a full academic year.

Rice-University of Würzburg Exchange Program

Through an agreement between the Physics Departments at Rice and the University of Würzburg, West Germany, undergraduates with a concentration in physics (and, in some cases, electrical engineering) may participate in a year-long exchange between the two schools. The exchange program at Würzburg includes an intensive German-language course taught in Germany prior to the fall term. To be eligible, Rice students must have completed at least two years of college-level German or the equivalent and must be selected through an application process in spring of the year prior to the exchange. Courses of study, usually fourth-year undergraduate level, must be arranged on an individual basis with members of the two Physics Departments.

Applicants are generally named on a one-for-one basis of exchange. Each student must cover tuition costs at his or her home institution, to be applied to the exchange partner; other costs must be borne by the individual. Applications and general information about this exchange may be obtained in the Office of Student Advising and in the Physics Department.

Exchange Program with Federation of German-American Clubs

Students at Rice with a firm grounding in the German language, both written and spoken, are eligible to compete for an exchange program co-sponsored by the Federation of German-American Clubs and Rice. Applications may be obtained from the Office of Student Advising and should be completed by mid-March. Selection of Rice finalists is made by the faculty of the Department of German and Slavic Studies, in cooperation with the Office of Student Advising. The number of Rice finalists is usually limited to one or two a year, based on an even exchange with German students.

This ten-month program provides for the Rice student's enrollment at one of eighteen outstanding German universities, professional schools, or technical schools, depending on individual qualifications and field of study. The Federation of German-American Clubs makes the university assignment, based on a priority ranking by the applicant. The Clubs also host several weekend gatherings in different parts of Germany throughout the year abroad and assign a host family.

Rice participants pay tuition, room, and board to Rice to be applied to their counterpart's credit; they are supplied with tuition payment and a stipend to cover room and board while in Germany.

Rice-Swarthmore Exchange Program

An exchange program exists between Rice and Swarthmore College for qualified students in the fall semester of their sophomore, junior or senior year. Swarthmore, which is situated on a wooded campus near Philadelphia, is a nondenominational coeducational college with academic standards similar to those at Rice. The exchange is for the fall semester only. Rice students apply in January by submitting their own letter of application and two supporting letters from faculty members. The exchange is on a one-for-one basis with each student continuing to pay all charges and fees to his or her home school.

Prior approval of transfer credit should be requested for each course from the Registrar. Courses to be taken at Swarthmore which will apply to the student's major must also be approved by the department. Students who enroll in the normal program of four four-semester-hour courses at Swarthmore receive upon satisfactory completion 16 hours (or five courses) toward their Rice degree with a notation of specific courses which may count for fulfillment of major requirements or distribution within that block credit. Further information on this program may be obtained from the Office of Student Advising.

Sweet Briar Junior Year in France Program

Established in 1948, the Sweet Briar Junior Year in France Program provides an opportunity for students from colleges and universities in the United States and

Canada to spend a year studying at four universities and other institutions of higher education in Paris following a four-week orientation period in Tours. While some students in this program major in French, many others specialize in such areas as art and art history, comparative literature, government, history, international relations, mathematics, music, philosophy, political science, religion, theatre arts, etc. Students are encouraged to experience French culture by living with families in both Tours and Paris.

Academic Regulations

All undergraduate students are subject to the academic regulations of the University. The Committee on Examinations and Standing administers the rules described below. Under unusual circumstances any student may submit a written petition to the committee requesting special consideration. All correspondence with the committee should be addressed in care of the Vice-President for Student Affairs.

Registration

Currently enrolled students preregister in April for the fall semester and in November for the spring semester and complete registration at the beginning of each semester. Entering students complete their registration during Orientation for New Students the week before classes begin in August. New students must complete, sign, and return a matriculation card in order to be properly registered.

Unless a special tuition plan has been elected, all tuition and fees for the fall semester must be paid by the middle of August and for the spring semester by the end of December.

A student who does not register or request a delay from the Registrar of the deadline established by the Academic Calendar is considered withdrawn from the University by default. To be readmitted, the student must be eligible to continue and must pay a \$25 late registration fee. No student is allowed to register after the fourth week of classes except with approval from the Committee on Examinations and Standing for good reason shown.

Students may change their registration by adding or dropping courses according to the proper procedure during the first two weeks of the semester without penalty fee. From the end of the second week to the end of the fourth week the student must obtain the instructor's permission to add a course. The deadline for adding courses is the end of the fourth week of classes; the deadline for dropping courses is the end of the tenth week. Courses in which loss of credit has been assessed by the Honor Council may not be dropped. Students who add or drop courses after the second week but before the above deadlines will be charged \$1 for each drop/add form submitted. If the change is necessary because of a revision or cancellation of the course by the department, no penalty fee will be charged.

Students normally declare a major by the time of pre-registration for the spring semester of their sophomore year and will not be permitted to register for the fall semester of the junior year without having declared a major.

Course Programs

Students at Rice normally enroll in 15 to 17 semester hours each semester and thus in eight semesters complete the requirements for graduation in their major. Students who wish to register for more than 20 semester hours, or to enroll or continue in fewer than 12 hours, or to register simultaneously for credit at another university, must secure permission from the Vice-President for Student Affairs before filing their registrations. No student may receive credit for more than 20 semester hours in a semester, including courses taken elsewhere, unless he or she has received this prior written approval.

Students are prohibited from registering for more than one course at the same hour, unless they receive permission from the instructors involved.

Transfer Credit Including Credit for Summer School Courses Not Taken at Rice

The basis for approval of transfer credit toward a Rice undergraduate degree for courses taken at another college or university is that they should be appropriate to the Rice curriculum. Thus credit is given to courses whose content is such that they are or could be appropriately offered at Rice. Transfer credit is granted for a total of no more than 14 semester hours taken during the summer at an accredited college or university other than Rice.

Students who wish to take courses at another university during an approved leave of absence or during the summer are advised to secure prior approval of transfer credit from the Registrar by submitting the name of the school and the list of specific courses for which credit is requested. If courses taken elsewhere are to count as part of the student's major requirements, written approval for transfer credit must also be secured from the appropriate department.

Prior approval is recommended but not required. Courses may be submitted for transfer credit after the work has been completed. If approval of credit is granted, it is entered on the student's permanent record only when the Registrar receives an official transcript verifying completion of the work with a grade equivalent to "C-" or better.

Students transferring to Rice from another college or university should apply to the Registrar for transfer credit on the same basis.

Final Examinations

Final examinations are given in most courses, but the decision to give a final examination as a required part of the course rests with the instructor and the Department.

Final examinations that cover more than the material since the last examination, that are the only exam in the course, or that are comprehensive of the entire course may be given only during the final examination period. Such examinations may not, for example, be labeled "tests" and administered during the last week of classes.

Final examinations are normally of three hours duration. Faculty who, under exceptional circumstances, wish to give longer examinations can do so only if the exam is scheduled as take-home. Under no circumstances may final exams exceed

five hours. The "due date" for all take-home final exams is the end of the examination period.

The Committee on Examinations and Standing also recommends that hour exams not be given in the final week of classes in those courses in which a final is given.

All tests and examinations are conducted under the honor system.

University-sponsored events, including varsity athletic games, matches, and meets, and other functions which require student participation, shall not be scheduled so as to occur during the period beginning with the second day following the end of regular classes and continuing through the end of final examinations. In order to facilitate student attendance in classes during the final week of the semester, varsity athletic games, matches, and meets scheduled between Monday of the final week of classes and the day following the last day of classes should not involve travel outside of Houston. Requests for exceptions may be made to the Committee on Examinations and Standing which will forward its recommendations to the President.

The Pass-Fail Option

An undergraduate student may register for courses on a pass/fail basis subject to the following limitations:

1. The total number of pass/fail courses taken as an undergraduate shall not exceed one for each full year of residence up to a limit of four. Students participating in off-campus programs administered through Rice will be considered in residence at Rice for the purpose of this rule.
2. The total number of pass/fail semester hours shall not exceed 14.
3. A student may register for only one pass/fail course in a semester.
4. No courses specifically required for the major, nor courses within the major department (or major area for area or interdepartmental majors) may be taken pass/fail.

Courses can be taken under the pass-fail option if the student files the proper form in the Registrar's Office no later than the end of the fourth week of classes. The student may convert any course so designated to a graded course prior to the end of the tenth week by filing the proper form with the Registrar. Students should consider declaring pass/fail declarations early in the semester and changing to a grade designation later if appropriate. The Committee on Examinations and Standing rarely approves conversion to a pass/fail designation after the deadline. Students should be aware that while a P does not affect the GPA, an F for a course taken pass-fail does count in the GPA. The pass/fail option may be declared for a course taken during the Rice summer session, but this counts toward the total of four courses (14 hours).

Grade Symbols and Designations

Courses are graded using the following symbols:

A	
B	
C	
D	
F	
P	pass—students successfully taking a course pass/fail receive a P.
S	Students successfully completing a designated satisfactory/fail course receive an S. The grade of S indicates satisfactory completion of a course in which traditional grading procedures are not used. Unsatisfactory completion of such a course is indicated by the grade of F. Course or labs in which traditional grading procedures are not used must be designated in the "Schedule of Courses Offered" published each semester by the Registrar. Courses so designated may be counted toward the completion of a major. Students should be aware that while an S does not affect the GPA, an F received in such a course does.

Designations for special purposes:

W	withdrew
INC	incomplete
##	other
NG	no grade reported by instructor
NC	no credit granted for this course

These designations, explained below, do not affect grade averages.

Instructors are required to report a grade for all students (except auditors) whose names appear on the class list. For students who also receive a designation of "incomplete" or "other," the grade is determined on the basis of zero credit for the work not completed and does not become part of the student's record except as discussed below. For students who withdraw from the University within the last five weeks of classes, the grade, which will not appear on the student's record, but will be used solely in determining eligibility for readmission, should be based on the performance of the student up to the time of withdrawal.

A designation of "incomplete" is reported to the Registrar by the instructor when a student has not been able to complete a course because of verified illness or other circumstances beyond the student's control during the semester. Such work must be completed and a revised grade submitted by the end of the fifth week of the next semester; otherwise, the Registrar's Office will record the grade originally submitted by the instructor.

A designation of "other" is reported to the Registrar if a student fails to appear for the final examination after completing all the other work of a course. A designation of "other" must be resolved and a revised grade submitted by the end of the first week of classes of the second semester or by the end of the fourth week after commencement, whichever is applicable. If no revised grade is received, the Registrar's Office will record the grade originally submitted by the instructor.

A designation of "withdrew" appears for each course for which the student was enrolled at the time of withdrawal from the University. Courses dropped by

students prior to the late drop deadline are removed entirely from the transcript. A "W" is recorded for any course dropped with the approval of the Committee on Examinations and Standing after the late drop deadline. See also the section "Voluntary Withdrawal and Readmission" for rules concerning withdrawal in the last five weeks of classes.

A designation of "no grade" indicates that the instructor failed to report a grade. Instructors are asked to resolve this situation as quickly as possible.

Students with designations of "incomplete" and "other" should be aware that they may go on probation or suspension when these are changed to grades.

Students may repeat courses previously failed. The record of the first attempt (and grade) remains on the permanent record (transcript). Both grades are included in GPA calculations. If students repeat courses previously passed, credit is awarded only once unless the course is designated as repeatable for credit. Each attempt remains on the permanent record and each grade is included in the GPA.

Grade Points and Grade Averages

Grade Grade Points

A	4.0
B	3.0
C	2.0
D	1.0
F	0.0

Plus and minus signs may be attached to each grade except F. One-third of a grade point is added or subtracted, respectively. It is general University grading practice to give pluses and minuses.

Grade point averages (GPA's) are calculated as follows. For each course, the product of the course credit attempted and the grade points for the grade earned is calculated. These products are added for each course and the result is divided by the total credit attempted. The result is the GPA.

GPA's are reported each semester on the student's grade report, and may appear on unofficial transcripts. However, GPA's are not included on official transcripts; nor are they reported to any external agency. Class ranks are likewise not reported externally.

Faculty Grading Guidelines

The following guidelines on grading have been drawn up by the Committee on Examinations and Standing for the information of faculty and students. The committee believes that the following policies have long been supported in practice by the faculty both individually and collectively:

1. The evaluation of the student's performance in a course and a decision on the appropriate grade is the responsibility of the designated instructor or instructors in the course.
2. No student should be given an extension of time or opportunities to improve a grade that are not available to all members of the class, except for verified illness or justified absence from campus. Students who have

three scheduled final examinations in two consecutive calendar days may, however, take one of the examinations at another time.

3. Students in independent study courses are not to be allowed an extension beyond the time when grades are due. Faculty are to submit grades at the end of the semester for such students based on work completed during the semester. The instructor directing the independent study bears responsibility with the student both for ensuring that the work undertaken is appropriate to the span of a semester and for determining the degree credit to be received.
4. The basis for grading and the expectations on all written assignments or tests should be clearly explained to the class in advance, preferably in writing at the beginning of the semester. The instructor should explain clearly which assignments or homework are covered by the Honor Code and which are not. To prevent allegations of plagiarism on written assignments, students should be warned that all direct and indirect quotations from others sources should be properly acknowledged. The instructor should explain the extent to which the student's paper is expected to be independent of the references and clearly distinguishable from them.
5. Instructors should be willing to give any student an explanation of his or her grade as consistent with the grading for the rest of the class. For this reason the Committee urges the faculty to preserve all examinations and written material not returned to students as well as grade records for the semester for at least one month into the following semester so that students may, if they wish, review with their instructor the basis for the grade which they have received.
6. Instructors may not change a semester grade after the grade sheet has been submitted to the Registrar except for a clerical error in calculating the grade. This is a long-standing University rule of which the faculty are reminded by the Registrar at the end of each semester. It is designed in part to protect the faculty from student pressure for grade changes. All other grade changes, including retroactive change to *withdrawal* or *incomplete*, must be approved by the Committee on Examinations and Standing on the basis of a written petition from the student and information from the instructor.
7. There is no University requirement that a final examination be given in a course. It is University policy that:
 - a. Final examinations that cover more than the material since the last examination, that are the only exam in the course, or that are comprehensive of the entire course may be given only during the final examination period. Such examinations may not, for example, be labeled "tests" and administered during the last week of classes.
 - b. Final examinations are normally of three hours duration. Faculty who, under exceptional circumstances, wish to give longer examinations can do so only if the exam is scheduled as take-home. Under no circumstances may final exams exceed five hours. The "due date" for all take-home final exams is the end of the examination period.

8. Freshmen students receive mid-semester grades around the eighth week of the fall and spring semesters so that they can, if advisable, enroll in tutoring or drop a class for which they may not be prepared. Faculty who teach freshmen in any of their classes will be asked to submit grades of standing for these students during the *seventh week* of the semester and should schedule the grading of tests, quizzes, or homework assignments accordingly. These grades are not recorded on the student's transcript nor calculated in the GPA, but they are important indicators for students and their faculty advisers.
9. Departments using teaching associates, adjunct professors, or visiting faculty of any kind should make sure these teachers are familiar with Rice grading procedures. A regular faculty member who is well versed in the grading guidelines should be assigned to assist such instructors.

The Chair of the Committee on Examinations and Standing or the Vice President for Student Affairs will be glad to advise any faculty member faced with exceptional circumstances which may justify special consideration. Students may petition the Committee concerning the application of these guidelines. Suspected or possible violations of the Honor Code should be submitted to the Honor Council.

President's Honor Roll

Outstanding students are recognized each semester through the publication of the President's Honor Roll. In order to be eligible, students must have grades exclusive of pass-fail and satisfactory-fail in a total of 12 or more semester hours and must not have any grade of "F." Approximately 30 percent of all undergraduates are so recognized. Undergraduates enrolled in four-year bachelor's degree programs are always eligible for the Honor Roll. Students enrolled in five-year bachelor's/master's programs are eligible only during their first eight semesters.

Academic Probation

A student is placed on academic probation if at the end of any semester:

1. the student's grade point average for that semester is less than 1.67 or,
2. the student has a cumulative grade point average less than 1.67. This requirement is waived if the GPA for that semester is at least 2.0.

The period of probation extends to the end of the next semester in which the student is enrolled at the University. A student on probation (academic or disciplinary) is not permitted to be a candidate or hold any elective or appointive office. This restriction is also embodied in the constitution of the Student Association.

A student on academic probation is not allowed to enroll in more than 14 semester hours. A student who receives two or more "incomplete" grades in a semester is not eligible to enroll in more than 14 semester hours in the semester immediately following.

Academic Suspension

A student is suspended from the University if at the end of any semester:

1. the student earns grades that would place him/her on academic probation a third time, or;
2. the student earns a grade point average less than 1.00 for the semester, except for students completing their first semester at Rice.

Students readmitted after a previous suspension will again be suspended if in any succeeding semester they fail to achieve at least one of the following requirements:

1. a cumulative and semester grade point average of at least 1.67, or;
2. a semester average of at least 2.00.

The period of a first suspension is normally one semester; the period of a second suspension is at least two semesters. Normally, students will not be readmitted following a third suspension.

Suspension is deemed to occur as soon as a responsible University official, normally the Registrar, learns that a student's performance has been such as to place him or her on suspension. Suspension is lifted the first day of class of the semester in which the student returns to the University, or in the case of persons who have served the nominal term of suspension but do not intend to return to Rice when they have received permission from the Committee on Examinations and Standing to have that suspension lifted.

A student who earns grades in a semester that would place him or her on academic suspension but who otherwise satisfies the requirements for graduation in that semester will be allowed to graduate.

Disciplinary Probation and Suspension

A student may be placed on probation or suspension for an honor code violation or for disciplinary reasons through action of the Proctor. No student may receive a degree while on disciplinary suspension (including that for an honor code violation), even if all academic requirements for graduation have been fulfilled.

Readmission After Suspension

To obtain readmission after academic or disciplinary suspension, the student must address a letter of petition to the Committee on Examinations and Standing; this letter should be received at least a month before the beginning of classes. At the same time, the student should request two supporting letters from persons under whom the student has worked during the suspension period as a student or an employee. If the problems causing the previous difficulty appear to have been relieved, the student is generally readmitted. In some instances, approval of readmission may be postponed, or suspension may be permanent. Petitions for readmission following a separation from the University involving disciplinary or other non-academic consideration will be subject to review by the Proctor before consideration by the Committee on Examinations and Standing. A student desiring special consideration with regard to readmission following suspension should petition the committee in writing.

The Committee on Examinations and Standing does not normally place students on probation and suspension as the result of deficient performance in the Rice Summer School (although it may do so at its discretion). Students are warned, however, that grade averages are affected.

Voluntary Withdrawal and Readmission

A student may withdraw voluntarily from the University at any time during the semester up until the last day of classes and, if in good academic standing at the time of withdrawal, the student is normally readmitted upon written application to the Committee on Examinations and Standing.

Any student desiring to withdraw should inform the college master in person and give written notification of withdrawal to the Vice-President for Student Affairs, who will notify other offices of the University as necessary. If the student withdraws within five weeks of the last day of classes, grades of standing as of the day of withdrawal are considered in determining eligibility for readmission. Students with grades of standing that would have placed them on suspension had they not withdrawn will, for purposes of readmission, be treated as if they had been suspended. Such students should follow the guidelines for readmission shown under the suspension rules. Students who fail to give notice of withdrawal should expect to receive failing grades.

Leave of Absence

A student may request a leave of absence from the University by applying in writing to the Committee on Examinations and Standing at any time prior to the first day of classes in the semester which marks the beginning of the leave. Leave from the University after the first day of classes is considered a voluntary withdrawal.

To be readmitted following an approved leave of absence of not more than four semesters, students need only notify the Vice-President for Student Affairs of their intention to terminate their leave at least one month before the beginning of the semester. After four semesters, they should apply in writing to the Committee on Examinations and Standing, as in the case of a voluntary withdrawal.

Approval of a leave of absence is always contingent on the student's satisfactory completion of course work in the semester preceding the leave; otherwise, the approved leave may be converted to suspension.

Extended Time Graduation

Students enrolled in four (five-) year bachelor's programs may elect to be subject to the academic regulations in effect either at the time of their initial registration at Rice or at the time of their graduation, unless they graduate more than seven (eight) years after that initial registration. In that case they will be subject to the regulations in effect at the time of their last readmission.

Courses in a student's major program completed more than seven (eight) years prior to graduation are subject to review by the appropriate departments. If the departments conclude that any such courses are no longer suitable for satisfying the requirements of the major, those courses will not be credited toward the major program, although they will remain on the student's record.

Academic Advising and Tutorial Programs

Rice University provides for academic advising of freshman and sophomore students through a well-developed program centered in the residential colleges, overseen by the college masters and involving more than 150 faculty members. These faculty associates are equipped to give broad, inclusive advice to students, as well as specific information about individual disciplines. Within each college, faculty members designated as "divisional advisors," representing humanities, social sciences, natural sciences, and engineering, additionally advise prospective majors in those divisions and give final approval to course schedules and to the dropping and adding of classes. Majors in music and architecture obtain course approval from academic advisors in the Shepherd School of Music and the School of Architecture, as appropriate.

Once a student designates a departmental major, usually in the fourth semester, he or she comes under the jurisdiction of an academic department (or departments, in the case of a double major) for academic advising and approval of course schedules. Area majors obtain approval from the Office of Student Advising, which operates in cooperation with the academic departments involved in each interdisciplinary major.

The Director of Student Advising, assisted by faculty associates, serves as an administrative liaison between the academic departments and the college advising system, maintains an up-to-date file on departmental course requirements, coordinates a tutorial program, provides training for faculty and peer advisors, and organizes the exchange of academic information between students, advisors, and departments. The Director oversees areas that span a range of academic disciplines—area majors, study abroad, exchange programs, pre-professional advising, and undergraduate fellowships—and arranges for programs, such as Majors Day and Orientation Week Academics Fair, that inform students about academic options within the Rice curriculum.

The Office of Student Advising serves as a resource center for general academic information, for brochures describing study abroad and exchange programs, for information regarding prestigious undergraduate fellowships awarded on a national basis (Rhodes, Marshall, Luce, etc.), for graduate catalogues and guides, and for application packets for GRE, MCAT, LSAT, and GMAT tests. Faculty advisors counsel individual students with academic problems and questions. Operating within the Office of Student Advising, the Foreign Student Advisor assists foreign students with visas and with cultural adaptation.

The Rice tutoring program provides free assistance to freshmen in any course and to upperclassmen who are having difficulty with introductory courses. Each department with major teaching assignments at the introductory level names a departmental coordinator who is responsible for organizing tutorial activities within the department and assigning students to group or individual tutoring. The departmental coordinator also approves the list of tutors and signs records of completed tutorial sessions.

Each college also selects a faculty associate who coordinates the tutoring program within the college. This faculty member seeks ways to aid communication and help advise those students who need tutoring. Both the departmental and

college aspects of the tutoring program are under the supervision of the Director of Student Advising.

Normally, a student who is having academic difficulty should consult with the course instructor or the departmental coordinator to arrange for tutoring; however, college coordinators provide an alternate referral source. Further information for those who need tutoring or who would like to serve as a tutor may be secured from the Office of Student Advising.

Admission of New Students

From its beginning, Rice University has sought to maintain an academic program of the highest excellence for a small body of students. This number has grown with the expansion of the university's resources over the past decade, but the total number of students admitted to Rice still remains relatively small—approximately 600 students in each first-year class.

In making its selections, the Admission Committee attempts to seek out and identify students who have demonstrated exceptional ability and the potential for personal and intellectual growth. There is no discrimination whatsoever on the basis of sex, race, ethnic background, age, or physical handicap. Decisions are based not only on high school grades and test scores but also on such qualities as leadership, participation in extracurricular activities, and personal creativity. The university's aim is diversity rather than uniformity, and it believes that students learn from each other and from life in the residential colleges, as well as from their classes and laboratories.

Students are selected on a competitive basis in five academic areas. They are: (1) architecture, (2) humanities and social sciences, (3) engineering, (4) music, and (5) natural sciences. Applicants should give careful consideration to the category under which they wish to be considered. Students, however, are free to change from one of these areas to another, after consultation with their adviser. Only architecture and music have strictly limited enrollments. Occasionally, physical limitations of other departments may make it necessary to limit enrollment of majors.

There are five basic measures generally used in evaluation of candidates for admission: (1) scholastic record as reflected by the courses chosen and the quality of performance, (2) scores on the Scholastic Aptitude and Achievement Tests administered by the College Board, (3) recommendations from teachers and counselors, (4) the personal interview, and (5) the application itself. The Admission Committee is particularly interested in any information that can give insight into the extracurricular areas of development and such intangible factors as motivation, intellectual curiosity, character, and special talents.

1. The High School Record. The completion of not less than 16 acceptable units is required. The record must include the following units:

English	4	Laboratory science	2
Social Studies	2	(biology, chemistry, physics, etc.)	
Mathematics	3	Additional credits in above-	3
A foreign language	2	listed subjects	
		Total	16

Students admitted with academic deficiencies will be asked to complete the required work by taking high school or college level courses during the summer before enrollment at Rice.

Courses in chemistry, physics, trigonometry, or other advanced mathematics courses are required of applicants for the engineering and science divisions.

2. Entrance Examinations. The required entrance examinations are administered by the College Board. The College Board bulletins and test applications are available from high school counseling offices or the Rice Admission Office. The applicant is responsible for making arrangements to take the examinations, and official score reports must be submitted before the student can be considered for admission (see the calendar on page 97).

The following tests are required according to the curriculum desired:

A. Humanities, Social Sciences, Architecture, and Music

- (1) Scholastic Aptitude Test
- (2) Three Achievement Tests as follows
 - (a) English composition*
 - (b) any two of the following:
A foreign language
American history
European history and world cultures
Literature
Mathematics
A science

B. Science and Engineering

- (1) Scholastic Aptitude Test
- (2) Three Achievement Tests as follows
 - (a) English composition*
 - (b) Mathematics
(Level I or Level II)
 - (c) Chemistry or physics

*with or without essay

3. Candidates must submit evaluations from a counselor and one teacher. The necessary forms are included in the application.

4. The Personal Interview. The interview is an integral part of the admission procedure. It enables the Committee on Admission to reach a decision based on nonacademic, as well as academic, aspects of the candidate's development. Students should arrange for an interview in compliance with the admissions calendar on page 97. Campus interviews are held at 109 Lovett Hall between the hours of 9:00 a.m. to 4:00 p.m. Monday through Friday, and until 11:30 on Saturday mornings. (Summer schedule: Monday through Friday, 9:00 a.m. to 4:00 p.m.) Houston area students who fail to interview will not be considered for admission. Applicants who cannot visit the university or who are unable to meet with a traveling member of the admissions staff may be interviewed by alumni interviewers located throughout the United States and in several foreign countries. If an applicant cannot be interviewed by one of these methods, the interview may be waived. Candidates for admission to the Shepherd School of Music must arrange for an audition and theory test with the music faculty. Architecture applicants should interview with a faculty member in the School of Architecture and submit a portfolio.

5. The Application. The application provides the committee with important information on the student's background and gives the applicant an opportunity to provide statements on his or her interests, experiences, and goals. Please note that no application fee is required of candidates for admission to Rice.

Early Decision Plan

The Early Decision Plan is open to candidates for admission who regard Rice University as their first choice and will await the outcome of their application to Rice before applying elsewhere. Students applying for the fall semester 1990 under the Early Decision Plan must complete the required Scholastic Aptitude Test (SAT) on or before the October testing date in the senior year. The Achievement Tests (ACH) must be taken by the June test date in the junior year. All other materials should be filed by November 1. Admission notices will be mailed on December 1.

Requirements for admission are not altered by an early decision. Those accepted are expected to complete the remainder of their high school work with superior performance. Early Decision candidates should apply for financial aid using the Early Version of the Financial Aid Form (FAF). Those applying by November 1 will be notified by December 1. Late filers will be notified as soon as their information is processed.

Action on some applications will be deferred until the Regular Decision period if the Admissions Committee does not have adequate grounds for an affirmative decision in December. An additional semester of the high school record and additional College Board scores from the November, December, or January tests may be added for later consideration. The applicant would, of course, be released from the pledge to apply only to Rice. An applicant offered admission under the Early Decision Plan must make a \$100 registration deposit within 30 days in order to hold his or her place in the incoming class. This deposit is nonrefundable after May 1. Those who desire a room on campus must make an additional \$50 deposit.

Interim Decision Plan

Applicants who complete their SAT and Achievement Tests on or by the December testing date and who file all other materials by December 1 may be considered in the Interim Decision Plan and notified of the outcome by early February. Action on some applications may be deferred until the Regular Decision period if the Admission Committee does not have adequate grounds for an affirmative decision in February.

Applicants offered admission under this plan must make a \$100 nonrefundable registration deposit within 30 days of the notification date. It is expected that students sending the \$100 deposit will withdraw their applications to other schools from further consideration. Any student unwilling to do so should contact the Rice Admission Office as soon as possible. Those who desire a room on campus must make an additional \$50 deposit.

Regular Decision Plan

Regular Decision applications postmarked by January 2 are considered by April 1. Applications received after January 2 are considered only after all earlier applications. Candidates who apply after January 2 must do so in full knowledge that they are in a highly speculative position.

Regular Decision applicants who are offered admission should make a \$100 registration deposit by May 1 to reserve their places in the incoming class. This deposit is not refundable. Those who desire a room on campus must make an additional \$50 deposit.

Financial aid applicants for Interim and Regular Decision should consult the calendar below for deadlines and notification dates. Late filers will be notified as soon as their information is processed.

Admissions Calendar

Early Decision Application by *November 1	Interim Decision Application by *December 1	Regular Decision Application by *January 2	Transfer Application by *April 2 for fall, *Nov. 1 for spring
Required SAT on or by October test date in senior year Achievement Tests on or by June test date in junior year	Required SAT and Achievement Tests completed on or by Dec. test date	Required SAT and Achievement Tests completed on or by Jan. test date	Required SAT if never previously taken
Notification of admission mailed December 1	Notification of admission mailed February 1	Notification of admission mailed April 1	Notification in late May or December
Financial Aid Form (Early Version) filed by November 1 Financial Aid notification by December 1	Financial Aid Form filed by Jan. 15 Financial Aid notification by February 1	Financial Aid Form filed by March 1 Financial Aid notification by April 1	Notification when admitted; allow 1 month after filing Financial Aid Form
Deposit within 30 days nonrefundable after May 1	Deposit within 30 days nonrefundable	Deposit by May 1 (Candidates' Reply Date) nonrefundable	Nonrefundable \$100 deposit within 15 days of admission

NOTE: For students desiring on campus accommodations, a \$50.00 room deposit should accompany your registration deposit. The room deposit may be refunded or credited to the applicant's account until May 1. No application fee is required of candidates for admission to Rice.

*Rice University will accept applications for admission if postmarked by the date indicated for the respective decision plan.

Advanced Placement

Entering first-year students who have done work well beyond the usual high school courses in certain subjects and who score "4" or "5" on the Advanced Placement College Board examinations prior to matriculation at Rice are given university credit toward graduation for appropriate Rice courses satisfying distribution or free elective requirements. Acceptance of such credit in fulfillment of a student's major requirements is subject to approval by the department in question.

Rice students who earn the International Baccalaureate diploma will, subject to approval by the relevant departments, receive credit for individual higher level exams for which they receive a score of 6 or 7. Students from high schools that offer International Baccalaureate courses but not the diploma will receive credit according to the same criteria.

Furthermore, during orientation week at the beginning of the academic year, entering students may take placement tests administered by various departments at Rice. On the basis of these tests, students may be advised to register in courses beyond the introductory level. Degree credit is not given for these tests.

Transfer Students

Rice University encourages application from students with superior records who wish to transfer from a two-year college or a four-year college or university. Interested students should request a transfer application form from the Office of Admission.

Applications for admission in the fall semester should be filed by April 2 and be accompanied by official transcripts of all high school and college work completed to date and courses in progress. Notification of admission is mailed in late May. Applications for admission for the spring semester with the appropriate transcripts must be filed by November 1. Notification of admission is mailed by mid-December. The criteria used in evaluating transfer applications are essentially the same as those applied to applicants for the first-year class, except that special emphasis is given to performance at the college level. Because of the highly competitive nature of transfer admission, it is recommended that applicants have a minimum 3.2 (4.0 scale) G.P.A. on all college work. Scholastic Aptitude Test scores are required. If candidates have not previously taken College Board tests, they must take the Scholastic Aptitude Test no later than April if they wish to apply for admission in the fall. Achievement Tests are not required.

Transfer students must be registered in residence at Rice for at least four full semesters during the fall or spring terms and must complete not less than 60 semester hours in 300 and 400 level courses for a Rice degree.

Note that *first-year candidates* may apply for entry in the fall semester only, because Rice does not accept freshmen at midyear. Transfer candidates may be admitted for either the spring or fall semesters, except for students applying to the School of Architecture, who may enter in the fall only.

For further information or application forms, prospective candidates for undergraduate admission should communicate with the Office of Admission.

When requesting application forms, candidates should indicate that they are prospective transfers from another college.

Visiting Students

Students who wish to spend a semester or a year at Rice taking courses for credit to be applied toward their undergraduate degree at another school should apply for admission as visiting students through the Office of Admission. The student's application should be accompanied by an official transcript of college work to date and a letter from the student's academic dean or registrar agreeing to grant transfer credit subject to satisfactory performance.

Visiting students are assigned membership in a college during their stay and are charged the same fees as other undergraduates. In a few classes where enrollment is limited because of space or other considerations, candidates for Rice degrees have priority over visiting students.

Rice/Baylor College of Medicine Premedical Scholars' Program

The Premedical Scholars' Program is designed for talented and motivated students who desire careers in medicine or biomedical science research. Up to 15 graduating high school senior students will be admitted to Rice University and Baylor College of Medicine concurrently. Selection to the Program is conducted through the established admission process at Rice. Finalists for the Program will be expected to interview at Baylor College of Medicine. Notification of interview will be sent to students in late March and decisions will be made by April. Applications for the Program can be requested from the Rice Admission Office and must be completed in addition to the Rice admission application. Applications for the Program and Rice University applications are due by January 2, 1990. Applicants who are not admitted to the Premedical Scholars' Program are still eligible for admission to Rice and are still eligible to apply to Baylor College of Medicine upon graduation from Rice.

Class III Students

Class III standing at Rice University designates students with an undergraduate or graduate degree from an accredited college or university who are taking courses for credit but not in a specific degree program.

Admission of High School Students to Take Courses for Credit

Accelerated high school juniors and seniors who have taken all the courses in a given discipline available to them in high school or who have completed their high school graduation requirements may request admission to Rice for the purpose of taking one or more university level courses on the same basis as Rice undergraduates. Such courses are graded for credit, and the university sends a transcript of this record by student request to any college or university. If the high school student is

later admitted to Rice, any such courses are counted toward the student's undergraduate degree at Rice. Tuition for such courses is \$265 per semester hour plus a \$50 registration fee, the total not to exceed \$3,050. These charges are for 1989-90 and are subject to change in subsequent years. Application for admission should be made to the Admission Office. Financial assistance is not available for this program.

Auditors

Any interested person, including currently enrolled students, may audit one or more courses at Rice by securing permission of the instructor and by registering as an auditor with the Registrar. The university grants no academic credit for such work. Audit credit does not appear on transcripts. Currently enrolled students may audit courses without charge. Rice alumni may audit as many courses as they wish for a fee of \$25 per semester. All others are charged \$50 per course per semester for the privilege of auditing.

Student Housing

Information about residence in the colleges and room application forms accompany the notice of admission sent to each new undergraduate. Room reservations cannot be made prior to notification of admission.

At present, Rice University has the capacity to house about 70 percent of its undergraduate students in the residential colleges on campus. Although the majority of students desiring to live in the colleges can be accommodated, demand usually exceeds the available number of rooms. Every effort is made to provide housing in the colleges for all incoming first-year students who wish to live on campus, but space cannot be promised. Continuing students draw for rooms according to the priority system in each college. No student is required to live on campus. Off-campus members are encouraged to eat in their colleges and to participate in college activities.

Correspondence from new students regarding housing in the residential college should be addressed to the Office of Admission. Information concerning off-campus housing is available from the Office of Student Advising and Student Activities.

Tuition, Fees, and Expenses

The tuition for undergraduate students in 1989-90 is \$6,100 per year, \$3,050 payable prior to the beginning of each semester.

Part-time students taking fewer than 12 hours by special permission are billed at the part-time rate of \$265 per semester hour for the courses in which they are enrolled plus a \$50 registration fee, the total tuition and registration fee not to exceed \$3,050 per semester.

Any undergraduate who withdraws or takes an approved leave of absence and is then readmitted to the university is charged the tuition in effect during the semester in which he or she returns.

Fees

All undergraduate students and candidates for a second bachelor's degree are charged the following annual fees, payable in full at the time of the student's first tuition payment for the year or any portion of the year. An exception is the Health Service fee, which is paid in two installments, half before the beginning of the fall semester and half before the beginning of the spring semester.

Subsidies to student activities.....	\$42.60
Tickets to athletic events	35.00
College fee.....	40.00
Health Service fee	<u>142.00</u>

Total basic fees.....	\$259.60
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All Rice students are required to have health insurance. Insurance for the 1989-90 school year may be purchased at a yearly premium of \$389.00 (Plan A) or \$294.00 (Plan B) from the University's program developed for Rice students. Coverage will be effective from 12:01 a.m., August 15, 1989, until 12:01 a.m., August 15, 1990. Dependent coverage is also available (application and policy description can be obtained from the Cashier's Office or the Office of Student Activities and Advising). If you have other medical insurance, a waiver card showing proof of insurance must be signed and returned to the Cashier's Office by August 15 to avoid being charged for insurance.

Special Charges

Orientation week room and board (required for all new students)...	\$100.00
Late payment/late registration fees.....	\$25.00
Late course change	\$10.00
Late application fee for Class III.....	\$50.00

Refund of Tuition and Fees and Appeal Procedure

A student who withdraws during the first two weeks of the semester is not charged tuition or fees for that semester. A student who withdraws during the third week is charged 30 percent of the semester's tuition. The amount of the refund is reduced by 10 percent at the beginning of each successive week. No refund is made for withdrawals after the ninth week. There is no refund of fees or special charges after the second week of classes in the semester. The \$100 registration deposit paid by incoming students is not refunded at any time if the student withdraws. There is no partial refund of fees paid for the full year for withdrawals or leaves of absence in the spring semester.

Student requests for special consideration in connection with waivers, refunds, or adjusted payments on tuition, fees, and other charges, which cannot be

satisfactorily resolved between the student and the Cashier's Office, should be forwarded to the Vice-President for Student Affairs. Resolution of waivers and refunds for room and board charges should be arranged through the Vice-President for Administration.

Teacher Certification Program Fees

Students enrolling in the apprenticeship or the internship plan are charged a \$100 registration fee for each semester; an additional \$25 registration fee (paid to the Office of Continuing Studies) is charged for each summer session.

Delinquent Accounts

No student in arrears in any financial obligation to Rice University as of the date announced for the completion of registration for any semester can be registered. No certificate of attendance, diploma, or transcript of credit is issued at any time for a student whose account is in arrears.

Students who have not made satisfactory arrangements with the Cashier for payment of current charges or have moved on campus without executing a satisfactory room contract may be discharged from the University.

Transcripts

Transcripts are issued on written request made to the Office of the Registrar. No transcript is issued without consent of the individual whose record is concerned. There is a charge of \$1 for each copy, payable in advance. Those requesting transcripts by mail should include payment with the request.

Living Expenses

Residence fees, to cover costs of dining halls and operation of residences, are established from year to year as requirements dictate. For 1989-90, the yearly Room and Board charge for residence in a residential college is \$4,375. This charge provides room and all the meals eaten during the year for most students. All meals are priced on an a la carte basis. Food Service provides 3 meals per day Monday through Friday and continental breakfast and brunch on Saturday and Sunday. Meals are not served during the Thanksgiving holidays, mid-year, fall, and spring mid-term recesses, and spring holidays. Information on optional meal plans is available from the College Food Service. When securing room assignments for the academic year to follow, each student is required to sign a lease agreement. To assure reservation of space, current students must sign a lease by the date established in the various colleges, but no later than April 15. New students are required to make a \$50 deposit prior to May 1. These deposits are not returnable, but are applied against the following semester's charges. The balance of the residence fee is payable in installments. The exact amounts and due dates are stated in the Residential Lease Agreement that each on-campus resident is required to sign.

Students terminating their residence for any reason shall be entitled to a refund or credit of the unspent reduced balance of board charges, but are held responsible for payment of the room charge for the entire academic year. Exceptions to the room charge payment (example: academic suspension, Rice sponsored study abroad, and family emergencies) will be dealt with on a case by case basis.

Financial Aid

The financial aid program at Rice University provides assistance to meet the costs of attendance for all students who are admitted and demonstrate computed financial need. Through grants, low interest loans, campus work opportunities, or a combination of these programs, Rice attempts to give the students sufficient aid to meet educational expenses.

The financial aid program is funded from many sources. Rice University receives contributions from alumni and friends; these funds are used to initiate and maintain scholarships and loan funds. Federal programs, both grant and loan, the state grant program, and the Rice University tuition grant also provide funds. Awards are based primarily on financial need.

The University publishes budgets that realistically summarize student expenses including living costs at home and on- or off-campus, personal expenses and necessary travel.

Parents are expected to contribute according to their means, taking into account their income, assets, number of dependents, and other relevant factors. Students themselves are expected to contribute from their own assets and earnings, including appropriate borrowing against future earnings.

A brochure entitled *Financial Aid at Rice University* explains the program of assistance in detail. Students may secure a copy from the Office of Admission or the Office of Financial Aid. The determination of need is based on information supplied through the College Scholarship Service. Need is defined as the amount required to meet the difference between the student's total educational expenses and the family's resources.

Application

To apply for financial assistance, the candidate must file a Rice University financial aid application with the University as well as the Financial Aid Form (FAF) with the College Scholarship Service. When Rice University receives both forms, the applicant is considered for all appropriate assistance administered by the University including grants, scholarships, loans, and work. Tax forms will also be required.

Early decision candidates may obtain the Early Version Financial Aid Form from Rice University. In order to receive notification of awards at the same time as notification of admission, this form and the application for financial aid must be filed by November 15. Interim Decision candidates must file the Rice University financial aid application and the Financial Aid Form by February 1, and Regular

Decision candidates must file both forms by March 1 in order to receive notification of awards at the same time as notification of admission. Forms filed after these dates will be considered as received. Deadline for new students is June 1.

Financial aid awards are made on an annual basis and are payable as indicated on the award letter.

Since financial circumstances change from year to year, annual review and adjustment of need and awards is necessary. Therefore, continuing students must file the Rice University financial aid application with the University and the Financial Aid Form with the College Scholarship Service by June 1 (December 1 for second semester only) every year in which they desire assistance.

Financing

Meeting the costs of higher education in a private university may be difficult even though the usual financial analysis indicates no need for financial aid. It is understood that even though a family's financial situation may be adequate to afford the cost of tuition, fees, and room and board without financial aid, payment of relatively large sums at stated times may require rearrangement of family planning that results in hardships or sacrifice. Rice University offers two payment plans to permit financing of educational costs. Both require low interest charges.

A deferred payment plan permits the payment of each semester's charges to be divided over four payments. Arrangements are made through the Cashier's Office. Applications and details are available each semester at the time of billing.

Longer term financing is available to eligible students through the Parent Loans for Undergraduate Students (PLUS) program. Applications are available in the Rice University Office of Financial Aid, and Rice will arrange processing if needed.

Satisfactory Progress Policy for Financial Aid Recipients

The Higher Education Act of 1965, as amended by Congress in 1980, mandates that institutions of higher education maintain minimum standards of "satisfactory progress" in order for students to receive financial aid.

Policy for Undergraduate Students

1. Financial Aid Probation. A student is placed on financial aid probation if at the end of any semester: (a) the student has a cumulative grade point average less than 1.67, or (b) the student's grade point average for that semester is less than 1.67. The period of probation extends to the end of the next semester in which the student is enrolled at the University.

2. Financial Aid Ineligibility. A student is ineligible for financial aid if at the end of any semester: (a) the student earns grades that would result in financial aid probation a third time, or (b) the student earns a grade point average less than 1.00 for that semester, except for students completing their first semester at Rice.

3. Reinstatement of Financial Aid Eligibility. The period of financial aid eligibility is normally at least one semester. To regain eligibility, the student must address a letter of petition to the Committee on Student Financial Aid following the same instructions which apply to the readmission of suspended students as

written in the Rice University *General Announcements*. Suspended students readmitted by the Committee on Examinations and Standing need not petition the Committee on Student Financial Aid if the conditions in Section 5 have been met.

4. Requirements for Students Regaining Financial Aid Eligibility. A student regaining financial aid eligibility will again become ineligible if in any succeeding semester he/she fails to achieve either: (a) a cumulative and semester grade point average of at least 1.67, or (b) a semester average of at least 2.00. Ineligibility a second time will result in at least two semesters without aid. Normally a student will not again receive aid after a third ineligibility.

5. Maximum Time Frame to Complete Educational Objective. Undergraduate students are eligible to receive financial aid for 10 semesters (except Rice Tuition Grant — see Section “C” of “Rice University — Financial Aid Policies and Procedures”). All semesters for which a student has a transcript in the Registrar’s Office are counted in the 10 semester limitation even if no financial aid was received. To make normal satisfactory progress, a student must earn a minimum of 18 semester hours credit by the end of the first academic year, 44 semester hours credit by the end of the second year, 70 semester hours credit by the end of the third year, and 96 semester hours credit by the end of the fourth year. A student who is ineligible because of insufficient semester hours credit may be considered eligible for aid only when enough credits, including incomplete courses, have been completed to make up the credit shortage. The academic year commences with the first day of classes of the fall semester and continues to the first day of classes the following fall.

Policy for Graduate Students

Satisfactory academic progress will be determined by the student’s department at the end of each academic year but the student must have at least a 2.33 cumulative GPA.

Notification for All Students

The Office of Financial Aid will notify, by letter, any student qualifying for financial assistance who does not meet minimum satisfactory progress and who is being terminated from aid. Following the fall semester, notices are considered delivered when sent to the colleges of undergraduate students and to the departments of graduate students. Following the spring semester, notices will be sent to the most recent permanent address provided to the Registrar by the student and are considered delivered.

Appeals for All Students

Any student deemed ineligible for financial aid due to lack of satisfactory progress has the opportunity to appeal such action to the Committee on Student Financial Aid. Appeals must be made in writing to the Chairman of the Committee. Mitigating circumstances will be considered.

Student Loan Funds

Perkins Loans (formerly NDSL) are awarded by the Office of Financial Aid to help meet the self-help portion of aid under Rice University packaging policy.

A few endowments have been established for student loans primarily as memorial tributes. These funds are in addition to the normal financial aid program. They are used for emergency loans to students who experience unexpected financial problems during a term or for a student who shows additional need beyond regular eligibility.

Karl Bailey-William Carroll Memorial Loan Fund

Frank McFadden Caldwell Loan Fund

Louise Adele Drenkle Loan Fund

Mary Alice Elliott Loan Fund

Gulf Oil Educational Foundation Loan Fund

Houston Bridge League Loan Fund

Benjamin S. Lindsey and Veola Noble Lindsey Memorial Loan Fund

Lora B. Peck Loan Fund

Rice Institute Loan Fund

Students Memorial Loan Fund

Owen Wister Literary Society Alumnae Loan Fund

Student Employment

Employment is available to students interested in working part time during the academic year. These work opportunities are available both on campus and off campus. Students seeking employment should apply directly to the Financial Aid Office.

Vocational Rehabilitation

The Texas Rehabilitation Commission offers assistance for tuition and nonrefundable fees to students who have certain disabling conditions if their vocational objectives have been approved by a TRC counselor. Examples of such conditions are orthopedic deformities, emotional disorders, diabetes, epilepsy, and heart conditions. Other services are also available to assist the handicapped student in becoming employable. Application for such service should be made at the Texas Rehabilitation Commission. Students with visual handicaps should contact the Texas State Commission for the Blind.

Undergraduate Scholarships and Awards

Alumni and friends of Rice University have generously endowed many awards and scholarships, some of which are given strictly on the basis of entrance qualifications or performance at Rice. Students do not make separate application

for these awards since every admitted or attending student is eligible for consideration.

Continuing students who completed a minimum of 30 semester hours for credit in the previous year are automatically considered for such awards. Students who spend a semester abroad on an approved program are considered if they completed a minimum of 15 semester hours for credit during the semester at Rice.

For other awards, demonstrated need is an additional factor and evidence of need must be submitted to the Office of Financial Aid. Some awards may have additional criteria.

Further information concerning the donors is available from the Office of Financial Aid, the Office of the Vice-President for Student Affairs, or the Office of Admission.

General Awards and Scholarships

I. Administered Through the Office of Financial Aid

Joe L. and Barbara Allbritton Scholarship
 Florrie Ethel and M. E. Andrews Scholarship
 Robert and Elaine Andrews Scholarship
 Max Autrey Memorial Scholarship
 Axson Club, Ellen Axson Wilson Scholarship
 Axson Club, Katie B. Howard Scholarship
 Axson Club, Special Scholarship Honoring Mrs. A. S. Foote
 Axson Club, Pauline M. Crouch Scholarship
 Axson Club, Elanor Trotter Huddleston Scholarship
 R. C. Baker Foundation Scholarship
 James Foulds Barbour Scholarship
 Eric and Arabella Beall Scholarship
 H. Leroy Bell Scholarship
 Mr. and Mrs. Val T. Billups Scholarship
 Beverly and Donald Bonham Scholarship
 Weldon Brigance Scholarship
 Fletabel Denton Briggs Memorial Scholarships
 Harriana Butler Scholarship
 Clyde and Ethel Butcher Scholarship
 George Alva Chatfield Scholarship
 Class of 1921 Scholarship
 Class of 1929 Scholarship
 Class of 1930 Scholarship
 Class of 1931 Scholarship
 Class of 1932 Scholarship
 Class of 1933 Scholarship
 Class of 1934 Scholarship
 Class of 1935 Scholarship
 Class of 1936 Scholarship
 Class of 1937 Scholarship
 Class of 1938 Scholarship
 Class of 1939 Scholarship
 College Bowl Champions Scholarship

Arthur B. Cohn Scholarship
 William Arthur Combs Scholarship
 Millie Tutt Cook Scholarship
 John W. Cox Research Fund for Scholarships and Fellowships in
 Bioengineering and Biosciences
 Kenneth Wallace Cunningham Scholarship
 Daughters of the American Revolution, John McKnitt Alexander
 Scholarship
 Daughters of the American Revolution, Fannie Bess Emery
 Montgomery Scholarship
 Daughters of the American Revolution, Lady Washington Texas
 Centennial Award
 Decade 1975 Scholarship
 Decade 1976 Scholarship
 Thomas A. and Pauline M. Dickson Scholarship
 Thomas P. and Maude Seeger Dow Scholarships
 C. A. Dwyer Scholarship
 Epoch Matching Funds
 Farmer's Insurance Group Scholarship
 Thomas Flaxman Scholarship
 Thomas R. and Julia H. Franklin Scholarships
 Joe Gallegly Scholarship
 General University Scholarship Fund
 Glasscock Scholarship
 Richard L. Grider Scholarship
 Lionel B. Hohenthal Scholarships
 Mercer T. Ingram Scholarship
 Interfaith Charities Scholarship
 Meredith H. James Scholarship
 Alfred R. and Eleanor H. Johnson Scholarship
 Grant William Jordan and Cora Jordan Memorial Scholarships
 John T. King Scholarship
 Julia Merle and Roy Lay Scholarship
 A. C. Lederer, Jr. Scholarship
 Patrons of E. L. Lester and Company Scholarship
 Daniel B. and Mary H. Lovejoy Scholarship
 Genevieve Parkhill Lykes Scholarship
 J. Everett McAshan Scholarship
 Margaret Brokaw McCann Scholarship
 John Charlton McCoy, Jr. Scholarship
 Michael Vincent McEnany Award
 Emma S. McGree Scholarships
 Bayliss McInnis and Family Scholarship
 James G. and Alberta Matteson McMurtry Scholarship
 Franklin G. and Harriet Chelgren Meck Scholarship
 Achille and Malline Meyer Memorial Scholarship
 John and Harriet Millington Scholarship
 Frances Black and Raymond Moers Scholarship
 Elizabeth Morford Scholarship
 Berney L. Morgan Scholarship

Motheral-Neilan Scholarship
 Ida R. and Hanna E. Nussbaum Scholarship
 Rebecca Raphael and Lily G. Nussbaum Scholarship
 Charles Breckenridge Parkhill Scholarship
 J. H. Pearlstone Memorial Scholarship
 Raymond Pearson Scholarship
 Elsie Rachlin Scholarship
 Emanuel and Mose Raphael Scholarship
 Robert H. Ray Memorial Scholarships
 Ernest R. Rechel Memorial Scholarships
 William J. Reckling Memorial Scholarship
 Randy T. Reese Memorial Scholarship
 Mrs. L. A. Richardson Scholarships
 Edith Ripley Scholarship
 Duane Rivers Scholarship in Chemical Engineering
 James M. and Sarah Rockwell Scholarships
 Pamela Davis Rogers Scholarship
 Catherine Withers Roper and Benjamin E. Roper Memorial Scholarship
 Willie Rowell and Ruth Andrews Scholarship
 David Miller Rulfs, Jr. Scholarship
 Anita and Campbell Sewall Scholarship
 Evelyn Slomovitz Memorial Scholarship
 Society of Rice University Women Scholarship
 Southland Paper Mills Foundation Scholarship
 Sara Stratford Scholarship
 Nola McCarty Symms Scholarship
 Hope Pierce Tartt Scholarship
 Beth Turner Scholarship
 USX Foundation Scholarship
 Herschel M. Vaughan Student Scholarship
 John B. Warren, Jr. Scholarship
 Abe and Rae Weingarten Scholarship
 Harris Weingarten Scholarship
 Elizabeth Aldridge Wells Scholarship

II. Administered Through the Office of Admission

Astronaut Fund
 Eric and Arabella Beall Scholarship
 Board of Governors Scholarships
 Beverly and Donald Bonham Scholarship
 Class of 1921 Scholarship
 Class of 1929 Scholarship
 Class of 1930 Scholarship
 Class of 1931 Scholarship
 Class of 1932 Scholarship
 Class of 1933 Scholarship
 Class of 1934 Scholarship
 Class of 1935 Scholarship
 Class of 1936 Scholarship
 Class of 1937 Scholarship

Class of 1938 Scholarship
 Class of 1939 Scholarship
 College Bowl Champions Scholarship
 Decade 1975 Scholarship
 Decade 1976 Scholarship
 C. A. Dwyer Scholarship
 George Foundation Scholarship
 Richard L. Grider Scholarship
 Honors Scholarship for Minorities
 Meredith H. James Scholarship
 Leadership Award for Minorities
 J.L.C. McFaddin Scholarship
 W.P.H. McFaddin Scholarship
 Bayliss McInnis and Family Scholarship
 James G. and Alberta Matteson McMurtry Scholarship
 Franklin G. and Harriet Chelgren Meck Scholarship
 Gilbert A. Metz, Jr. Scholarship
 Elizabeth Morford Scholarship
 Motheral-Neilan Scholarship
 J. H. Pearlstone Memorial Scholarship
 Presidential Scholarship for Minorities
 Robert H. Ray Memorial Scholarship
 Randy T. Reese Memorial Scholarship
 Rice Sponsored National Merit Scholarships and National Achievement Scholarships
 William Marsh Rice Scholarships
 Pamela Davis Rogers Scholarship
 Volney J. Rose Scholarship
 The Roy Scholarships
 Lee Sharrar Scholarship
 Evelyn Slomovitz Memorial Scholarship
 Southland Paper Mills Foundation Scholarship
 James U. and Margot Teague Scholarship
 Beth Turner Scholarship
 USX Foundation Scholarship
 University Scholars Scholarship
 University Scholarship for Minorities
 Charles K. and Maidie Autry Wilbanks Student Fund

III. Administered Through the Office of the Vice-President for Student Affairs

Samuel S. Ashe Scholarship
 Graham Baker Studentship
 James A. and Alice Graham Baker Distinguished Scholar
 James A. and Alice Graham Baker Honor Scholars
 Board of Governors Scholarships
 Chapman-Bryan Memorial Scholarship
 Barbara Long Chilton Scholarship
 College Women's Club Scholarship
 Edith Jo Leeseman Dissinger Scholarship
 James H. Durbin Scholarship

T.C. Edwards Scholarship
 Mary Parker Gieseke Scholar
 Richard P. Goodwin Scholarship
 Annette Schreiber Hill and William Bruce Hill Scholarship
 Gaylord Johnson Scholars
 Mason G. Lockwood Engineering Scholarship
 The Lottman Scholarships
 Hope and Byron Meredith Scholarship
 Torkild Rieber Award
 Daniel Ripley Scholars
 Carl A. Robertus and Ellen J. Robertus Scholarship in Science
 The Roy Scholarships
 Richard Steed Scholarships
 Seldon D. and Virginia H. Steed Scholarship
 Blanche White Honor Scholars
 Willoughby C. Williams Scholarship

IV. Miscellaneous

Paul Frederick Bobb Award
 Tom Crumpton Memorial Award
 Susan T. Scanlon Scholarship
 Jameson Fellowship

Awards and Scholarships in Departmental Disciplines

Architecture

Alpha Rho Chi Award in Architecture
 American Institute of Architects School Medals
 AIA/AIAF Scholarship
 Edward B. Arrants Award in Architecture
 Rosemary Watkin Barrick Traveling Fellowship
 James H. Chillman, Jr., Prizes
 John Crowder Memorial Scholarship
 William D. Darden Medal
 M. N. Davidson Fellowships
 Featherlite Scholarship in Architecture
 Margaret Everson Fossi Traveling Fellowship
 Gensler Scholarship
 Gene Hackerman Scholarship
 Jesse H. Jones Scholarship in Architecture
 Jameson Fellowship
 Roderick M. Jones Scholarship
 McGinty Scholarship Fund
 Morris R. Pitman Award
 Louis Sudler Prize in the Arts
 Texas Architectural Foundation Awards
 William Ward Watkin Traveling Fellowship

Art and Art History

Art Supply Award
Kyriakouli Bitzes Scholarship
Jameson Fellowship
Mavis C. Pitman Memorial Prize in Art
Christine Croneis Sayres Memorial Art Award
Louis Sudler Prize in the Arts
Texas Art Supply Company Award

Athletics (Honorary Awards)

George R. Brown Football Awards
Emmett Brunson Award
Tom Crumpton Award
Walter W. Fondren, Jr., Memorial Scholarship
Gene Hackerman Award
Catherine Hannah Award
Joyce Pounds Hardy Award
Kay Pearson Keating Award
Eva Jean Lee Award
Joe F. Lipscomb Freshman Award
George Martin Award
T. S. Martino Scholarship
Harry W. McCormick Scholarship
Dell Morgan Award
Jess Neely Football Awards
Neely-Davis Scholarships
John Plumbley Memorial Award
Hally Beth Poindexter Award
Robert Pilcher Quin Award
"R" Association Award
Hugh C. Welsh Scholarship
Billy Wohn Award
also
Bing Crosby Loan Fund

Bioengineering and Bioscience

John W. Cox Research Fund for Scholarship and Fellowships in Bioengineering and Biosciences

Chemistry

Z. W. Salsburg Memorial Awards

Drama/Theater/English

Barbara L. Chilton Scholarship
Susan T. Scanlon Scholarship

Economics

Blanche Randall Haden Scholarship
 Omicrom Delta Epsilon Economics Essay Prize
 Wall Street Journal Student Achievement Award

Education

Donald I. Wood Award

Engineering

Herbert Allen Merit Award
 American Institute of Chemical Engineers, South Texas Section, Scholarship
 R. C. Baker Foundation Scholarships
 George R. Brown Scholarship
 Brown Scholarships in Engineering
 Harriana Butler Scholarship
 Alan Chapman Scholarship in Engineering
 Gerard A. Dobelman Memorial Scholarship
 Steven G. Dobelman Memorial Scholarship
 Albert Fanestiel Scholarship
 Gulf Foundation Scholarship
 Lillian Haynie Scholarship
 Houston Engineering and Scientific Society Scholarship
 Paul N. Howeli Annual Award in Chemical Engineering
 Charles Francis Cyrus Johnson Scholarship
 Jacobs Engineering Group, Inc., Scholarship
 A. C. Lederer, Jr., Scholarship in Civil Engineering
 Paul Alois Lederer Scholarship in Civil Engineering
 Mason G. Lockwood Engineering Scholarship
 Lottman Scholarship
 McDermott Incorporated Scholarship
 Gilbert A. Metz Scholarship in Mechanical Engineering
 W. L. Moody, Jr., Scholarships in Engineering
 Thomas W. Moore Scholarship in Chemical Engineering
 NL Industries Scholarship
 National Action Council for Minorities in Engineering
 National Society of Professional Engineers Scholarship
 Oshman Scholarships for Women in Engineering
 Rice Engineering Alumni Outstanding Engineering Student Awards
 Hershel M. Rich Invention Award
 Duane M. Rivers Scholarship in Engineering
 Shell Incentive Funds Scholarship
 Mr. and Mrs. Samuel T. Sikes Scholarship in Mechanical Engineering
 Samuel T. Sikes, Jr., Scholarship in Engineering
 James Redding Sims Scholarship in Civil Engineering
 Randy T. Reese Memorial Scholarship
 Sohio Scholarship
 Texaco Scholarship
 USX Foundation Scholarship

Louis J. Walsh Scholarships/Fellowships in Engineering
James S. Waters Creativity Award

English

Genevieve Parkhill Lykes Scholarship

French

Alliance Francoise Scholarship
Clyde Ferguson Bull Traveling Fellowship
Pi Delta Phi André Bourgeois Award
William J. Reckling Memorial Scholarship

Geology and Geophysics

Chevron Scholarship
Houston Geological Society Outstanding Scholar Award
Eugene A. Merten Memorial Award
Torkild Rieber Award
Torkild Rieber Scholarship
W.A. Tarr Certificate
Sam P. Worden Award

German and Slavic Studies

Max Freund Prize in German
Dr. and Mrs. Mitchel Fellowship for German and Russian
Language Study Abroad

History

Kyriakouli Bitzes Scholarship
Mary Hayes Ewing Publication Prize in Southern History
Jameson Fellowship
Barbara Field Kennedy Prize in American History
Clifford Lefton Lawrence Award in British History
Captain Charles Septimus Longcope Award
Susie Smith Vandiver Scholarship
Willoughby C. Williams Scholarship

Human Performance and Health Sciences

G. L. Hermance Award in Physical Education
Jill Pitman Jones Award

Managerial Studies

H. Russell Pitman Award in Managerial Studies
Transco Energy Company Scholarships
Wall Street Journal Student Achievement Award

Mathematics

Willoughby C. Williams Scholarship

Military Science

American Legion for General Military Excellence Awards

American Legion/Andrew Jackson Memorial Award

Houston Chamber of Commerce Military Affairs Committee Award

Armed Forces Communications and Electronics Association Award

Reserve Officer Association Award Scholarship

Society of American Military Engineers Award

Society of American Military Engineers William S. Bailey Scholarship

Sons of the American Revolution Scholarship

Music

Denson Endowed Scholarship for Percussion

Elva Kalb Dumas Prize in Music

Lillian H. Duncan Prize in Piano

Frederick Royal Gibbons Memorial Award

William E. and Elva F. Gordon Scholarship

Erwin and Emily Heinen Prize in Music

Mary Root Kirkland Prize in Voice

Gwendolyn Jaster Lederer Scholarship in Piano

Larry J. Livingston Prize in Violin

Bertha Mallard Scholarship for Music Composition

Dr. Joseph A. and Ida Kirkland Mullen Scholarships

Sallie Shepherd Perkins Prize in Music

Burt Duke Raiza Prize in Piano

Shepherd Society Awards and Scholarships

Dorothy Richard Starling Scholarships in Violin

Naval Science

American Defense Preparedness Association Scholarship (ADPA)

Armed Forces Communications and Electronics Association Awards

Chief of Naval Education and Training Scholarship (CNET)

Distinguished Naval Graduate Award

Mary Henry Gibson Scholarship

Jesse H. Jones Naval Scholarships

Commander F.C. Johnson Award

Military Affairs Committee, Houston Chamber of Commerce Award

Navy League Award

Reserve Officers Association Award

C. Grady Smith Memorial Award

Society of American Military Engineers Award

Texas Society — Sons of the American Revolution Award

United Services Automobile Association Scholarship Award

United States Naval Academy Alumni Association Award

Philosophy

Jacob and Babette Atlas Prize in Moral Philosophy
Frank Moser and Professor R.A. Tsanoff Scholarship
Hilda Atlas Rich Scholarship
Tsanoff Undergraduate Essay Prizes

Physics

Claude W. Heaps Prize in Physics

Political Science

Charles Breckenridge Parkhill Scholarship in Political Science

Religious Studies

Aparicio Prize
Edith Jo Leeseman Dissinger Scholarship

Rice Institute for Policy Analysis

Shell Scholar in Public Policy

Sociology

Walter and Helen Hall Prize
Weber-Durkheim Prize for Excellence in Sociology

Spanish, Portuguese, and Classics

Barzan Scholarship for Summer Study Abroad
Ruth Lee Kennedy Fellowship for Studies in the Golden Age of Spanish Literature
Sacks Scholarship for Summer Study Abroad
Summer Program in Spain Scholarship
Tsanoff Scholarship for Summer Study Abroad
Robert Wells Scholarship for Summer Study Abroad

College Awards (Some Honorary)

Marie Alexander Leadership Award
Athenian Awards
Donald R. Baker Scholarships
H. E. Bray Freshman Award
Franz and Frances Brotzen Award
J. Dennis Huston Sports Award
Jones College Scholarships
Jones Master and President Award
Leeds Award for Excellence in Scholarship
John E. Parish Fellowship
Richardson College Master's Award for Excellence in Scholarship
Z. W. Salsburg Award

Jackie Schnell Memorial Scholarship
 Graham C. Stebbings College Service Award
 Corrinne and Radoslav Tsanoff Sophomore and Junior Prizes
 Harry Carothers and Olga Keith Wiess Scholarship
 Olga Keith Wiess Award

In addition to the above awards, Rice is invited to nominate students for several scholarships and fellowships which provide funds for foreign study and travel or later graduate work. Final selections for these awards are made nationally or regionally.

Edwin, Frederick, and Walter Beinecke Memorial Scholarship
 Churchill Scholarships
 Danforth Fellowships Fulbright-Hays Scholarships
 Latin American Scholarship Program of American Universities, Inc. (LASPAU)
 Scholarships
 Henry Luce Scholarships
 Marshall Scholarships (British)
 Rhodes Scholarship (British)
 Harry S. Truman Scholarships
 Thomas J. Watson Fellowships
 Woodrow Wilson Doctoral Dissertation Fellowship in Women's Studies
 Zonta International Amelia Earhart Aerospace Award

Honor Societies

The Phi Beta Kappa society was founded in 1776 at the College of William and Mary for the purpose of recognizing intellectual achievement and the love of learning among students in the liberal arts and sciences. The Rice University chapter was formally installed on March 1, 1929.

Phi Lambda Upsilon, an honorary chemical society, promotes high scholarship and original investigation in all branches of pure and applied chemistry. The Rice chapter was installed in 1927.

The Pi Delta Phi society, organized to interest students of French in competing for high standing in scholarship, authorized in May 1930 the formation of the Theta chapter of Rice.

The Society of Sigma Xi, for the promotion of research in science, established the Beta of Texas chapter at Rice on March 23, 1938.

The Tau Beta Pi Association, organized to interest engineering students in competing for high standing in scholarship, created the Gamma of Texas chapter at the University on December 18, 1940.

Delta Phi Alpha was founded to promote an interest in the German language and literature. The National Council authorized the Gamma Xi Chapter at Rice in April 1949.

Sigma Delta Pi was founded to promote an interest in the Spanish language and literature. The Rice University chapter was installed on May 14, 1953.

Tau Sigma Delta is a national honor society in architecture and applied arts. The Tau Chapter was established at Rice on May 7, 1961.

Eta Kappa Nu was founded in 1904 at the University of Illinois for electrical engineering students. The purpose was not just to stimulate and reward scholarship, but to assist and encourage its members to grow professionally throughout their entire lives. The Rice chapter was installed January 1981.

Omicron Delta Epsilon was founded to promote study in economics. The Rice University chapter was established in 1981.

Student Life

Student Responsibility

Each Rice student is expected to observe standards of conduct consistent with respect for the law, the fulfillment of contractual obligations, consideration for the rights of others, and a high level of personal integrity. Though the University does not intend to supervise the personal lives of its students, all members of the University community should be aware that their behavior both on and off campus will reflect on the University.

The student government, the judicial system, and the honor system depend on a willing exercise of responsibility and honor on the part of everyone.

The University reserves the right to require the withdrawal of any student whose conduct may be judged clearly detrimental to the best interests of either the student or the University. Such action is taken only after careful consideration by the appropriate branches of the student government and/or the faculty and administration.

No individual or group may use the name of the University or one of its colleges without prior approval of the University and the college.

The Honor System

One of the oldest and proudest traditions at Rice is an honor system administered by a student Honor Council whose members are elected annually by the student body. Adopted by a vote of the student body in 1916, the system has remained essentially unchanged except for changes in the procedures and membership of the Honor Council.

All written examinations and any specifically designated assignments are conducted under the honor code. The student body, through its commitment to the honor system, accepts responsibility for assuring the validity of all examinations and assignments conducted under the system. The Honor Council is responsible for investigation of all reported violations and for trial in those cases when the facts warrant. The Proctor reviews the results of investigations and trials and acts upon recommendations for penalties. The Honor Council conducts a continuing program to orient new students and faculty to the responsibilities and privileges of the system.

Residential Colleges

Every undergraduate student, whether living on campus or not, is a member of one of eight residential colleges, all of which are coeducational.

Each college has a faculty master who occupies a house adjacent to the college. The master, whose authority derives from the president of the University, has overall responsibility for all aspects of student life in the college. He or she is especially responsible for encouraging broad cultural and intellectual interests and for promoting self-discipline and effective self-government within the college. Other members of the faculty are invited, upon agreement of the student members and the master, to become resident and non-resident associates of the college. Faculty associates act as advisers to the members and participate in the camaraderie and activities of the college. Colleges also have nonfaculty university associates and community associates from the Houston area, drawn from various professions.

Each college is a self-governing group of students whose elected officers and representatives are responsible to the master and to the college membership for directing a variety of cultural, social, and athletic activities, for the appropriate and responsible expenditure of college funds, and for maintaining good order in the college. While uniformity among the colleges has never been sought, and each college has developed its own particular interests and character, all seek to foster fellowship among their members and a mature sense of honor, responsibility, and sound judgment.

Upon acceptance by the University, each undergraduate student is designated a member of one of the colleges. Two students who are entering Rice for the first time may ask to be assigned to the same college but may not designate which college. A new student may request membership in the same college as a close relative. No other choice of college is allowed.

The buildings of each college include a dining hall and living rooms, which are available to both resident and nonresident members, and living quarters for approximately 215 students from all classes of the University, and all academic disciplines. At present, on-campus residential space is available for most of the first-year students who request it, but space is not assured until receipt of formal notification. Continuing students draw for the available space by the priority and lottery system established in each college since the demand exceeds the available space.

The College Food Service provides 19 meals per week, excluding evening meals on Saturday and Sunday. Breakfast and lunch meals are cafeteria service, and dinner is seated, family style. No meals are provided on designated holidays and recesses. Various services provided by the College Food Service for students living in the colleges include: (1) assistance with special diets prescribed by a physician; (2) sack lunches for students who must miss a meal due to a job conflict; (3) sick trays for students when requested by the Student Health service; and (4) alternate menu entree, whenever possible, in accordance with students' religious practices.

College Courses

As one of their important activities, individual colleges sponsor courses and workshops open to all students. College courses are initiated by students in the

colleges during the semester before they are offered. Following approval by the master and faculty associates of the college and by the Vice-President for Student Affairs, they are accepted for academic credit on the same basis as departmental courses and listed by the Registrar each semester during preliminary registration.

College workshops carry no academic credit and do not appear on a student's permanent record. Generally designated for instruction in practical skills, they may meet on a regular schedule throughout the semester or be offered as short courses.

By expanding the course offerings of the departments, college courses promote the academic involvement of the colleges and provide opportunity for interdisciplinary topics of particular interest to students.

Student Government

All undergraduates are members of the Rice Student Association, which is governed through the Student Senate, composed of the president, two vice-presidents, the secretary, treasurer, the eight college presidents, and eight college senators.

Alleged violations of University or college rules are handled in accordance with the University Code of Judicial Procedure. In most cases, original jurisdiction is assigned to student courts, appeal from whose verdict may be made to the college master, the proctor, or the University Review Board as appropriate. Final appeal is to the president of the University. The Honor Council, which is composed entirely of students, administers the honor system and conducts hearings and trials for alleged offenses against it. The University retains ultimate authority in all matters of discipline and over all actions affecting its educational function or the safety and well-being of members of the University community.

The Student Association annually presents two coveted awards, one to a student and one to a faculty or staff member. The Rice Service Award, a memorial to Hugh Scott Cameron, first dean of students at Rice, is awarded to currently enrolled or former members of the Student Association who have rendered distinguished service to the student body. Selection is made by a committee of faculty and students appointed by the association. The Mentor Recognition Award recognizes extraordinary service to the student body by a current member of the faculty or staff.

Student Activities

In addition to the many activities of the residential colleges, various campus-wide organizations and activities give students a wide range of choices for extra-curricular interests. The official publications include the *Thresher*, the student newspaper, the *Campanile*, the university annual; and the *University Blue*, a literary publication. The Rice Program Council sponsors various programs of current interest to the student body as well as social functions. A campus radio station, KTRU, is operated by students on an 18-hour, seven-day-a-week schedule, broadcasting FM stereo.

A large number of student organizations provide for special interests, such as the Black Student Union, the Hispanic Association for Cultural and Educational Revitalization, the Chinese Student Association, Rice Young Democrats, and

Young Republicans. There are sports clubs for sailing, karate, rugby, lacrosse, soccer, etc. A student debate society, a premed society, and a prelaw society serve other student interests.

Many organizations are associated with special academic and professional disciplines, such as foreign language clubs, the Architectural Society, the student affiliates of the American Institute of Architects, the American Chemical Society, and the student branches of the American Institute of Chemical Engineers, the American Institute of Physics, the American Society of Civil Engineers, the American Society of Mechanical Engineers, the Association for Computing Machinery, and the Institute of Electrical and Electronic Engineers.

The Rice Players is an extracurricular theater group composed of Rice students and faculty. The Players present at least four productions each year. Recent productions include: Jean Genet's "The Balcony", Milan Kundera's "Jacques and His Master," Sam Shepard's "Fool for Love", and an original production of "Universified" by Tom Senning, Rice '88. The Players welcome participation by anyone interested in any aspect of theater production or management.

Rice students are affiliated with a number of denominational religious organizations. These include the Baptist Student Union, Canterbury Association, Christian Science Organization, Hillel Society, Lutheran Student Association, Newman Club, Intervarsity Christian Fellowship, and the Wesley Foundation. Many of these clubs are assisted by local clergy, who form the Joint Campus Ministry.

The Student Health Service

The Student Health Service fee, paid annually by undergraduate and graduate students, makes available to students both the Student Health Service and the Rice Counseling and Psychiatric Service. The care and services provided by the Health Service and the Rice Counseling and Psychiatric Service are described in information available from either Service or from the Office of Student Activities.

The Student Health Service is an outpatient primary care clinic located on campus in the north wing of Hanszen College. The clinic is staffed by two physicians and two nurses. Clinic hours are from 8:00 a.m. to 5:00 p.m., Monday-Friday through the undergraduate school year.

After hours and weekend medical care is provided by Park Plaza Hospital. For treatment in the emergency room at Park Plaza Hospital students must identify themselves as members of Rice University by presenting their Rice I.D. cards. Students should also have available medical insurance information. Students will be billed for services provided by Park Plaza. Students are responsible for all medical bills for blood test, X-rays, and physician care outside of the Health Service.

In serious emergencies call the Health Service (University extension x4966 during work hours), Campus Police (x3333), Houston Fire Department (227-2323), Park Plaza Hospital Emergency Room (527-5134).

The Health Service is open from the first day of Orientation Week until the day before Commencement. The Health Service is closed during the Christmas break and Thanksgiving and Easter weekends, but is open during mid-term breaks in the mornings only.

The Health Service provides the following:

1. Primary care for illness and injury with referral to specialist when needed.

2. Maintenance of health record for all students and administration of immunizations.
3. Contraceptive counseling and routine Pap Smears.
4. Administration of allergy injections with serum provided by student after specialist allergy work-up.
5. Physical examinations for employment, transfer to another school, scholarship expeditions.

Confidentiality. The Student Health physician/patient relationship and confidentiality is absolute, except where the individual student may be deemed a significant health risk to other students.

All Rice students are required to have health insurance. Insurance may be purchased through the University at two levels of coverage, described in a brochure that is sent to incoming students each summer. Brochures and applications may also be obtained from the Cashier's Office or the Office of Student Activities. Rice's group coverage will be effective from 12:01 a.m., August 15, 1989, until 12:01 a.m., August 15, 1990. Dependent coverage is also available. If you have other medical insurance, a waiver card showing proof of insurance must be signed and returned to the Cashier's Office by August 15, prior to the beginning of classes, to avoid automatic billing for coverage.

The Rice Counseling and Psychiatric Service, which is staffed in cooperation with the Department of Psychiatry of the Baylor College of Medicine, provides help to students with many types of problems. The health fee includes this service although the Psychiatric Service is independent of the Student Health Service. Consultation and brief psychotherapy are available without additional charge. When it is clear that more prolonged counseling or treatment is necessary, the individual may be referred to a private physician or a clinic at his or her own expense or as covered by health insurance. An appointment may be made directly by a student either by phone or in person at the office of the Service. Provisions have been made for emergency situations that occur outside office hours. The confidential relationship between doctor and patient is carefully maintained as necessary for the effectiveness of the service.

Nonstudent spouses of students, both graduate and undergraduate, may participate in both Health Service and Psychiatric Service if they pay the health fee. The spouse must obtain an ID and have it validated through the Cashier's Office once the Health Service fee has been paid.

Brochures describing the Health Service, Psychiatric Service, and student health insurance are available in the Health Service Office, the Psychiatric Service Office, and in the Office of Student Activities.

The Fondren Library

With a collection of some of 1.4 million volumes, 2 million microforms, and 12,500 current periodical and other serial titles, the Fondren Library is strongly committed to supporting the research and information needs of Rice's students and faculty and it provides extensive resources for advanced study and research. Among the notable research collections are the Menil Collection in art and art history, the Nadler German language and literature collection, as well as strong collections in Austrian history, architecture, engineering, American history,

French literature, and the natural sciences and engineering. Bibliographic access is provided through LIBRIS, the Fondren's automated catalog.

The library is also a depository for United States Government documents and for United States patents, as well as a University affiliate for the U.S. Census data. The Woodson Research Center is the repository of the library's rare books, manuscripts, and University archives. Special collections, including Civil War imprints, Texana, eighteenth century English drama, the papers and scientific library of Sir Julian Huxley, the Anderson Collection on the History of Aeronautics, as well as numerous literary and historical manuscript holdings are available for research at the center. Large microform sets of research materials such as Early American Imprints, papers of a number of United States presidents, and newspapers are also available.

The Fondren's open shelf policy enables patrons to locate materials easily. The reference/collection development librarians provide assistance in the use of library materials and in computer searches of over nine hundred subject databases. Special facilities such as individual study carrels, group study rooms, audiovisual facilities, microform reading carrels, word processing, and photoduplicating equipment are also available in the library.

The Rice Memorial Center — Ley Student Center

The Rice Memorial Center, built through the generosity of friends and alumni, was dedicated on Homecoming weekend in the fall of 1958. The Ley Student Center was added through similar generosity and dedicated in the fall of 1986. The Rice Memorial Chapel is an integral part of the student center complex.

The Center serves as a gathering place for students and the University community, providing a variety of services, offices, and meeting facilities. The Rice Memorial Center houses the Association of Rice Alumni, Career Services Center, Student Activities Office, Minority Affairs Office, the Rice Student Volunteer Program, the Rice Campus Store, Sammy's (snack bar and cafeteria), Willy's Pub and the MOB (Marching Owl Band). The Ley Student Center is the home of the Office of Student Advising, the International Student Office, the Student Association, the Graduate Student Association, KTRU, the *Thresher*, the *Campanile*, the Rice Program council and various other student organizations.

The student center meeting facilities are available to the University community for meetings, parties, dinners, concerts, weddings, and special events. The Grand Hall, Farnsworth Pavilion, Brown Garden, Rayzor Memorial Chapel, Kelley Lounge, Ray Memorial Court, and conference rooms provide a variety of spaces for formal and informal meetings and special events.

Career Services Center

The Career Services Center is a full service career center offering a variety of services to undergraduates, graduate students and alumni of the University. Our services are designed to help everyone in the university community from liberal arts majors to engineers.

Among the center's activities is career counseling for those unable to decide on a career to pursue or explore, and for those who need assistance and direction in the path they have chosen. Career testing is also available for those interested in a more

analytical approach to career decision making. Workshops, career panels, and a number of career fairs are sponsored by the Career Services Center each year to provide information on career areas for students. Details on individual events are publicized throughout the campus and through the *Career News*, a publication of the center.

Located within the Career Services Center is the Career Library. The library has a substantial collection of resources and literature on careers and occupations in many areas, locating and securing employment, summer jobs, company information, and graduate schools. These resources are also helpful in determining areas of career exploration.

Internships may be obtained through the Joint Venture program of the Career Services Center. Internships can be a vital part of a college education and students are encouraged to apply for these opportunities through the center.

A great many representatives from business, industry, and other employing organizations visit the center each year for prospective summer and full-time employees. Students register and schedule interview dates and times through the Center. Listings for full, part-time, and summer jobs are also available in the Career Library.

Office of Minority Affairs

Located in the cloisters of the Rice Memorial Center, the Office of Minority Affairs represents a deliberate, programmatic response to the academic, social and recreational needs of ethnic minority students at Rice. Charged primarily with providing counseling and support, the Office also serves as a reference and resource center with a library of guides and information on graduate schools, jobs, fellowships, internships and other opportunities available to minority students once beyond the Rice community. The Office further serves to oversee cross-cultural programming for the campus, and to promote the education and celebration of issues related to cultural diversity. Programming is designed to enhance the University's efforts to recruit and retain more minority students.

Intercollegiate Athletics

A charter member of the Southwest Athletic Conference and a Division I-A member of the National Collegiate Athletic Association, Rice fields teams in football, basketball, baseball, cross country, indoor and outdoor track, swimming, tennis, and golf for men—and in basketball, volleyball, cross country, indoor and outdoor track, swimming, and tennis for women. Home football games are played in the beautiful 70,000 seat Rice Stadium. Autry Court for basketball and volleyball, Cameron Field for baseball, the Jake Hess Tennis Stadium and the Rice Track Stadium round out a complex of outstanding athletic facilities. Dedicated to the pursuit of high-level athletic goals for true student-athletes, Rice prides itself on its dual goal of excellence in both the academic program and the athletic arena, and refuses to use the rigors of either as an excuse for less than high quality performance in the other.

Intramural Sports

The Department of Human Performance and Health Sciences offers a supervised program of intramural sports for all students, faculty and staff. An individual may participate in individual, dual, and team sports. Any interested students, faculty and staff may form teams for the wide variety of tournaments. A student may compete in the University intramural tournaments and/or represent his/her college in the college team sports tournaments which follow the open tournaments. In the past few years, over 6,000 entries from the student population have participated in 53 tournaments. (Students participate at their own risk.)

Sports Clubs

The Department of Human Performance and Health Sciences administers a Sports Club Program. A sports club is a special interest group organized to engage in and promote interest in a recreational physical activity. Clubs are organized in bowling, cricket, cycling, fencing, lacrosse, martial arts, rugby, soccer, sailing, volleyball, ultimate frisbee, and water polo. These groups are formed to increase individual and team skills through a continuing instructional and competitive program. Club activities are supported by individual contributions, membership dues, University funds, and fund-raising activities. (Students participate at their own risk.)

Student Automobiles

All student vehicles must be registered with the Traffic Division of the Rice University Police Department. Students must park in assigned areas and observe University regulations. Illegally parked or unregistered vehicles are subject to tow away and/or fines assessed by the University. Copies of the University Traffic and Parking Regulations, which detail student privileges and responsibilities, may be obtained from the Traffic Division of the University Police. Students must inform all guests of parking regulations as repeat violators are subject to towaway.

Information Systems

Office of Administrative Computing

The Office has responsibility for coordinating all campus administrative computing activities. The principle systems included are those that support the Comptroller, the Registrar, the Library, and the Development Office.

The Administrative Computing Group helps the administrative departments on campus with their computing needs. The Group manages a Prime 2755-2 for various administrative departments' recordkeeping needs including the Cashier's Office, Financial Aid, Registrar's Office, Admission Office, and Graduate Programs. Administrative Computing can also be contracted to write applications or to help in long-term computing projects on the AS/9000.

Office of Networking and Computing Systems

Networking and Computing Systems designs, builds and operates the Rice campus network, known as Rice Internet, and manages several of the major computational resources attached to it. The Office also provides operational support of the SesquiNet regional network under an arrangement with its sponsors.

The Computer and Network Operations Group monitors the network and selected computer systems to assure their proper operation and maintains the public computer lab facilities supported by Information Systems. Through its Technical Services section, it is responsible for construction of the network. Staffed around the clock, the Operations Center serves as a focal point for reporting problems with the network, its external connections, and facilities managed by Information Systems.

The Network and Systems Support Group evaluates, installs, maintains and, in some cases, creates the software to support networking, network services and the various campus computing systems, including the AS/9000, OwlNet, Research Sun Lab and Rice Advanced Visualization Laboratory. This group provides technical expertise to support the information dissemination and consulting activities of the Office of Computing Information Services and other campus groups.

Office of Computing Information Services

Responsible for the collection and dissemination of computing information on campus, Computing Information Services provides consultation, documentation, training and reference areas to support the computing services required for the scholarly and administrative activities of the university. Environments supported include micro, mainframe/mid-level, and high performance computers and their associated software and access systems. Computing Information Services provides assistance and information for a variety of campus and off campus

computing resources as well as information for purchasing and managing individual and departmental resources. This office also provides feedback and evaluation to providers of computing services.

Computing Information Services manages several microcomputer classrooms and laboratories open to the Rice community and provides overall business and planning services for the Information Systems offices and distributed laboratories.

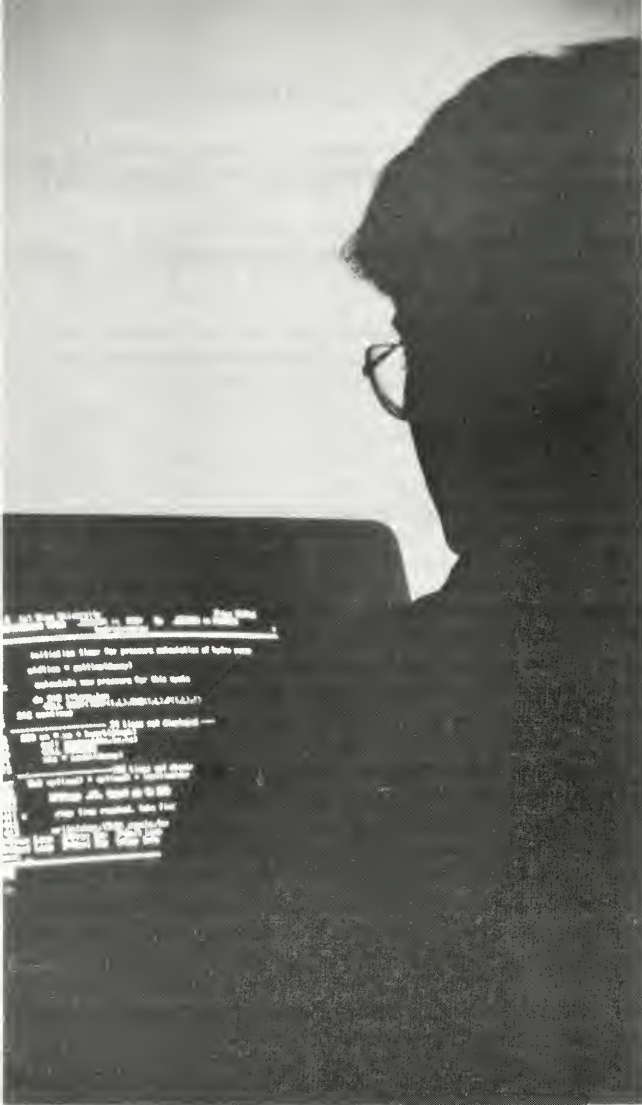
Projects which benefit from campus coordination such as site licenses, discount programs, joint proposals, campus standards, and some investigations into new software, technologies and products are also undertaken in this office.

Campus Computing Labs

- **Mudd Lab** - microcomputer classrooms and labs open to the Rice community. Located in the west wing of the Mudd Building, this laboratory includes software libraries and demonstration materials for Apple Macintosh and IBM PS2 equipment.
- **Center for Scholarship and Information** - a microcomputer classroom and lab located in Fondren Library.
- **Social Science Computer Lab** - a microcomputer lab designed for the support of Social Science faculty, staff, and students located in Sewall Hall.
- **Research Sun Lab** - an experimental lab of Sun workstations for Rice faculty and staff research located in Mudd Lab.
- **Owlnet** - an educational network of the School of Engineering for use by Engineering students. This lab is located in several sites in Engineering.
- **Rice Advanced Visualization Lab** - a lab of high powered computer visualization tools for education and research use located in Architecture in Anderson Hall.

Where to go for Further Information

If you need more information or wish to set up a computing account, stop by the Computing Resource Center (CRC) on the first floor of the Mudd Lab. Consultants are available to answer your computing questions or guide you to additional resources.



Information for
Graduate
Students

Information for Graduate Students

Since the opening of the university in 1912, the importance of graduate study and research as a principal means of advancing knowledge has been recognized. The first Doctor of Philosophy degree was awarded in 1918 in mathematics. Since that time, the graduate area has been expanding through the basic sciences, the humanities, engineering, the social sciences, architecture, music, and administration and includes interdepartmental areas. The number of graduate programs has steadily increased, and advanced degrees are now offered in 33 fields of study.

Graduate programs are of two types, research and professional. Research programs lead to the Doctor of Philosophy, Doctor of Architecture, Master of Arts and Master of Science degrees. Professional programs provide advanced course work in scientific disciplines, but do not generally include independent research. They lead to the degrees of Doctor of Musical Arts, Master in Applied Mathematical Sciences, Master of Accounting, Master of Architecture, Master of Architecture in Urban Design, Master of Arts in Teaching, Master of Business Administration (which includes public and nonprofit management), Master of Chemical Engineering, Master of Civil Engineering, Master of Computer Science, Master of Electrical Engineering, Master of Environmental Engineering, Master of Environmental Science, Master of Materials Science, Master of Mechanical Engineering, Master of Music, and Master of Statistics.

All degrees conferred by the university are awarded solely in recognition of educational attainments, not as warranty of future employment or admission to other programs of higher education.

Research Degrees

The degree of Doctor of Philosophy is awarded for original studies in accounting, anthropology, biochemistry, biology, chemical engineering, chemistry, civil engineering, computer science, economics, electrical and computer engineering, English, environmental science and engineering, French, geology, German, history, linguistics, materials science, mathematical sciences, mathematics, mechanical engineering, philosophy, physics, political science, psychology, religious studies, statistics, space physics and astronomy. In architecture, the equivalent degree is the Doctor of Architecture. These degrees are awarded after successful completion

of a program of advanced study and an original investigation reported in an approved thesis. As final evidence of preparation for this degree, the candidate must pass a public oral examination.

The degree of Master of Arts is available in the various humanities listed above plus art history and Spanish and in scientific fields of study, including the social sciences. The Master of Science degree may be obtained in the fields of chemical, civil, electrical and computer engineering, mechanical engineering, computer science, environmental science and engineering, materials science/engineering, and space physics and astronomy. The Master of Architecture, Master of Architecture in Urban Design, and Master of Music are also offered as research degrees, with a thesis option.

The Master of Arts or Master of Science degree, or the Master of Architecture or Master of Music research degree, may be awarded after completion of at least 30 semester hours of study, including the thesis, 24 of which must be done at Rice. The residency requirement (full-time study at the University) is one semester. Programs generally include original work embodied in a thesis, and the candidate's preparation is evidenced by a public examination. Most students require three or four semesters to complete such a program, although some programs may be longer. In many departments, students may be awarded a master's degree on the basis of achieving candidacy for the doctoral degree. Such an award must be approved prior to April 1 of the year in which the degree is to be awarded.

Foreign language requirements for the master's and doctoral degrees are established by the individual departments according to the need for foreign languages in the conduct of research and scholarship in their respective fields.

Information on candidacy, the oral defense of thesis, and thesis regulations is given under Academic Regulations, beginning on page 84. More specific information about requirements for advanced degrees in each field of study is given under department headings in the section of the catalog which begins on page 148. Additional material may be obtained from the appropriate department chair.

Professional Degrees

Rice University offers several advanced degree programs which prepare students for positions in fields such as accounting, business administration, public and nonprofit management (see accounting and administrative science), architecture, mathematical sciences, computer science, engineering, and secondary education; in some departments, such degrees prepare the student for a doctoral level program. In addition, a non-thesis Doctor of Musical Arts degree is awarded after completion of a program of advanced study and required performances or original compositions. (If the field of emphasis is composition, a major work is presented as a thesis.)

Requirements for these degrees include the successful completion of 30 semester hours or more of advanced courses (numbered 300 or higher). At least 24 of these 30 hours must be taken at Rice. Additional information is presented in this catalog under the departmental listings in the Courses of Instruction section beginning on page 148 and in the Academic Regulations section, beginning on page 84. In each case, application materials are available from the department.

Accounting and Administrative Science

The Jesse H. Jones Graduate School of Administration offers two professional degrees, the Master of Business Administration (which includes a concentration in public and nonprofit management) and the Master of Accounting. Completion of either professional degree program requires two academic years. (Rice undergraduates may complete the Master of Accounting program in one year of graduate study if they have taken a prescribed set of prerequisite courses by the end of their senior year. Please see pp. 72 and 152 for information.) To qualify for either degree, the student must maintain a "B" (3.0) average and may be required to pass a special examination during the last semester in residence. There is no thesis requirement, although there is a thesis option in the Master of Accounting degree.

Applicants must submit scores on the Graduate Management Admission Test (GMAT), all college transcripts, and three letters of recommendation, as well as specified essays. Unless they received an undergraduate degree from a U.S. college or university, foreign nationals whose native language is not English must submit recent scores on the Test of English as a Foreign Language (TOEFL). Admission to the Jones Graduate School is open to undergraduates from Rice and other universities, regardless of undergraduate major, but is highly selective and limited to those who have performed with distinction in their previous academic work and on the GMAT. No specific undergraduate course work is required for admission to either master's degree program. However, undergraduates contemplating graduate work in accounting or administrative science are encouraged to take course work in accounting, microeconomics, and computing. College mathematics through calculus is helpful.

The Jones Graduate School offers an accelerated degree plan, known as the "five-year" plan for highly qualified undergraduates. Under the "five-year" plan, a Rice student may enter the Jones Graduate School at the end of his or her junior year; normally all the undergraduate major requirements must have been completed by that time. Ordinarily, the bachelor's degree is awarded at the end of the fourth year, and the master's degree in accounting or business administration at the end of the fifth year. The application process is the same for a "five-year" applicant as for a regular applicant.

Architecture

Degrees of Master of Architecture and Master of Architecture in Urban Design are offered. Completion of either degree requires two or more academic years. An applicant for admission should write to the Dean of the Rice University School of Architecture for specific information about the program for which the applicant would be qualified by education and experience. Completed application materials include the Rice University Application for Graduate Study form, transcript(s), Graduate Record Examination scores, a portfolio of the applicant's work, and a minimum of three letters of recommendation.

Computer Science

The Master of Computer Science degree requires completion of ten advanced courses approved by the Department of Computer Science, in accordance with

general practices stated under Engineering, below. The program for each student is formulated in consultation with a departmental adviser. The areas of concentration are algorithms, compiler construction, operating systems, and programming languages.

Education

The Master of Arts in Teaching is a professional degree program for students wishing to qualify for secondary school teaching following a liberal undergraduate education. The program normally requires completion of 11 advanced courses with grades of "B" or higher. All courses must be approved by the Department of Education.

Admission requires that the applicant have a bachelor's degree, scholarly ability and motivation, and an interest in teaching at the secondary school level. Each applicant will be expected to take the Aptitude Test of the Graduate Record Examination. Applications are reviewed by members of the Rice University Teacher Education Council. Other requirements for the Master of Arts in Teaching are found in the Department of Education section of the Courses of Instruction listing.

Students in the program are not normally eligible for Rice University Graduate Fellowships or scholarship support since cooperating school districts pay students a salary for internship teaching. However, a limited number of tuition waivers may be available.

Engineering

Non-thesis master's degrees are offered in the branches of engineering listed below. A completed bachelor's degree in a relevant field is required for admission. Candidates are required to complete 30 hours of approved advanced courses (numbered 300 or higher). These advanced courses include at least four at the 500- or 600-level, indicating professional study in depth of a particular area. Courses counting toward these 30 hours may not be taken on a pass/fail basis. The student's major department must approve the overall program, and any departure from these guidelines must be approved in the Graduate Office.

Chemical Engineering. Flexibility in course planning permits specialization in such areas as economics, biochemical engineering, reservoir engineering, process control, optimization and systems analysis, applied mathematics, materials science, kinetics, and catalysis.

Civil Engineering. The area of concentration is structures and mechanics. Some specialization in solid mechanics, geotechnical engineering, or applied mathematics is possible within the structures and mechanics concentration.

Electrical and Computer Engineering. Technical electives permit some specialization in the general areas of bioengineering, communication and control theory, electro-optics and physical electronics, and computer science and engineering.

Environmental Science. Major emphasis of the degree program is in the areas of environmental biology, environmental chemistry and toxicology, surface and ground water hydrology, water pollution control, environmental geology, and environmental planning.

Environmental Engineering. Major emphasis of the degree program is in the areas of hydrology and water resources engineering, water and wastewater treatment design and operation, water pollution control, and numerical modeling.

Materials Science and Engineering. The student takes an approved program of courses in materials science and engineering or related fields plus two appropriate electives. Students may enter this degree program following undergraduate preparation in any of a number of related fields in addition to materials science/engineering.

Mechanical Engineering. Flexibility in course requirements permits specialization in thermal sciences and energy conversion, gas dynamics, hydrodynamics, computer-aided design, stress analysis and mechanical behavior of materials, and aerospace engineering.

Mathematical Sciences

The Master in Applied Mathematical Sciences degree requires satisfactory completion of 30 semester hours of approved course work beyond a bachelor's degree in an appropriate field. Concentrations are possible in numerical analysis, operations research, and physical mathematics. Candidates for admission are evaluated on their previous academic records and their potential for success in and benefit from the professional program.

Music

The Shepherd School offers the Master of Music degree in the following areas: composition, choral and instrumental conducting, historical musicology, performance, and music theory. An audition is required as part of the admission process for instrumental and conducting applicants. Composition majors are required to submit a portfolio of their works, and musicology and theory majors should submit samples of their written work. The Graduate Record Examination (both the Aptitude and Advanced Music Tests) is required of musicology, theory, and composition majors. The faculty of the Shepherd School may determine that additional work at the undergraduate level is needed.

The precise minimum hourly requirements for the Master of Music degree vary from 43 to 57 according to major area. For a description of the requirements for a particular Master of Music degree, write to the Shepherd School of Music, Graduate Admissions.

The Doctor of Musical Arts degree, offered in selected areas, requires 90 hours beyond the bachelor's degree. For further information on the DMA program, write to The Shepherd School of Music, Graduate Admissions.

Statistics

The Master of Statistics degree requires satisfactory completion of ten approved courses. Study is in the fields of applied probability, biomatematics, data analysis, density estimation, epidemiology, image processing, model building, quality control, statistical computing, stochastic processes, time series analysis.

Interdisciplinary and Cooperative Programs

Interdisciplinary Graduate Programs. Opportunities are available for interdisciplinary study in various aspects of systems theory, solid-state electronics, materials science/engineering, and bioengineering. For applications or additional information, contact the chair of one of the participating departments as follows: for systems theory, the Department of Chemical Engineering, Economics, Electrical and Computer Engineering, or Mathematical Sciences; for solid-state electronics and materials science/engineering, Chemistry, Electrical and Computer Engineering, Mechanical Engineering, or Physics; for bioengineering, Chemical Engineering, Electrical Engineering, or Mechanical Engineering.

Joint Graduate Programs with Medical Colleges. Joint programs with the Baylor College of Medicine and the University of Texas Medical School are designed to provide educational experiences of high quality leading to research careers in medicine. These programs lead to joint M.D./Ph.D. or joint M.D./M.A. or M.D./M.S. degrees. Such programs can be worked out individually through various departments.

Joint Graduate Programs in History and Law. This selective program combines graduate work in legal and constitutional history at Rice University with professional work in law at the Bates College of Law, University of Houston, or at the Thurgood Marshall School of Law of Texas Southern University. Students in their first or second year of law school may apply for admission to Rice through their law school. Participants spend one year at Rice in the Master of Arts program concentrating on legal and constitutional history. After completing this year of residence and all requirements for the M.A. except the thesis, the student returns to law school to finish his or her legal studies. During the last year of law school, the student completes a suitable M.A.-level research thesis on a topic in legal and/or constitutional history selected with the approval of the law school instructor and the student's Rice history adviser. The student who completes this program receives a law degree from his or her law school as well as an M.A. in history from Rice.

Joint Graduate Program in Medical Ethics. Under an agreement with the University of Texas Health Science Center at Houston, a cooperative program of graduate study in medical ethics is offered, leading to the M.A. and Ph.D. degrees in religious studies from Rice University. Also, under an agreement with the Baylor College of Medicine and the Institute of Religion, a cooperative program in medical ethics is offered, leading to the M.A. and Ph.D. degrees in philosophy from Rice.

Non-degree Programs

Class III

Students with a "B" (3.0) or better grade average and an undergraduate or graduate degree from an accredited college or university may apply for admission as Class III students to take courses for credit without being admitted to a specific degree program. Permission of instructor (and in some cases, a department) and approval by the Dean of Continuing Studies are required.

Courses taken under this arrangement cannot be used to fulfill the requirements for a degree at Rice unless and until the student has been accepted into a degree program by an academic department (and in the case of graduate students by the Associate Provost), and the department has approved a special request that the Class III course count toward the degree. It is the student's responsibility to ensure that the proper appeals have been obtained. Normally, no more than three courses taken as a Class III student can be applied toward a graduate degree. Class III students cannot take courses on a pass/fail basis.

An application and course request form can be obtained from the Office of Continuing Studies and Special Programs, P.O. Box 1892, Houston, Texas, 77251-1892.

Official transcripts from all colleges and universities attended should be mailed directly from previously attended institutions to the Office of Continuing Studies at Rice. A student who has attended Rice as a Class III student must still complete continuation forms for each semester and submit them by the deadlines. These materials will be sent upon request from the Office of Continuing Studies. Deadlines for all applications are the respective workdays closest to August 1, December 1 and May 15 (Summer School). Applications will not be considered after classes have begun.

The tuition for 1989-90 (subject to change) is \$265 per semester hour; the total tuition not to exceed \$3,050 per semester. In addition, a \$50 application fee is due each semester. All fees are payable during registration, which must be completed by the end of the second week of class. Persons submitting applications not completed by the deadline must pay a late application fee of \$50. This late fee will also be charged continuing Class III students who do not complete continuation forms by the above deadlines. For some courses students may be charged for computer time. If a class is filled with degree students, Class III students may be dropped up to the end of the third week of class. In that case, the tuition (less \$25 of the registration) will be refunded.

Because Class III is not a degree granting program, foreign graduate students enrolled as Class III students cannot receive visas from Rice University. Persons who are B-2 visitors may be ineligible for enrollment as Class III students. A determination will be made by the Dean of Continuing Studies and the Foreign Student Advisor.

Faculty/staff spouses may apply and receive a tuition waiver for undergraduate level courses only; however, they must pay all fees and observe all deadlines.

For an application or for further information, please contact the Office of Continuing Studies and Special Programs at (713) 520-6022 or 527-4803.

Admission to Graduate Study

Graduate study is open to well-qualified students who possess adequate background in the field of study they wish to pursue. Normally, but not always, the equivalent of an undergraduate major in the field is required, but the final judgment of preparation rests with the department concerned. The emphasis is on the quality of the applicant's preparation rather than on the academic program pursued or credits earned in achieving it.

Applicants for admission to graduate study should address all communications to the chair of the appropriate department, who will provide the application form and relevant information about the program. The completed form, with transcript and recommendations, should be returned to the department chair. Scores on the aptitude portion of the Graduate Record Examination (or the Graduate Management Admission Test), and an appropriate advanced test if required by the department, should be sent directly to the admitting department. In order for these scores to be available at the time when admission decisions are normally made, applicants are encouraged to take the GRE by December of the year prior to that for which application is being made. The general application deadline for the following academic year is February 1. However, some departments specify an earlier deadline, and departments may occasionally be able to consider late applications.

Candidates are evaluated on their previous academic records, available test scores, and letters of reference from scholars under whom they have studied. Additional evidence of qualification to pursue advanced study, such as writing samples, portfolios, or statements of purpose, may be required. In addition to any specific requirements of the department, the applicant is expected to have at least a "B" (3.0) average in undergraduate work and high scores on the Graduate Record Examination (or GMAT). Foreign applicants, whose native language is not English, must take the TOEFL test, and are expected to have at least a score of 550. Initial decisions regarding admission or denial are made by departmental committees, which send recommendations to the Office of Graduate Programs for review. Official offers of admission may be made only by the Associate Provost.

Graduate programs at Rice are designed for full-time study, but a limited number of students may be admitted on a part-time basis if the department recommends making such an exception, and if the Associate Provost approves.

Each graduate student is advised by the departmental chair or an officially designated faculty member in planning the initial semester of graduate study. As soon as possible, each student should affiliate with a faculty advisor who will help plan both the course program and the thesis or special report.

Academic Regulations

Residency. The minimum residency (i.e., period of full-time study at Rice) is one semester for the M.A. or M.S., and four semesters for the doctorate.

Leave of Absence. Leave of absence is granted only by the Graduate Office upon the recommendation of the department, and is granted only to graduate students in good standing with the University. Leave must be approved in advance

of the academic semester in question; it will not be granted after the student has registered for courses or after the registration period has passed. Normally, leave of absence is granted for no more than two consecutive semesters. No work toward a degree may be done at Rice or involve Rice faculty (or facilities) during a leave of absence. A reinstatement fee of \$25 is charged upon return from an official leave.

Minimum Registration. Except for Degree 798 ("Degree Candidates Only"), registration in the final semester when all requirements have been completed earlier, the minimum number of hours for which a student may register is three.

Courses of Study. Graduate students may register for courses of study only with the approval of their departmental advisors or chair. Similarly, students are allowed to drop or add courses only if departmental approval has been given.

Full-time Status. Graduate programs at Rice generally require full-time study. The semester course load for full-time students is nine hours or more, as required by the department. Full-time students may accept other employment only with the approval of the department and the Graduate Office. Students who are employed elsewhere for more than 20 hours per week are not normally eligible for full-time status at Rice.

Part-time Study. Part-time students are occasionally admitted by special permission, usually for non-thesis programs only. Departmental recommendation is required. Students enrolling for nine semester hours or more will be considered full-time, and full-time tuition will apply.

Pass/Fail Option. Graduate students may take courses on the pass/fail basis only with departmental approval. All other restrictions regarding the pass/fail option, as stated on page 86, apply equally to graduate students. Class III students may not take courses pass/fail.

Grade Standards. In order to graduate, students must achieve at least a B- (2.67) average on courses counted towards the graduate degree. This is a minimal requirement; some departments have more stringent standards. Grade point averages are computed as shown in the undergraduate section of this catalog, on page 88.

Probationary Status. A graduate student is considered to be on probationary status whenever the cumulative GPA, or the GPA for one semester, falls below 2.33. Some departments may have more stringent standards. In most cases, the student's department will send the student a letter of warning. However, the probationary status applies whether or not such a letter has been issued. A second semester of probationary status will lead to automatic dismissal by the Graduate Office unless a plea for exception is presented by the student's department and approved by the Associate Provost. A student may be dismissed by departmental action after only one semester of performance at the probationary level. (For other causes, see below.)

Dismissal. A graduate student may be dismissed from a program either for reasons of unsatisfactory progress or for reasons of behavior judged by the University to be disruptive or otherwise contrary to the best interest of either the University or the student.

Appeal. Graduate students may petition Graduate Council concerning the application of any academic regulation. Petitions should be addressed to the Chair of the Council, but should be made only when a dispute cannot be resolved at the departmental level.

Calendar Deadlines. Graduate students are expected to observe deadlines, such as for adding and dropping courses, as stated in the academic calendar.

Continuous Enrollment, Readmission. Graduate students are expected to maintain continuous involvement and enrollment, unless official leave of absence has been granted. Failure to register for any period without a leave of absence granted by the Associate Provost constitutes a *de facto* withdrawal. If the student later wishes to resume study, reapplication is required. Readmission is given only on the recommendation of the department and the approval of the Associate Provost. A readmission fee of \$100 is charged.

Departmental Service. In most research degree programs, graduate students are assigned a limited amount of teaching or other departmental service as part of their training. The assignment should not entail more than ten hours per week, averaged over the semester, and will not be required for more than eight semesters.

Approval of Candidacy. A student seeking a master's or doctoral degree must submit a petition through the departmental chair to the Associate Provost. The chair must specify the student's thesis director, certify that the applicant has fulfilled the departmental requirements and provide a transcript or other evidence that the work within the department is of high quality. The final oral examination in defense of thesis can be given only after the candidacy has been approved by the Associate Provost. Applications for approval of candidacy for the doctoral degree must be filed in the Office of Graduate Programs prior to November 1 and for the master's degree prior to March 1 of the academic year in which graduation is expected. The approval is valid for two years for the master's degree and four years for the doctoral degree. A student must have been approved for candidacy for the doctoral degree before the beginning of the ninth semester of residency at Rice to be eligible for continued financial support.

Oral Examinations, Thesis Committees. A committee for the oral examination, known as the thesis committee, is approved by the Associate Provost at the time candidacy is approved. A thesis committee is composed of at least three members, of which two, including the committee chair, must be members of the department. In the case of a doctoral committee one member must be from another department. At least three members, including the chair, must be tenured or tenure-track members of the Rice faculty or must be members previously certified by the Provost. The committee chair need not be the thesis director, but must be tenured or a tenure-track member of the major department.

Candidates are responsible for informing the members of their committee of the nature of the research and its progress; the members of the committee should review and approve the thesis in preliminary form before March 15 in order for the candidate to be eligible to receive the degree in the May commencement. The oral examination may be scheduled at any time after the approval of candidacy, prior to the beginning of examination week in either semester. For the doctoral degree, the examination must be announced in the University Calendar at least one week in advance. In appropriate circumstances, an oral examination for the Ph.D. may be scheduled during the summer, and the posting of notice of the time and place on the bulletin board of Fondren Library the preceding week is acceptable as the public announcement. For the master's degree, public notice of the oral examination should be posted on the departmental bulletin board one week in advance.

The length of the examination and the character of the subject matter on which the candidate will be examined are left to the judgment of the committee. Should the candidate fail, the chair may schedule a second examination. In the event of a second failure, the student is required to withdraw from the University. Following the successful passing of the oral examination in defense of the thesis,

two signed copies of the thesis must be submitted to the Office of Graduate Programs no later than one year from the date of the examination.

Students who pass the oral examination in defense of thesis on or before the first day of classes of the fall semester do not have to register for that semester even though work on the final copy may be continuing. They must register for Degree 798 in the spring in order to receive the degree.

Thesis Regulations and Procedures. The thesis, which is the principal record of work for an advanced degree, will be permanently preserved in the library. Directions for standard thesis form, which must be followed in detail, are provided by the Office of Graduate Programs upon approval of candidacy. Students submitting a dissertation for the Doctor of Philosophy, Doctor of Architecture, or Doctor of Musical Arts degree must fill out a Survey of Earned Doctorates form. All students submitting theses, whether for master's or doctoral degrees, must complete a University Microfilm contract. Fees for the microfilming and binding of the thesis are to be paid to the cashier prior to submission of the two copies for approval. The deadline for submission of the thesis to the Office of Graduate Programs is noon of the next-to-the-last Friday preceding commencement.

Tuition, Fees, and Expenses

Tuition and fees for graduate students given here are for academic year 1989-90 only and are subject to change in subsequent years as the operating expenses of the University change.

Tuition for full-time students enrolled in the graduate division is \$6,100 per year (\$3,050 per semester) for all students through four or six semesters, as indicated below. In addition, each full-time graduate student pays a health service fee of \$142.00 per year (\$71.00 per semester), a Graduate Student Association fee of \$10 (\$5 per semester) and an Honor Council fee of \$1. After six semesters, students continuing any phase of their studies, including work on their dissertation, on or off campus, must be registered and are subject to a tuition fee of \$300 per year (\$150 per semester). Students who are admitted with a relevant master's degree enter the reduced-tuition category after four semesters.

Refer to page 101 for a discussion of health insurance charges.

Continuous involvement and enrollment are expected. Failure to register for any period without a leave of absence granted by the Office of Graduate Studies constitutes withdrawal. A reinstatement fee of \$25 is required upon return after an official leave of absence. A readmission fee of \$100 is required upon return after previous withdrawal or failure to maintain active registration.

The fee for the preceptorship programs in architecture, music, engineering, etc., which involve approved supervised work off campus to be recorded on the student transcript, is \$100 per semester. Tuition for part-time and Class III students is \$265 per semester hour plus \$50 registration fee each semester; total not to exceed \$3,050 for Class III students. Students taking nine hours or more must be considered full-time. No scholarship or fellowship support is available to part-time students.

Graduate students who have fulfilled all requirements for the degree sought, including the thesis and/or final public oral examination, not already registered

under one of the categories above, must be registered in Degree 798, "Requirements complete—registering for degree only" for the spring semester in which the degree is awarded. Tuition is not charged for registration in Degree 798.

For an annual fee of \$35, a graduate student may purchase admittance to all regularly scheduled athletic events. If married, a student may purchase a season ticket for a spouse at a reduced rate of one-half the regular price, provided the season ticket is purchased at the beginning of the fall term.

Fellowships, Scholarships, and Prizes

Memorial Fellowships, Honors, and Prizes. Provision is made for a variety of fellowships, scholarships, and prizes available to graduates of this and other universities. Memorial fellowships that have been founded and endowed by gift or bequest on the part of friends of Rice University provide stipends enabling the holders to devote their time to study and research in their chosen fields. There are also several industrial fellowships maintained by companies interested in the development of technical fields and the training of competent scientists, engineers, and business executives.

Persons desiring consideration for appointment as fellows should consult with the department in which they desire to do research. However, not all fellowships are available every year.

A partial list of graduate scholarships, fellowships, and awards includes: Achievement Rewards for College Scientists (ARCS Foundation) Scholarships in Science and Engineering

Ora N. Arnold Fellowship for better understanding between people and governments of the United States and those of Mexico, the South American states, the West Indies, and the Philippine Islands

Nettie S. Autrey Memorial Fellowship in Science

Eleanor and Mills Bennett Fellowships in Hydrology

Ralph Budd Award for Research in Engineering

Samuel Fain Carter Fellowship in Economics

Edward F. Chavanne Fellowship in Religious Studies

Robert L. Chuoke Award in Physics

Cities Service Research Fellowship in Geology

Continental Oil Company Fellowship in Geology

John W. Cox Research Fund for Scholarships and Fellowships in Bioengineering and Biosciences

William Dunlap Darden Medal in Architecture

Environmental Protection Agency Fellowships in Environmental Science and Engineering

W. Maurice Ewing Fellowship in Marine Science

Exxon Fellowship in Geology

John W. Gardner Award in Humanities and Social Sciences

Louis J. Girard Foundation Fellowship for Ophthalmic Research

William and Elva Gordon Scholarship in Space Physics and Astronomy

Patricia Roberts Harris Fellowships

Gulf Oil Company Fellowship in Geology

Karl F. Hasselmann Fellowship in Chemical Engineering
 Marjory Meyer Hasselmann Fellowship in Chemistry
 Fannie and John Hertz Foundation Fellowship in Applied Physical Sciences
 Houston Gem and Mineral Society Fellowship in Geology
 Houston Geological Society Outstanding Student Award
 Houston Oil and Minerals Corporation Fellowship in Geology
 Jameson Fellowship for American Decorative Arts
 Ruth Lee Kennedy Fellowship for Studies in the Golden Age of Spanish Literature
 Captain Charles Septimus Longcope Awards in History
 Edgar Odell Lovett Fellowships in Mathematics
 Jermayne MacAgy Fellowships in Art History
 Mrs. L. F. McCollum Fellowship
 John W. Mecom Fellowship in Geology
 Dr. and Mrs. Earl Douglas Mitchell Fellowship in German
 Dr. and Mrs. Earl Douglas Mitchell Fellowship in Linguistics
 William F. Marlar Scholarship in Space Science
 National Institute of Health Fellowships
 National Institute of Health Traineeships in Biology
 National Science Foundation Graduate Fellowships
 Pennzoil Company Fellowship in Geology
 Petroleum Research Fund Fellowships of the American Chemical Society
 Phillips Petroleum Company Fellowship in Chemistry
 Zevi W. Salsburg Awards in Chemistry
 Schlumberger Foundation Fellowship in Mathematics
 Shell Fellowship in Physics
 Robert Parker Shubinski Award in Civil Engineering
 Sigma Xi Research Awards
 John Stauffer Scholarship in Chemistry
 Tenneco Oil Company Fellowship in Geology
 Texaco Fellowship in Physics
 Radoslav A. Tsanoff Fellowship in Philosophy
 Richard B. Turner Memorial Awards in Chemistry
 Union Oil of California Fellowship in Geology
 Lodieska Stockbridge Vaughan Fellowship
 Harry Weiser Awards in Chemistry
 Wiess Fellowship in Geology
 Robert A. Welch Foundation Predoctoral Fellowships
 H. A. Wilson Award in Physics
 Wray-Todd Fellowships in Natural Sciences

Scholarships and Prizes of the Jesse H. Jones Graduate School of Administration

Leo M. Acker Memorial Scholarship in Accounting
 J. Kenneth S. Arthur Scholarship
 Alice Pratt Brown Scholarship
 Dean's Award for Academic Excellence
 COMIT Scholarship in Management Information Systems
 John J. Deering Loan Fund

Educational Foundation of Texas Society of Certified Public Accountants
Excellence Award

Executive Development Loan Fund

David E. Farnsworth Scholarship

Financial Executives Institute Award in Administrative Science

E.F. "Gene" Florian Scholarship in Administrative Science

Bernard Fuchs Scholarship

H.H. Galloway Award in Administrative Science

Jones Scholars

William H. and Marion F. Keenan Fellowships

Cooper M. and Zava Waldrop Lochridge Scholarship in Administrative Science

Speros P. Martel Loan Fund

John T. McCants Scholarship in Accounting

Vernon F. "Doc" Neuhaus, Sr., Scholarship

Pannel Kerr Forster Award for Excellence in Taxation

Lorane T. Phillips Award for Excellence in Writing

Robert E. Phillips Award for Excellence in Oral Presentation

Rotan Mosle Loan Fund

Verne F. Simons Scholarship in Accounting

Wall Street Journal Achievement Award

M. A. "Mike" Wright Award

Scholarships and Prizes of the Shepherd School of Music. See listing in the undergraduate section, page 115.

Rice Graduate Fellowships. Graduate students with high academic records and outstanding qualifications may receive support through awards of Rice University Fellowships. These fellowships in most cases provide a stipend plus tuition for the nine-month academic period. Special fellowships may be available to provide support during the summer months. Particularly outstanding entering students may be nominated by their department for a Rice Presidential Fellowship.

Research Assistantships, usually funded from grants and contracts, are available in many departments (especially those in the divisions of Natural Sciences and Engineering). These awards are given to qualified students (usually second-year or later) to provide assistance on faculty research projects. However, such work normally contributes to the student's thesis. In some departments, a limited number of Teaching Assistantships may be available to advanced students. Appointees to any fellowship or assistantship must be engaged in full-time graduate study.

Eligibility for support from Rice University funds is limited to five years of study for students seeking a doctorate or three years for students seeking a master's degree. However, in order to maintain eligibility in the fifth year, the student must have achieved candidacy. Doctoral students entering with a previously earned relevant master's degree will be eligible for stipend support for a maximum of four years of study and must have achieved candidacy by the beginning of the fourth year.

Graduate Tuition Scholarships. Students whose previous records show marked promise but for whom no graduate fellowships are available may, especially in their first year of graduate study, be awarded full or partial graduate tuition

scholarships without stipend. Graduate scholars must be engaged in full-time study.

Scholarships which provide both tuition and stipends are also available for a limited number of graduate students who are participants in the Army or Navy ROTC programs. For information on these scholarships, contact the Departments of Military or Naval Science.

Financial Aid

A limited number of tuition grants based on financial need are available. Rice engineering students who have received financial aid from the University during their undergraduate years may apply for continuation of assistance as needed for the year of study for the professional master's degree.

The Office of Financial Aid at Rice University offers limited aid to graduate students in the form of loans and work to U.S. citizens, permanent residents, and refugees.

Guaranteed Student Loans (GSL) may be processed through Rice up to a maximum eligibility of \$7,500 per annum. These are guaranteed by the State of Texas. Eligibility criteria are set by Rice University and the Texas Guaranteed Student Loan Corporation.

No interest accrues nor is payment required while a student is enrolled at least half-time at Rice or full-time in any eligible post-secondary institution or for six months after terminating attendance. Repayment begins after this period, including a 7 to 9 percent annual interest charge on the unpaid principal balance. Depending on the size of the total loan commitment, the repayment period may extend over as much as 10 years. A completed GSL application, with supplements and 1040s must be submitted to the Rice Financial Aid Office.

CAVEAT: If the student has prior undergraduate GSLs, it would be in his best interest to obtain additional loans from the same source. Deferment forms should be filed with the holders of undergraduate loans. This applies to those who are Rice graduates as well as students from other schools.

Supplemental Loans for Students (SLS) are available to graduate students. They may borrow up to \$4,000 per annum to an aggregate of \$20,000. The interest rate on SLS loans is a maximum of 12 percent per year on the unpaid balance of the loans. Ordinarily the first payment is due within 60 days of the date of disbursement. However, graduate students may defer payment of principal and interest until termination of enrollment.

A completed SLS application, with supplements, must be submitted to the Rice Financial Aid Office.

All students may work on campus but time is a a major factor. For most, 10 to 12 hours a week is a reasonable limit. College Work/Study is available to students who meet eligibility criteria set by the Federal Government. A Financial Aid Form (FAF) must be filed with College Scholarship Service (CSS), and earnings will be limited to the amount shown on the award letter.

Fellowship and scholarship recipients are selected by the individual departments, subject to the approval of the Office of Graduate Programs. Applications for such awards should be made directly to the department involved.

A Gulf Oil Corporation Foundation Loan Fund and the Benjamin S. Lindsey and Vesla Nobile Lindsey Memorial Loan Fund are also available to students who are working toward a degree to assist them in meeting educational expenses. The funds of this loan program are limited. Interested persons may contact the Financial Aid Office. Interested students wishing to apply for a loan under any of these loan programs should commence application procedures the summer prior to the academic year for which they are seeking assistance. Detailed information and application forms are available in the Financial Aid Office.

An Emergency Loan Fund, originally provided through gifts from the Graduate Wives Club of 1972-73, the Graduate Student Association, and various faculty members, is available to help graduate students at Rice with short-term needs. Loans from this fund are limited to \$150 and must be repaid within three months. In lieu of interest, a charge of \$1 per \$50 loaned is assessed to maintain the fund.

Graduate Student Life

Graduate Student Responsibility

Rice University encourages student self-discipline within the framework of its general objectives. Each member of the community is expected to govern his or her conduct by standards of good taste and ethical judgment and to exercise personal responsibility.

The University reserves the right to require the withdrawal of any students whose failure to accept responsibilities as evidenced by conduct or their scholastic achievements is considered detrimental to their own or the University's best interests.

The Honor System

Graduate students are expected to observe the provisions of the honor code. The provisions of the honor system are summarized on page 118.

Fondren Library

With a collection of some 1.4 million volumes, 2 million microforms, and 12,500 current periodical and other serial titles, the Fondren Library is strongly committed to supporting the research and information needs of Rice's students and faculty and it provides extensive resources for advanced study and research. Among the notable research collections are the Menil Collection in art and art history, the Nadler German language and literature collection, as well as strong collections in Austrian history, architecture, engineering, American history, French literature, and the natural sciences and engineering. Bibliographic access is provided through LIBRIS, the Fondren's automated catalog.

The library is also a depository for United States Government documents and for United States patents, as well as a University affiliate for the U.S. Census data. The Woodson Research Center is the repository of the library's rare books, manuscripts, and University archives. Special collections, including Civil War

imprints, Texana, eighteenth century English drama, the papers and scientific library of Sir Julian Huxley, the Anderson Collection on the History of Aeronautics, as well as numerous literary and historical manuscript holdings are available for research at the center. Large microform sets of research materials such as Early American Imprints, papers of a number of United States presidents, and newspapers are also available.

The Fondren's open shelf policy enables patrons to locate materials easily. The reference/collection development librarians provide assistance in the use of library materials and in computer searches of over nine hundred subject data bases. Special facilities such as individual study carrels, group study rooms, audio-visual facilities, microform reading carrels, word processing, and photoduplicating equipment are also available in the library.

Graduate Student Government and Organizations

All full-time graduate students are members of the Graduate Student Association, which is the sole organ representing the graduate students as a body. Part-time graduate students may become members of the association upon payment of the necessary fee. The governing body of this organization is the Graduate Student Association Council, consisting of a chairman, a secretary, a treasurer, and a representative from each department offering graduate study. Graduate students also participate in University affairs through their representatives on many of the standing committees appointed by the president, such as the Graduate Council, the Research Council, and on various departmental committees as well.

The Graduate Student Association invites participation by all members in a variety of social activities.

Housing

The Rice Graduate House is located at the south edge of the campus at the corner of South Main and University. The facility offers rooms, either private or shared, community kitchens, a commons and meeting rooms, and free transportation to academic buildings. Graduate students may also apply for membership in the undergraduate residential colleges. Rooms and apartments are often available for rent within walking or bicycling distance of the campus. The Office of Student Advising Activities and the Student Association keep a record of rooms and apartments about which they have been notified, and the daily newspapers list still others. Incoming graduate students are advised to arrive in Houston several days early in order to find housing. Rooms in the Graduate House must be reserved on a space-available basis by July 15 for the fall semester.

The Student Health Service and Insurance

Graduate students pay the same health service fee as undergraduates. A primary care outpatient clinic, open weekdays through the undergraduate school year, is located on campus in Hanszen College. After clinic hours, medical care is available at Park Plaza Hospital emergency room and through the doctors at Park Plaza Hospital. Access to limited psychiatric consultation, including marriage

counseling, is also available to graduate students through the Rice Counseling and Psychiatric Service. For more information, refer to page 121.

All Rice students are required to have health insurance. Insurance may be purchased through the University at two levels of coverage, described in a brochure that is available in the Cashier's Office and the Office of Student Advising and Activities. Rice's group coverage will be effective from 12:01 a.m., August 15, 1989, until 12:01 a.m. August 15, 1990. Dependent coverage is also available. If a student has other medical insurance, a waiver card showing proof of insurance must be signed and returned to the Cashier's Office by August 15, prior to the beginning of classes, to avoid automatic billing for coverage.

Student Automobiles

All automobiles on campus must be registered with the Rice University Police Department. For more information, refer to page 125.



Courses of
Instruction

Courses of Instruction

Academic departments are listed in this section alphabetically (except for the engineering departments, which are grouped together), with complete lists and descriptions of courses. Most departments also give specific requirements for students both at the undergraduate and graduate levels. These statements are supplemental to the University degree requirements described on pages 63-84.

Courses numbered below 300 are lower level or introductory courses. Those numbered 300 to 499 are designated as advanced courses. Advanced courses are open to first-year and second-year students with proper prerequisites and to graduate students on approval of the student's adviser. Courses designed for graduate students are numbered 500 and above. The methods of presentation and quality of work expected make them generally unsuited to undergraduate participation. Undergraduates are permitted to enroll in graduate-level courses only after consultation with their advisers and with the instructor of the course.

F and/or S following the course number indicates the semester the course is normally given.

Figures in parentheses following the title of each course signify the number of class hours per week, the number of laboratory hours per week, and the credit in semester hours for the completed course, in that order.

Certain courses are dependent upon available faculty, student demand, or funding. Uncertainty about *when* or *whether* a particular course will be offered during 1989-90 is indicated by the designation "Not offered every year."

Course descriptions in this section illustrate topics within the subject matter of the courses. Topics actually covered in the courses may vary from the examples given. Courses are subject to cancellation or modification, but cancellation of a course after final enrollment occurs only in extreme circumstances.

Students may obtain more detailed information about courses from the Registrar's *Schedule of Courses Offered* published each year or from the instructor of the course.

Persons using this catalog to evaluate Rice University transcripts should refer to course titles and descriptions, rather than course numbers, to determine content because course numbers are occasionally changed.

Accounting and Administrative Science

The Jesse H. Jones Graduate School of Administration

Professor Bailar, Dean

Professors Barnea, Bixby, Bryant, J. Cooper, Dipboye, Glanville, Howell,
R.N. Taylor, Tuggle, Uecker, von der Mehden, Westbrook, E.E. Williams,
Windsor, and Zeff

Adjunct Professors Blumberg, Eubank, and Morrison

Associate Professors Batsell, Dharan, Driskill, Kiepper, Napier, and
W.M. Taylor

Adjunct Associate Professors Cramer, Hatchett, Hewitt, Isgur, Loukissas,
Mikhail, Savino, Sutton, and D.L. Williams

Visiting Associate Professor Bougen

Assistant Professors Abraham, Bridges, W.R. Wilson, and Yim

Adjunct Assistant Professor Flatt

Lecturers Atherton, L. Baker, Ellis, Finer, Friday, Gow, Hassett, Hauser, Kehoe,
Leffel, McCormick, McQuilkin, Mandel, Mardis, Murray, D. Ross, Sabalos,
Scardaville, Viebig, and Westheimer

Degrees Offered: Master of Business Administration; Master of Accounting;
Ph.D. in Accounting

The Jesse H. Jones Graduate School of Administration was established in 1974 through a gift from Houston Endowment Inc. Interdisciplinary in nature, the school utilizes faculty of other university departments to augment its own still expanding faculty. The school is dedicated to providing unique educational opportunities for professional training in the fields of accounting, business administration, or public and nonprofit management for highly select graduate students. The curricula leading to the degrees of Master of Business Administration (which includes a concentration in public and nonprofit management) and Master of Accounting are designed to be distinctive in terms of scope, realism, and utility. The school also offers a Doctor of Philosophy in Accounting, in which students undertake highly individualized research studies under the direction of distinguished scholars. (Ph.D. applications are not being accepted in 1989-90). Financial aid is available for both master's and doctoral degree students.

Undergraduate Program. No undergraduate major is offered in the Jones Graduate School; however, such undergraduate courses as accounting may be used to fulfill major requirements in the interdisciplinary program in managerial studies. This degree program is described on page 369.

Students admitted to the Honors Program in Managerial Studies may elect certain specified graduate courses in accounting and administrative science as part of their major requirements. In addition, the undergraduate major in managerial studies for Rice students admitted as seniors to the Jones Graduate School in the

special "five-year plan" may be partly satisfied by course work taken for the master's degree.

Graduate Programs. The Jones Graduate School of Administration offers the Master of Business Administration and Master of Accounting degrees and the Doctor of Philosophy in Accounting. Applicants to these programs must submit recent scores on the Graduate Management Admission Test (GMAT), all official college transcripts, and three letters of recommendation. Unless they received an undergraduate degree from a U.S. college or university, foreign nationals whose native language is not English must submit recent scores on the Test of English as a Foreign Language (TOEFL). Application forms are available from and should be submitted to the Office of Admissions and Student Affairs, Jesse H. Jones Graduate School of Administration, Rice University, P.O. Box 1892, Houston, Texas 77251. Graduates from any accredited university and from a broad range of undergraduate majors are considered for either professional program. Students enrolled in the Jones Graduate School represent a wide variety of undergraduate majors, including economics, managerial studies, mathematics, mathematical sciences, political science, history, languages, fine arts, natural sciences, engineering, and business administration. An accelerated "five-year" degree plan is available to exceptional Rice students in which they may complete the master's degree by the end of five years of college study. Admission to the Jones Graduate School is highly selective and limited to those who have performed with distinction in their previous academic work and on the GMAT.

Undergraduates contemplating graduate work in accounting or administrative science are encouraged to take course work in principles of accounting, principles of microeconomics, and business data processing. College mathematics through calculus is helpful. However, no specific undergraduate course work is required for admission.

A minimum cumulative average of 3.0 (B) is required for graduation. This requirement applies to Jones Graduate School courses and to any other Rice University courses taken for the M.B.A. or Master of Accounting degrees. All courses taken for the degree (including courses taken outside the Jones Graduate School) will be counted in the GPA calculation.

Grades lower than C are not acceptable for credit towards graduation. Any time a student receives a grade lower than C, the course must be repeated if it is required for graduation. If a grade lower than C is received in an elective course, the specific course need not be repeated, but the credits must be made up.

A student with a cumulative GPA of 3.0 or higher is eligible to continue in the school and is eligible for graduation and for financial aid from Jones School sources. A student with a cumulative GPA lower than 3.0 will be placed on probation and may have financial aid terminated. A student will return to good academic standing, but will not necessarily receive financial aid, by achieving a cumulative GPA of at least 3.0.

A student is subject to academic dismissal if: (1) after attempted completion of at least 12, but fewer than 24 hours, the student's cumulative grade point average is below 2.90; (2) after attempted completion of at least 24 hours, but fewer than 40 hours, the student's cumulative grade point average is below 2.95; (3) after attempted completion of at least 40 hours, the student's cumulative grade point average is below 3.0 or the student attains a semester average of below 3.0 while on probation.

Any student who has completed 64 approved hours for the M.B.A. or 33 for the Master of Accounting degree, but has a cumulative average lower than 3.0, will not be permitted to graduate. Such students may, at the school's sole discretion, be permitted to complete additional approved course work in the subsequent 12 months in an effort to raise the cumulative average to 3.0. Students in this situation are also subject to academic suspension or dismissal.

A student who continues on probation in consecutive semesters is not eligible for scholarship support from the Jones Graduate School unless his or her most recent grade point average for the immediately preceding semester is 3.0 or above. Students who have been suspended may not be eligible for financial aid from Jones Graduate School sources upon their return to school.

In addition, students are expected at all times to maintain high standards of ethical and professional conduct. They are treated as professional colleagues and are expected to behave accordingly. Failure to maintain such standards is grounds for disciplinary action, including dismissal.

Financial assistance by the Jones Graduate School is awarded only for a given semester or year. Continuation of assistance depends on satisfactory academic performance, professional behavior, and availability of funds.

In the event of a significant disagreement between a student and an instructor, the following grievance process will be used. First, the student is expected to seek an accommodation with the instructor. Second, either party may then bring the matter to the associate dean for student affairs, who will attempt mediation. Third, either party may then appeal to the Curriculum and Standards Committee and the dean. The grievance process is conducted subject to a formal written policy approved by the school faculty. This process should be reserved for serious complaints of individual mistreatment; frivolous complaints will be dismissed. By university policy, a final grade for a course submitted to the registrar may be changed only if a clerical error has been made in calculating that grade; grading is a matter of faculty judgment. A copy of the formal written grievance policy is available from the associate dean for student affairs.

Master of Business Administration (M.B.A.) The M.B.A. program seeks to prepare students for high-level management positions in business, government, and nonprofit organizations.

Completion of the M.B.A. degree requires a minimum of two academic years in residence at Rice and 64 credit hours. One year of this residence requirement may be completed prior to receipt of the bachelor's degree through the accelerated "five-year" plan for Rice undergraduates. No student can receive a Rice graduate degree without first or simultaneously receiving a baccalaureate degree from his or her undergraduate institution.

The M.B.A. student must register for no fewer than 15 and no more than 17 credit hours. Any other registration requires special permission. All registration and drop/add forms require the signature of the associate dean for student affairs or his designee. All courses must be approved by the Jones Graduate School. Requirements are stated annually for each entering class.

Waivers, exemptions, and transfers of credit are solely the decision of the school. Required courses may be waived in exceptional cases where the student already has the equivalent preparation. The residence requirement is not necessarily reduced, but additional elective courses are made available.

Students must follow the curriculum of study as prescribed by the Jones Graduate School. Exceptions are granted only upon written petition to the school's

Curriculum and Standards Committee, which advises the dean; the dean's decision must be appealed to the Graduate Council.

The first year of the full-time program is completely required and consists of foundation courses including accounting, communications, economics, finance, legal and governmental processes, management information systems, marketing, organizational theory, and quantitative methods. The student must complete at least 33 approved credit hours in the first year. The exact courses will be specified by the Jones Graduate School at registration. No exceptions are permitted except at the sole discretion of the school. Courses in the first year serve as prerequisites for the second year required and elective courses. Prerequisite requirements are enforced.

The second year features two case method courses on management strategy designed to integrate the foundations skills taught in the first year. The student must complete at least 31 approved credit hours in the second year, including Administration 503, 504, 591, and 592, together with 24 credit hours of approved electives. Each student is required to complete at least one area of concentration consisting of no fewer than 12 hours of elective courses. No credit hour may be counted toward more than one concentration; no more than two concentrations may be declared. With the assistance of an adviser, each student selects courses to meet the student's goals and objectives. Most courses will be in administrative science or accounting, but they may also include graduate or upper level offerings in other departments. Concentrations are available in accounting, business entrepreneurship, finance, international management, management information systems, marketing, and public and nonprofit management. Students concentrating in operations research may supplement the school's offerings with courses from the departments of mathematical sciences, economics, and statistics. Any other concentration requires a petition to the associate dean for admissions and student affairs.

The **international management program** offers a set of elective courses in the political, economic, and legal aspects of multinational activities. Students must take Administration 572 and 573. Students may take related courses in other departments. The international management program is particularly relevant for students with a strong background in foreign languages and cultures. Students lacking such a background are strongly advised to take additional time (including summers and possibly a third year) to acquire such skills. Language training does not qualify for graduate credit toward the M.B.A. degree.

The Jones Graduate School offers an area of concentration in **public and nonprofit management**. Students who wish to prepare for government or nonprofit service select, with the assistance of an adviser, a set of elective courses tailored to meet the student's career aims. Students may take related courses in other departments. The M.B.A. core curriculum is specifically designed to promote the transfer of management skills from the private to the public and nonprofit sectors. Students interested in **business entrepreneurship** may take no more than two of Administration 521, 522, or 525 and will take other related courses.

Master of Accounting (M.Acco.) The Master of Accounting program prepares students for professional positions in public accounting as well as for a variety of senior financial positions in business and government.

Rice undergraduates may complete the Master of Accounting program in one year of graduate study if they have taken the following prerequisite courses by the end of their senior year: Accounting 305, 406, and 411; Economics 211 and 212;

Economics 370 or 372; Mathematical Sciences 376; either Statistics 280, Economics 350, or Psychology 339; and Political Science 309 and 310. Additional recommended, but not required, courses are Statistics 381 and 480; Economics 375 and 448; and Psychology 101 and 231. No specific undergraduate major is required for entrance into the program.

The Master of Accounting degree program requires a minimum of 33 semester hours, including the following courses: Accounting 503, 512, 514, 524, 526, 531, and 541; and Administration 501, 502, and 511. Completion of the program qualifies the student to take the Uniform CPA Examination. Texas requires the completion of 20 semester hours in accounting in order to file for the CPA examination. To become a licensed CPA, one must have completed 30 semester hours of accounting, passed the CPA examination, and either have a master's degree and one year of accounting work experience or a bachelor's degree and two years of experience.

Rice graduates and graduates from other universities, who have not satisfied the prerequisite courses, may require two years (at least 62 semester hours) to complete the program.

All courses must be approved by the Jones Graduate School. Required courses may be waived in exceptional cases where the student already has the equivalent preparation. Waivers, exemptions, or transfers of credit are solely the decision of the school. The residence requirement is not necessarily reduced, but additional elective courses are made available. Requirements are stated annually for each entering class.

Doctor of Philosophy in Accounting. The Ph.D. program prepares candidates for teaching and research careers in accounting. The program, which emphasizes research, normally requires a minimum of three years of full-time residence work (two years of course work and one year of dissertation research and writing). A bachelor's degree is required for entry.

After a year of course work, a doctoral student must satisfactorily complete a research paper before continuing. The student must also successfully complete a comprehensive examination prior to undertaking dissertation research and writing. The student will be expected to undertake certain research and instructional obligations as part of the Ph.D. program.

Applications are not being accepted in 1989-90.

Accounting

The list of courses and credit hours below is subject to change.

Accounting Courses

305,F/S INTRODUCTION TO ACCOUNTING (3-0-3)

Survey of basic accounting theory and practice with emphasis on the primary problems of asset valuation and income determination. In addition to preregistration, students must sign a reservation list in 250 Herring Hall. Limited enrollment.

406,S MANAGEMENT ACCOUNTING (3-0-3)

Uses of accounting data to plan and evaluate long-run investment and financing decisions and short-run price, costing, output, and financing decisions of the business firm or public entity. In addition to preregistration, students must sign a reservation list in 250 Herring Hall. Prerequisites: Acco 305 and Econ 211.

411,F ASSET ACCOUNTING (3-0-3)

Deals with the major questions of asset valuation and income determination in the context of accounting theory and the evolving financial, economic, and political factors which have shaped the extant standards. The standard-setting process is discussed. In addition to preregistration, students must sign a reservation list in 250 Herring Hall. Prerequisite: Acco 305.

497,F INDEPENDENT STUDY (3-0-3)

Independent study on an approved project under faculty supervision. Enrollment by special permission.

498,S INDEPENDENT STUDY (3-0-3)

See Acco 497.

501,F FINANCIAL ACCOUNTING (3-0-3)

Introduction to accounting theory and practice with emphasis on the primary problems of asset valuation and income determination. Prerequisite: graduate standing.

502,S MANAGERIAL ACCOUNTING (2-0-2)

Introduction to accounting systems designed to facilitate internal decision-making evaluation and control by private and public organizations. Particular emphasis is given to behavioral impact of alternative internal reporting schemes. Prerequisite: Acco 501.

503,F ADVANCED MANAGERIAL ACCOUNTING AND MIS (3-0-3)

Case-oriented study of recent developments in adaptation of cost accounting systems to modern manufacturing environments. Introduction to management information systems and computer skills. Prerequisite: graduate standing.

510,S CORPORATE FINANCIAL REPORTING (3-0-3)

Using a case and readings format, the course deals with controversial issues in financial accounting and the analysis and interpretation of companies' financial statements. Prerequisites: graduate standing and Acco 501 or equivalent.

511,F ASSET ACCOUNTING (3-0-3)

Deals with the major questions of asset valuation and income determination in the context of accounting theory and the evolving financial, economic, and political factors which have shaped the extant standards. The standard-setting process is discussed. Prerequisite: Acco 501.

512,S EQUITY ACCOUNTING (3-0-3)

Deals with the particular problems in the estimation of liabilities and stockholders' equity. The focus is both on accounting theory and on the financial, economic, and political factors that have shaped the extant standards. Prerequisites: graduate standing and Acco 501 or equivalent.

514,S SPECIAL TOPICS IN ACCOUNTING (3-0-3)

Deals with the theoretical and technical problems of consolidations, branch accounting, interim reporting, foreign operations, and international accounting standards. Also introduces accounting for government and nonprofit organizations. Prerequisites: Acco 511 and 512.

524,S MANAGERIAL ACCOUNTING AND FINANCE (3-0-3)

Financial statements and accounting are studied in their relationships to financial analysis, investment, and capital structure decisions. Capital budgeting and financial theory from the perspective of management are emphasized. Prerequisites: graduate standing and Acco 501 or equivalent.

525,F COMPETITIVE USE OF INFORMATION TECHNOLOGY (3-0-3)

Examines the use of information technology in competitive strategy. Prerequisite: graduate standing.

526,S SYSTEMS ANALYSIS AND DESIGN

Concepts related to systems analysis, design, development, and implementation. Prerequisite: Acco 503 or Admn 541.

528,S MANAGING THE MIS FUNCTION (3-0-3)

Examines key issues related to managing the information system and information technology activities in an organization. Prerequisite: Acco 503 or Admn 541.

529,F EXPERT AND DECISION SUPPORT SYSTEMS (3-0-3)

Examines a variety of problems and approaches associated with designing expert systems and decision support systems and integrating them into an organization's information system. Prerequisite: Acco 503 or Admn 541.

531,F FEDERAL TAXATION OF BUSINESS ENTERPRISES (4-0-4)

Theory of United States income taxation and its application to corporations, partnerships, and proprietorships; study of decision models involving tax structure and tax planning in business situations. Prerequisites: graduate standing and Acco 501 or equivalent.

532,S FEDERAL TAXATION OF INDIVIDUALS (3-0-3)

United States individual income taxation, including consideration of tax planning and tax-favored retirement plans. Prerequisite: Acco 531.

534,S SPECIAL TOPICS IN TAXATION (Variable)

An examination of the theory and structure of federal estate and gift taxation, from both compliance and tax planning standpoints, and interrelated income tax planning, including income taxation of estates and trusts. Prerequisite: Acco 531.

541,F AUDITING AND FINANCIAL REPORTING (3-0-3)

Auditing standards and procedures, statistical sampling applications, audit programs and reports, and professional ethics associated with the public accounting profession. Prerequisites: graduate standing and Acco 511 or equivalent.

551,F FINANCIAL ACCOUNTING PRACTICE (3-0-3)

Comprehension of FASB pronouncements on valuation, income, and cash flow concepts. Prerequisites: graduate standing and Acco 511 or equivalent.

597,F INDEPENDENT STUDY (Variable)

Independent study or directed reading on an approved project under faculty supervision. Enrollment by special permission.

598,S INDEPENDENT STUDY (Variable)

See Acco 597.

600,F/S MASTER'S THESIS (3-0-3)**612,S TUTORIAL/ACCOUNTING RESEARCH (3-0-3)**

Intensive study in an area of accounting research in which the student expects to specialize. Prerequisites: Acco 602, Acco 611.

800,F/S THESIS RESEARCH (3-0-3)

Administrative Science

The list of courses and credit hours below is subject to change.

Administration Courses

501,F MANAGERIAL SKILLS SEMINAR I (Variable)

Periodic dean's seminar held each semester in which invited speakers discuss a variety of management topics. Basic oral and written communication and placement skills for first-year M.B.A. and M.Acco students. Prerequisite: graduate standing.

502,S MANAGERIAL SKILLS SEMINAR II (Variable)

See Admn 501.

503,F MANAGERIAL SKILLS SEMINAR III (Variable)

Periodic dean's seminar held each semester in which invited speakers discuss a variety of management topics. Advanced oral and written communication and placement skills for second-year M.B.A. and M.Acco students. Prerequisite: Admn 501.

504,S MANAGERIAL SKILLS SEMINAR IV (Variable)

See Admn 503.

505,F FACULTY RESEARCH SEMINAR (0)

Faculty and invited guests meet periodically to present current research findings.

506,S FACULTY RESEARCH SEMINAR (0)

See Admn 505.

511,F ORGANIZATION THEORY (3-0-3)

Examines theoretical and empirical content of psychology applied in the organizational setting, the development of organization theory, current approaches to the study of complex organizations, and the operation of major types of complex organizations in both private and public sectors. Prerequisite: graduate standing.

518,S MANAGERIAL DECISION MAKING (3-0-3)

Review of current theories of decision making in and by organizations. Emphasis on behavioral decision theory, human problem solving, and organizational processes. Prerequisite: graduate standing.

521,F ENTREPRENEURSHIP AND THE NEW ENTERPRISE (3-0-3)

Characteristics of entrepreneurs, the economics of entrepreneurship, the role of entrepreneurship in economic growth, process of starting and managing a new business, venture capital, legal and tax aspects of new venture activities, and preparation of a business plan. Prerequisite: Admn 541.

522,S ENTREPRENEURSHIP AND ENTERPRISE EXCHANGE (3-0-3)

How to negotiate, the "needs" approach to buying and selling a business, enterprise valuation, deal and contract structuring, and corporate venturing. Limited enrollment; instructor's permission. Prerequisite: Admn 521.

523,F REAL ESTATE INVESTMENT (3-0-3)

Examines financing aspects of real estate development. Prerequisite: Admn 541.

524,S REAL ESTATE DEVELOPMENT (3-0-3)

Identifies and analyzes real estate development opportunities. Prerequisite: Admn 541.

525,F CREATIVE ENTREPRENEURSHIP (3-0-3)

Conceiving ideas for new businesses and evaluating those ideas are the foci of this course. Prerequisite: Admn 541.

531,F QUANTITATIVE METHODS I (3-0-3)

Use of statistical methods and computer systems to analyze decision problems, including product design as an illustration of marketing management. Prerequisite: graduate standing.

532,S QUANTITATIVE METHODS II (2-0-2)

Use of operations research methods and computer systems to analyze decision problems, with particular emphasis on production and operations management. Prerequisite: Admn 531.

541,F MANAGERIAL ECONOMICS AND MIS (3-0-3)

Long-run and short-run price and production decisions in private and public economic entities in the face of differing demand conditions and market environments. Introduction to management information systems and computer skills. Prerequisite: graduate standing.

542,S MACRO AND INTERNATIONAL ECONOMICS (2-0-2)

Provides an analysis of the relationships between the levels of income, employment, interest rates, investment, consumption, government spending, and inflation from a Keynesian and neoclassical perspective. Economic relationships between nations, trade theory, and international finance, and exchange rates are also considered. Prerequisite: Admn 541.

544,S CAPITAL MARKETS (3-0-3)

Financial environment of the corporation, use of money and capital market instruments, roles of financial intermediaries and institutions. Prerequisite: Admn 545 or consent of instructor.

545,F INVESTMENTS (3-0-3)

Investment decisions for individuals and institutions in the context of modern portfolio theory and asset pricing relationships. Major topics include portfolio theory, term structure of interest rates, asset pricing, stock valuation, fixed income securities, options, and futures contracts. Prerequisite: Acco 524.

546,S CORPORATE FINANCIAL STRATEGY (3-0-3)

Advanced financial topics of interest to the corporation: value creation, diversification, risk-benefit analysis, tax policy, present value. Emphasizes practical problems of the corporation. Prerequisite: Acco 524.

547,F CORPORATE FINANCIAL MANAGEMENT (3-0-3)

Capital structure and dividend theories including signaling, agency costs, and tax effects are emphasized. Takeovers, mergers and acquisitions, debt contracting, and financing alternatives are studied in the context of corporate finance theory. Prerequisite: Acco 524.

551,F COMMERCIAL BANKING AND THE ENTREPRENEUR (3-0-3)

Examines the highly competitive and dramatically changing national and international financial services markets. Utilizing visiting speakers, case studies, and a computer simulation, "Bank Presidents' Game," emphasis is placed on understanding the principles and concepts of bank management and operations within a complex economic environment. Special emphasis is placed on ways in which the entrepreneur selects, works with, and uses his/her bank. Prerequisite: Acco 524.

552,S INVESTMENT BANKING (3-0-3)

Analysis of the characteristics of the investment banking industry, focusing on topics of corporate financial transactions: public offerings, private placements of debt and equity, and mergers and acquisitions. Prerequisite: Admn 545 or consent of instructor.

560,S LAW FOR ACCOUNTANTS (3-0-3)

Civil law, common law, equity, state and federal court systems, contracts, sales, bailments and carriers, bankruptcy, secured transactions, Uniform Commercial Code, and the Uniform Partnership Act. Not equivalent of Admn 562. Prerequisite: graduate standing.

561,F LEGAL AND GOVERNMENTAL PROCESSES I (3-0-3)

Impact of government on decision making in business, featuring comparisons of governmental intervention across major industrial systems; analysis of environmental trends and public policy options. Prerequisite: graduate standing.

562,S LEGAL AND GOVERNMENTAL PROCESSES II (3-0-3)

Law as the medium in which American society and business function; legal history, jurisprudential bases, theory and practice of principal kinds of law: common law, statute law, constitutional law, and law of government control. Prerequisite: Admn 561.

563,F PUBLIC ADMINISTRATION (3-0-3)

The administration and implementation of public policies across federal, state, and substate governments. Prerequisite: permission of instructor. Also offered as Poli 537.

564,F PUBLIC FINANCIAL MANAGEMENT (3-0-3)

Political, economic and accounting dimensions of financial management in public and nonprofit organizations. Emphasis on budgeting systems, appropriations processes, cost-benefit analysis, taxation, pricing, fund accounting, debt management, financial administration. Prerequisite: permission of instructor. Also offered as Poli 564.

572,S POLITICAL RISK ANALYSIS (3-0-3)

Analyses of political and social factors affecting business operations abroad, including domestic instability, foreign conflict, corruption, nationalization, and indigenization. A simulation exercise is required. Also offered as Poli 571.

573,F GLOBAL STRATEGIC MANAGEMENT (3-0-3)

Changes in international competition, techniques for analysis of economic forces, changes in governance, and the concepts of competitive strategy and globalization of technology and the marketplace. Prerequisite: graduate standing.

580,S MARKETING (3-0-3)

Introduction of key marketing concepts that illustrate the function of marketing in the business enterprise; provides a foundation for advanced course work in marketing. Prerequisite: graduate standing.

581,F MARKETING STRATEGY AND MANAGEMENT (3-0-3)

Promotes students' overall ability as marketing managers. Little emphasis is placed on learning marketing "techniques." Focus is on marketing concepts and frameworks with the goal of improving students' decision making abilities in a marketing context. A key aspect is case analysis; therefore, students must at all times be prepared to engage actively in the knowledge acquisition process rather than as passive recipients of information. Students participate in a marketing strategy simulation game (Markstrat). Prerequisite: Admn 580.

583,F CONSUMER BEHAVIOR (3-0-3)

Exposes students to the field of consumer behavior with special emphasis on managerial implications. Prerequisite: Admn 580.

584,S PRODUCT MANAGEMENT (3-0-3)

Applies various dimensions of marketing strategy and management to the increasingly common role of product manager, who is responsible for all aspects of developing and marketing a particular product. A number of different industries are examined. Prerequisite: Admn 580.

585,F MARKETING RESEARCH I (3-0-3)

Introduces students to the design, execution, and analysis of marketing research. Topics include experimental, survey, and questionnaire design; the specification sampling and coding schemes; and the application and interpretation of such multivariate methodologies as analysis of variance and multiple regression. Prerequisite: Admn 580.

586,S MARKETING RESEARCH II (3-0-3)

Advanced techniques in marketing research, such as factor analysis, multidimensional scaling, conjoint analysis, choice models, and focus groups. Prerequisite: Admn 585.

587,F PRICING STRATEGY (3-0-3)

Provides a managerial orientation to making pricing decisions, with emphasis on an integration of the economics of profit maximization, the psychological aspects of customer response to price, and the anticipation of competition.

588,S MANAGEMENT OF ADVERTISING (3-0-3)

Focuses on the role and function of advertising, including management of the client-agency relationship, role of the advertising agency, and the role of advertising. Prerequisite: Admn 580.

591,F MANAGEMENT STRATEGY I (3-0-3)

Examination of managerial and organizational problems in the private and public sectors which illustrate fundamental principles of domestic and international management practice. This course integrates key managerial skills taught in other core courses. Extensive use of case materials, student presentations, and computer simulation. Prerequisite: Acco 524.

592,S MANAGEMENT STRATEGY II (3-0-3)

Continuation of Admn 591.

593,F TOPICS IN MANAGEMENT I (3-0-3)

Selected topics in management. Section 1: Production and Operations Management. Prerequisite: permission of instructor. Not offered every year.

594,S TOPICS IN MANAGEMENT II (3-0-3)

Selected topics in management. Section 1: Management of Technology. Section 2: Statistical Quality Control. Prerequisite: permission of instructor. Not offered every year.

595,F SOCIAL AND ETHICAL RESPONSIBILITY OF BUSINESS (3-0-3)

Examines the ethical dimensions of management, including the social responsibility of business. Theories and methods of ethical reasoning are considered. Not offered every year. Prerequisite: permission of instructor.

597,F INDEPENDENT STUDY (Variable)

Independent study or directed reading on an approved project under faculty supervision. Enrollment by special permission.

598,S INDEPENDENT STUDY (Variable)

See Admn 597.

Ancient Mediterranean Civilization

**Professors Cuthbertson, Drew, Kelber, R. McIntosh, S. McIntosh,
Levin, Van Helden**

Associate Professors Maranhão, Wallace, Widrig

Assistant Professors Maas, Morrison, Yunis

Lecturers Benjamin, Dunne, Eaker

Degree Offered: B.A.

Ancient Mediterranean Civilization is an interdisciplinary major that explores the cultural traditions of ancient Greece and Rome, Judaism, early Christianity, and their antecedents. We study these traditions not only for their intrinsic interest and value, but because of their contribution to modern society in the West. Thus as well as providing instruction in ancient cultural history in its widest sense, the major offers perspectives in cultural criticism, for it examines the beginnings of a civilization in which we, the examiners, still participate. To achieve a balanced interdisciplinary approach the major is planned around a series of courses in Anthropology, Art History, Classics, History, Philosophy, and Religious Studies. The major as well provides opportunities for archeological field work and study abroad.

Rice is a sponsor of the Intercollegiate Center for Classical Studies in Rome, managed by Stanford University. Students in the major are encouraged to study in this program.

Requirements: A student majoring in Ancient Mediterranean Civilization must complete a minimum of 36 semester hours. These must include History 201, one year of an ancient language, and one course each in ancient Philosophy, Religious Studies, and Art History. Students may fulfill the language requirement by examination. All prospective programs for individuals majoring in Ancient Mediterranean Civilization are to be drawn up in consultation with a member of the staff.

As a second major: In consultation with the staff a maximum of six semester hours (two courses) outside of the Ancient Mediterranean Civilization Major but related to the student's plan of study may be substituted for an equivalent number of hours/courses in the major.

Courses:

CORE COURSE

201,F INTRODUCTION TO ANCIENT HISTORY (3-0-3).

Maas, M.

I. Language, Literature and Culture

GREEK

- 101,F** ELEMENTARY GREEK I (3-0-3). *Eaker, H.*
- 102,S** ELEMENTARY GREEK II (3-0-3). *Eaker, H.*
- 201,F** INTERMEDIATE GREEK: PLATO (3-0-3). *Yunis, H.*
- 202,S** INTERMEDIATE GREEK: HOMER (3-0-3). *Wallace, K.*

LATIN

- 101,F** ELEMENTARY LATIN I (3-0-3). *Wallace, K.*
- 102,S** ELEMENTARY LATIN II (3-0-3). *Yunis, H.*
- 201,F** INTERMEDIATE LATIN: CAESAR (3-0-3). *Eaker, H.*
- 303,F** CICERO (3-0-3) *Wallace, K.*
- 304,S** LUCRETIUS (3-0-3) *Levin, P.*
- 305,F** VIRGIL (3-0-3)
Not offered 1989-90. *Staff*
- 306,F** OVID (3-0-3)
Not offered 1989-90. *Staff*
- 312.** MEDIEVAL LATIN (3-0-3) *Eaker, H.*

CLASSICAL STUDIES

- 211,F** GREEK CIVILIZATION (3-0-3). *Wallace, K.*
- 212,S** ROMAN CIVILIZATION (3-0-3). *Wallace, K.*
- 222,S** PERSPECTIVES ON GREEK TRAGEDY (3-0-3).
Not offered 1989-90. *Yunis, H.*

162 COURSES OF INSTRUCTION

315,S SOCRATES: THE MAN AND HIS PHILOSOPHY (3-0-3)

Yunis, H.

336,F CLASSICAL MYTHOLOGY II (3-0-3)

Not offered 1989-90.

Levin, D.

335,S CLASSICAL MYTHOLOGY I (3-0-3)

Levin, D.

352,S PERICLEAN ATHENS (3-0-3)

Not offered 1989-90.

Yunis, H.

ANTHROPOLOGY

224,F THE CULTURE OF ANCIENT GREECE (3-0-3)

Maranhão, T.

II. Art History, Classical Archaeology and Prehistory

HISTORY OF ART

305. GREEK ART AND ARCHAEOLOGY I (3-0-3).

Staff

306. GREEK ART AND ARCHAEOLOGY II (3-0-3).

Staff

308,S ROMAN ART AND ARCHAEOLOGY (3-0-3).

Staff

309,F LATE ANTIQUE AND EARLY CHRISTIAN ART (3-0-3)

Not offered 1989-90.

Widrig, W.

310,S BYZANTINE ART (3-0-3)

Not offered 1989-90.

Widrig, W.

483 F/S 484 F/S ARCHAEOLOGICAL FIELD WORK AND RESEARCH (3-0-3).

Widrig, W.

ANTHROPOLOGY

205,F INTRODUCTION TO ARCHAEOLOGY (3-0-3)

Not offered 1989-90.

McIntosh, R.

211,S EARLY CIVILIZATIONS (3-0-3)

Not offered 1989-90.

McIntosh, R.

216,S INTRODUCTION TO WORLD PREHISTORY (3-0-3)

Not offered 1989-90.

McIntosh, S.

362,S ARCHAEOLOGICAL FIELD TECHNIQUES (3-0-3)

Not offered 1989-90.

McIntosh, R.

460,S ADVANCED ARCHAEOLOGICAL THEORY (3-0-3).

Not offered 1989-90.

McIntosh, R.

III. History

306,S POLITICS AND SOCIETY IN ANCIENT GREECE (3-0-3)

Not offered 1989-90.

Maas, M.

307,F IMPERIAL ROME FROM CAESAR TO DIOCLETIAN (3-0-3)

Not offered 1989-90.

Maas, M.

308,S THE WORLD OF LATE ANTIQUITY (3-0-3)

Maas, M.

**309,F THE DECLINE AND FALL OF THE ROMAN EMPIRE IN THE
WEST (3-0-3)**

Not offered 1989-90.

Maas, M.

337,F HISTORY OF ANCIENT AND MEDIEVAL LAW (3-0-3)

Drew, K.

POLITICAL SCIENCE

340,S ANCIENT AND MEDIEVAL POLITICAL THEORY (3-0-3)

Cuthbertson, G.

IV. Philosophy and Religion

PHILOSOPHY

201,F HISTORY OF PHILOSOPHY I (3-0-3).

Morrison, D.

301,S ANCIENT AND MEDIEVAL PHILOSOPHY (3-0-3).

Morrison, D.

501,F SEMINAR IN ANCIENT PHILOSOPHY (3-0-3)

Morrison, D.

RELIGIOUS STUDIES

205,F ARCHAEOLOGY AND THE BIBLE (3-0-3).

Not offered 1989-90.

Benjamin, D.

307,F CHRISTIAN ORIGINS (3-0-3)

Kelber, W.

308,S SYNOPTIC GOSPELS (3-0-3)

Kelber, W.

310,S PAULINE CORRESPONDENCE (3-0-3)

Not offered 1989-90.

Kelber, W.

- 312,S HISTORY OF RELIGIONS: JUDAISM, CHRISTIANITY, ISLAM**
(3-0-3). *Dunn, K.*
- 355,F BIBLICAL ANCESTORS AND HEROES (3-0-3)** *Benjamin, D.*
- 356,S PROPHETS (3-0-3)** *Benjamin, D.*
- 357,F WOMEN IN THE BIBLE (3-0-3)**
Not offered 1989-90. *Benjamin, D.*
- 358,S BIBLE, CREATION AND APOCALYPSE (3-0-3)**
Not offered 1989-90. *Benjamin, D.*
- 506,F GOSPEL AND TRADITION (3-0-3)** *Kelber, W.*
- 508,S JOHN AND LOGOCENTRISM (3-0-3)** *Kelber, W.*
- 511,F HEBREW BIBLE AND HERMENEUTICS** *Benjamin, D.*
- 512,S RELIGION OF ANCIENT ISRAEL** *Benjamin, D.*

Anthropology

Professor Marcus, Chair
Professors Fischer, R.J. McIntosh, S.K. McIntosh, and Tyler
Associate Professors Maranhão, Taylor, and Traweek
Adjunct Associate Professors Gibson and Schreiber
Assistant Professors Georges and LaViolette
Adjunct Assistant Professor Biesele

Degrees Offered: B.A., M.A., Ph.D.; B.A. in behavioral science

Undergraduate Program: Anthropology is a discipline that encompasses many subjects of study, all related to understanding human beings and their cultures. A student may organize a major in one or more of anthropology's principal fields or may combine a major in anthropology with one in another discipline. Students majoring in anthropology are required to take a total of 30 semester hours in anthropology (ten semester courses). Majors must devise a plan of study in consultation with a faculty adviser. Although there are no required courses, students will be encouraged to gain exposure to all of the principal fields within anthropology (archaeology; biological, cultural, and linguistic anthropology). On declaring a major in anthropology, a student should meet with the departmental undergraduate adviser in order to tailor a major plan in line with the student's interests. This plan can be modified at any time with the approval of the adviser.

With departmental approval, a maximum of 6 semester hours (two courses) outside of anthropology but related to the student's plan of study may be substituted for hours/courses in anthropology. Majors who plan to pursue graduate training toward a career in anthropology will need a reading knowledge of one or two European languages and are urged to enroll in undergraduate language courses. These majors are also urged to apply for admission to the honors program.

Honors Program. The primary purpose of the Honors Program is to provide selected undergraduate majors with an opportunity to receive advanced training, particularly in the planning and execution of independent research, within their chosen areas of specialization in anthropology. A secondary purpose of the program is to establish an administrative framework for the formal recognition of outstanding students. Majors considering a career in anthropology are strongly encouraged to apply, as are all others who desire the experience of an intensive, individual research project as part of their undergraduate education.

Acceptance into the program is at the discretion of the anthropology faculty. A statement of eligibility requirements and program requirements is available in the departmental office.

Behavioral Science Major. The major in behavioral science centers on a nucleus of courses in anthropology, psychology, and sociology. The student ordinarily, but not necessarily, emphasizes one of these three fields.

Students majoring in behavioral science are required to take a minimum of 30 semester hours (ten semester courses) in anthropology, psychology, or sociology, of which 24 hours (eight courses) must be courses numbered 300 or higher. A minimum of 6 semester hours (two courses) in each of the three fields of anthropology, psychology, and sociology is required. With the approval of the major adviser, a maximum of six semester hours (two courses) in courses numbered 300 or higher in related fields outside the core fields may be included in the major. Six semester hours (two courses) at the 200 level may be substituted for advanced courses if they are in a field of the major in which no courses have been taken previously. Students are encouraged to plan in consultation with the program adviser an independent study course (to be taken in the fall of their senior year) that integrates the varying perspectives of anthropology, psychology, and sociology.

Graduate Program. The graduate program offers advanced training in social/cultural anthropology, biological anthropology, and archaeology, leading to a Ph.D. in anthropology. The M.A. is optionally offered upon approval of candidacy for the Ph.D. The M.A. as a terminal degree requires satisfactory completion of 30 semester hours of course work approved by an adviser, satisfactory completion of one of the special papers (see uniform requirements for the Ph.D.), and a thesis. Although there are uniform requirements for the Ph.D. degree, each field of specialization offers different opportunities for training and different topical research orientations reflecting the interests of the faculty. Consequently, the Department seeks applicants with a defined interest in one of the broad fields of specialization within anthropology. An undergraduate background in anthropology is desirable but not required for admission. In consultation with a major adviser and two other faculty members, each entering student is expected to design a flexible study plan that emphasizes broad training in a field of specialization and the eventual definition of a problem for dissertation research. All first-year students can usually be offered some form of support, ranging from full graduate fellowships, which provide tuition plus a stipend, to tuition scholarships only. When possible, these awards are renewed for the second year of study.

Specialization in Social/Cultural Anthropology. The faculty is eclectic in its interests, and the program offers exposure to styles of argument and reasoning across the range of contemporary theoretical issues in social/cultural anthropology. We emphasize the reading of primary sources of theory, which have inspired the discussion and definition of central problems within anthropology. In addition, as essential preparation for doctoral research, explicit attention in instruction is paid both to field work and to skills in the conception and writing of ethnography.

Specialization in Biological Anthropology. Training in biological anthropology emphasizes biomedical issues, including nutrition, growth and development, human adaptation, human genetics, and public health. Students may take advantage of the extensive resources of the Houston Medical Center through ties established with the University of Texas School of Public Health and Graduate School of Biomedical Sciences. In addition to work at Rice, degree credit may be given for both formal courses offered at the Schools of Public Health and Biomedical Sciences and independent study, tutorials, and research with adjunct faculty at these institutions.

Specialization in Archaeology. Training emphasizes research skills in the library, field, and laboratory, to be tested by means of the three required research papers, at least one of which must be an original data paper. In addition to research on the dissertation topic, all students are encouraged to develop at least one analytical skill — such as remote sensing, archaeological statistics, osteology, geomorphology, and pedology — making use of the excellent laboratory and computer facilities at Rice.

Uniform Requirements for the Degree of Doctor of Philosophy. Each entering student will devise a detailed first year plan of study and provisional plans for succeeding years in consultation with his or her advisers. Seminars and tutorials can be arranged on any topic relevant to a student's training, and where appropriate, these can be conducted in supervisory consultation with scholars in other disciplines at Rice as well as with adjunct faculty. During the first two years of study, each student will prepare three substantial papers, each emphasizing an analytical, research, and writing skill appropriate to the field of specialization. The subjects of the papers and their scheduling are major considerations in the ongoing consultations between students and their advisers. During the course of study, each student must demonstrate reading competency in one foreign language. Before advancing to Ph.D. candidacy, a student must prepare a satisfactory proposal for dissertation research. Following approval of the research proposal, a dissertation committee is appointed. Dissertations are ordinarily based in substantial part upon field research.

Anthropology Courses

200,F/S LANGUAGE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

An introduction to the scientific study of language. The methods of linguistic prehistory. The language families of the world and the interrelationship of language and thought. Also offered as Ling 200.

Meyer, C.

201,F INTRODUCTION TO SOCIAL/CULTURAL ANTHROPOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

An introduction to the history, methods, and concepts of the discipline devoted to the systematic description and understanding of cultural diversity in human societies.

Georges, E.

202,S INTRODUCTION TO BIOLOGICAL ANTHROPOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

The evolution, genetics, and adaptive significance of human biological differences. Includes an examination of the fossil record of human evolution as well as patterns of and explanations for variability in modern human populations.

Georges, E.

205,F INTRODUCTION TO ARCHAEOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Principles and methods of archaeology; an introduction to the elementary concepts of the discipline through a series of case studies.

LaViolette

224,S THE CULTURE OF ANCIENT GREECE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Readings from the tragedians, the poets, and the philosophers, emphasizing topics such as family life, sexuality, mental health, discourse, and communications. Summary of the prehistory and ethnology of the Greeks.

Maranhão, T.

260,S LATIN AMERICA AND ITS POLITICS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Focuses on the widely shared socioeconomic, political, and cultural themes as seen over history and in current events.

Taylor, J.

300,F LINGUISTIC ANALYSIS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

English and other languages as objects of scientific analysis. Phonological structure, morphology and syntax, semantic structures, and techniques of linguistic analysis. Also offered as Ling 300.

Copeland, J.

301,S PHONOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Theory and practice of articulatory phonetics and of methods of determining the structural patterns which underlie speech sounds. Also offered as Ling 301.

Copeland, J.

305,F HISTORICAL LINGUISTICS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

The nature of language change in its social and geographical contexts from the perspective of language acquisition. Also offered as Ling 305.

Mitchell, E.

306,F HISTORY OF ANTHROPOLOGICAL IDEAS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

An introduction to the history of anthropology, its theories, and methods. The emphasis is upon social and cultural anthropology.

Marcus, G.

308,F HISTORY AS A CULTURAL MYTH (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Ideas of history and attitudes toward the past as culturally conditioned phenomena. Emphasizes history as statement of cultural values as well as conceptualizations of cause, change, time, and reality.

Taylor, J.

309,F CULTURAL STUDIES OF SCIENCE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Analyzes several studies of laboratories and research groups around the world to investigate how culture impinges upon scientific activity. Evaluates key terms in the study of science and technology for their cultural assumptions by using those terms to explicate these laboratory studies. Discusses the design of ethnographic studies of scientific and technological laboratories.

Traweck, S.

312,F AFRICAN PREHISTORY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Thematic coverage of developments throughout the continent from the Lower Paleolithic to medieval times, with emphasis on food production, metallurgy and the rise of cities and complex societies.

La Violette, A.

313,F LANGUAGE AND CULTURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Investigates the relation between language and thought, language and world view, language and logic. Also offered as Ling 313.

Tyler, S.

314,S ORALITY, LITERACY & CULTURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

The study of sociocultural traditions based on their dominant mode of communication: oral, literate or electronic.

Maranhão, T.

315,F EMPIRICAL AND PHILOSOPHICAL ANTHROPOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Reviews the answers sought to the questions, "What is man?" "What are the limits of human knowledge?" and "How should we lead our lives?" with focus on the works of anthropologists and of philosophers.

Maranhão, T.

316 SHAMANISM (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

This course covers the ethnography of shamanism in foraging societies of the world and assesses the body of theory and comparative work on the subject since the middle 19th century. Offered occasionally.

Staff

319,F SYMBOLISM AND POWER (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

This course will use both traditional and contemporary readings to emphasize the trend in cultural analysis from a view of culture as monolithic and static to perceptions that any culture is internally varied and contradictory as well as changing and complex.

Taylor, J.

326,F THE ANTHROPOLOGY OF LAW (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Social conflict and methods of dispute management in Western and non-Western societies. Comparison of legal institutions in band, tribal, early state, and complex industrial societies.
Staff

327,S GENDER AND SYMBOLISM (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Examinations of beliefs concerning men, women, and gender in different cultures, including the West, relating to issues of symbolism, power, and the distribution of cultural models.
Taylor, J.

333,F CONTEMPORARY TRENDS IN SOCIAL AND CULTURAL THEORY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

British functionalism, analytic philosophy, French structuralism, neo-Marxism, phenomenology, hermeneutics, and ethnomethodology. An intensive review of the major sources of theory guiding research in contemporary anthropology. Strongly recommended for majors and for students in the humanities.
Fischer, M.

336,S THE ART OF ETHNOGRAPHY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

A seminar that explores the experience of doing field work and the problems of transforming theory, field experience, and data into a written account. Emphasis is on reading field work accounts and gaining ethnographic writing skills. Strongly recommended for majors but also for other interested students in the social sciences and humanities.
Marcus, G.

340,S CAMERA AND CULTURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

How photographs come to be produced and read as documentary evidence in science, law, history, anthropology and families. How photographs and photographic technology shape and are shaped by the cultures in which they are used as a case study in the relations between technology and culture.
Traweek, S.

345,F THE PERSON ACROSS CULTURES (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Course discussions and lectures will be built around the central issue of whether the "individual", or the "self", is uniquely an Euroamerican cultural idea or whether it is universally an aspect of personhood in all cultures.
Maranhão, T.

347,S THE CULTURE OF EXPERTISE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

How experts and expertise, primarily in science and technology, shape and are shaped by their professional communities, national policies, and international political, economic, and intellectual relations. Not offered 1989-90.
Staff

348,F AMERICA AS A CULTURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Explorations in community studies, symbolic anthropology, literary criticism, religion, and politics. Not offered 1989-90.
Fischer, M.

170 COURSES OF INSTRUCTION

350 INDIANS OF THE AMERICAS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Examines the cultures of Native American peoples throughout the New World. Both pre- and post-contact cultural patterns will be discussed with an emphasis on native and European reactions and responses. Not offered 1989-90.

Staff

353,S CULTURES OF INDIA (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Summary of the prehistory, ethnography, and ethnology of the Indian subcontinent. Special emphasis on Hinduism, Buddhism, and Indian philosophy.

Tyler, S.

354,F WOMEN IN NON-WESTERN SOCIETIES (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Examines the statuses and roles of women in the world's non-western societies. Special attention is given to symbolic depictions of women along with the relationship of women to the worlds of work, family and politics. Not offered 1989-90.

Staff

355,F CULTURAL STUDIES OF JAPAN (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Anthropological studies of diverse experiences of education, work, community, nation, person, family, gender, power, and region in Japan.

Traweek, S.

356,S ETHNOGRAPHY OF TRIBAL PEOPLE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Some "people"—for example, the Nuer, the Samoans, the Australian aborigines, the Hopi and the Navajo—have been studied by anthropologists for decades and in a few cases almost a century. This course will review the studies for a particular people, discussing change and permanence in their anthropological description and other related issues. Not offered 1989-90.

Staff

362,S ARCHAEOLOGICAL FIELD TECHNIQUES (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Methods used in field work, laboratory analysis, and interpretation of archaeological data from a local site excavated by the class. Prerequisite: Anth 205.

La Violette, A.

365,S CULTURAL ECOLOGY AND ANCIENT LANDSCAPE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

The interaction of human geography (cultural ecology) and the physical landscape (geomorphology and physical geography) as applied to past and present settlement on major floodplains. Not offered 1989-90.

McIntosh, R.

367 HUMAN EVOLUTION (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Overview of the fossil evidence for human evolution, focusing on when and why our uniquely human characteristics appeared. Not offered 1989-90.

Staff

368 PRIMATOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

An introduction to primate diversity, ecology, and sociality, based on what is now known from field studies of wild primate populations. Offered occasionally.

Staff

370,S SOCIOBIOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Explores the evolutionary biology of social behavior in non-human primates and other animals before examining the extent to which these principles are or are not applicable to human beings. Offered occasionally.

Staff

381 MEDICAL ANTHROPOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Cultural, ecological, and biological perspectives on human health and disease throughout the world. Not offered 1989-90.

Georges, E.

383,F HUMAN ADAPTATION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Explanations for the range and patterns of human biological differences in the context of theories of adaptation. Integrates themes from human genetics, physiology, and cultural studies. Not offered 1989-90.

Staff

386,S HUMAN NUTRITION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

The anthropology of eating: nutrient requirements; assessment of nutritional status; food selection; symbolic, psychological, and cultural aspects of food and food consumption.

Georges, E.

388,F THE LIFE-CYCLE: A BIOCULTURAL VIEW (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

The human life cycle from conception to death. Focus is on the interaction between biological processes and culture.

Georges, E.

402,F SYNTAX AND SEMANTICS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Study of semantic categories and their formal expression in morphological, syntactic, and lexical units and patterns. Also offered as Ling 402.

Davis, P.

404,F/S INDEPENDENT STUDY (3-0-3)

Directed reading and preparation of written papers on anthropological subjects not offered in the curriculum and advanced study of subjects on which courses are offered.

Staff

406,S COGNITIVE STUDIES IN ANTHROPOLOGY AND LINGUISTICS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Relations between thought, language, and culture. Special emphasis given to natural systems of classification and the logical principles underlying them. Not offered 1989-90. Also offered as Linguistics 406.

Tyler, S.

407,F FIELD TECHNIQUES AND ANALYSIS (3-0-3)

Techniques and practice in the observation, analysis, and recording of a human language. Also offered as Ling 407.

Staff

408,S FIELD TECHNIQUES AND ANALYSIS (3-0-3)

Continuation of Anth 407. Also offered as Ling 408.

Staff

410 THE ETHNOGRAPHY OF DEVELOPMENT (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

This course suggests the necessity of a solid ethnographic grounding for both practical development work and for further intellectual growth of the discipline. Offered occasionally.

Staff

411,S NEUROLINGUISTICS: LANGUAGE AND THE BRAIN (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Organization of the brain: localization of speech, language, and memory functions; hemispheric dominance; and pathologies of speech and language associated with brain damage. Also offered as Ling 411.

Tyler, S.

414,F HERMENEUTICS AND LINGUISTIC ANTHROPOLOGY (3-0-3)

Application of linguistic theory and method in the analysis of cultural materials. Discourse analysis; the structure and interpretation of texts and conversation. Also offered as Ling 414.

Tyler, S.

420,S ARCHAEOLOGY OF PREHISTORIC ART (3-0-3)

Critical evaluation of interpretations of ancient rock art, with concentration on the Rice Lower Pecos project. Students will learn the Apple program developed for this project and will take field trips to the rock shelter sites. Prereq- Anth 205.

La Violette

446,S ADVANCED TOPICS IN BIOMEDICAL ANTHROPOLOGY (3-0-3)

Seminar on contemporary research on the biomedical aspects of human health and disease. Includes topics from medical ecology and epidemiology. Not offered 1989-90.

Georges, E.

458,S HUMAN OSTEOLOGY (3-0-3)

Introduction to the analysis of human skeletal material from archaeological sites. Not offered 1989-90.

McIntosh, S.

460,S ADVANCED ARCHAEOLOGICAL THEORY (3-0-3)

History and analysis of the major currents of archaeological theory from the Encyclopaedist origins of positivism, through cultural evolutionism and historical particularism, to the New Archaeology and current trends. Prereq- Anth 205. Not offered 1989-90.

McIntosh, R.

490,F DIRECTED HONORS RESEARCH (3-0-3)

A two-semester sequence of independent research culminating in the preparation and defense of an honors thesis. Open only to candidates formally accepted into the honors program.

Staff

491,S DIRECTED HONORS RESEARCH (3-0-3)

See Anth 490.

Staff

501,F SOCIAL/CULTURAL ANTHROPOLOGY (3-0-3)

Georges, E.

506,F HISTORY OF ANTHROPOLOGICAL IDEAS (3-0-3)

See Anth 306.

Marcus, G.

508,F/S HISTORY AS A CULTURAL MYTH (3-0-3)

See Anth 308.

Taylor, J.

509,F CULTURAL STUDIES OF SCIENCE (3-0-3)

See Anth 309.

Traweek, S.

513,F LANGUAGE AND CULTURE (3-0-3)

See Anth 313.

Tyler, S.

514,F ORALITY, LITERACY & CULTURE (3-0-3)

See Anth 314.

Maranhão, T.

515,F EMPIRICAL AND PHILOSOPHICAL ANTHROPOLOGY (3-0-3)

See Anth 315.

Maranhão, T.

516,S SHAMANISM (3-0-3)

See Anth 316.

Staff

524,S CULTURE OF ANCIENT GREECE (3-0-3)

See Anth 224.

Maranhão, T.

**533,S CONTEMPORARY TRENDS IN SOCIAL AND CULTURAL THEORY
(3-0-3)**

See Anth 333.

Fischer, M.

536,S THE ART OF ETHNOGRAPHY (3-0-3)

See Anth 336.

Marcus, G.

540,F/S CAMERA AND CULTURE (3-0-3)

See Anth 340.

Traweek, S.

545,F THE PERSON ACROSS CULTURES (3-0-3)

See Anth 345.

Maranhão, T.

547,S CULTURE OF EXPERTISE (3-0-3)

See Anth 347.

Staff

548,F AMERICA AS A CULTURE (3-0-3)

See Anth 348.

Fischer, M.

550,S INDIANS OF THE AMERICAS (3-0-3)

See Anth 350.

Staff

174 COURSES OF INSTRUCTION

553,S CULTURES OF INDIA (3-0-3)

See Anth 353. 10

Tyler, S.

554,F WOMEN IN NON-WESTERN SOCIETIES (3-0-3)

See Anth 354.

Staff

555,F/S CULTURAL STUDIES OF JAPAN (3-0-3)

See Anth 355.

Traweck, S.

556,S ETHNOGRAPHY OF TRIBAL PEOPLE (3-0-3)

See Anth 356.

Staff.

565,S CULTURAL ECOLOGY AND ANCIENT LANDSCAPE (3-0-3)

See Anth 365.

Staff

567,F HUMAN EVOLUTION (3-0-3)

See Anth 367.

Staff

568,F PRIMATOLOGY (3-0-3)

See Anth 368.

Staff

570,S SOCIOBIOLOGY (3-0-3)

See Anth 370.

Staff

581,F MEDICAL ANTHROPOLOGY (3-0-3)

See Anth 381.

Georges, E.

583,F HUMAN ADAPTATION (3-0-3)

See Anth 383.

Staff

586,S HUMAN NUTRITION (3-0-3)

See Anth 386.

Staff

600,F/S INDEPENDENT STUDY (3-0-3)

Staff

601,S GRADUATE PROSEMINAR IN ANTHROPOLOGY (3-0-3)

Mapping the current fields of anthropological discourses, examining the debates in and between each of these fields, and discussing how these debates are conducted in the domains of fieldwork, ethnographic writing, and in the construction of careers in anthropology.

Traweck, S.

606,S COGNITIVE STUDIES IN ANTHROPOLOGY AND LINGUISTICS

(3-0-3)

See Anth 406.

Tyler, S.

607,F FIELD TECHNIQUES AND ANALYSIS (3-0-3)

See Anth 407.

Staff

608,S FIELD TECHNIQUES AND ANALYSIS (3-0-3)

See Anth 408.

Staff

610,S THE ETHNOGRAPHY OF DEVELOPMENT (3-0-3)

See Anth 410.

Staff

614,F HERMENEUTICS AND LINGUISTIC ANTHROPOLOGY (3-0-3)

See Anth 414.

Tyler, S.

620,S ARCHAEOLOGY OF PREHISTORIC ART (3-0-3)

See Anth 420.

McIntosh, R.

646,S ADVANCED TOPICS IN BIOMEDICAL ANTH (3-0-3)

See Anth 446.

Georges, E.

658,S HUMAN OSTEOLOGY (3-0-3)

See Anth 458.

McIntosh, S.

660,S ADVANCED ARCHAEOLOGICAL THEORY (3-0-3)

See Anth 460.

McIntosh, R.

800,F/S RESEARCH AND THESIS (Credit variable)

Staff

School of Architecture

Professor Paul A. Kennon, Dean

Professor Alan Balfour, Associate Dean

Professors Cannady, Casbarian, Mitchell, Papademetriou, and Todd

Visiting Professors Wilford and Samuels

Associate Professors Parsons, Waldman, and Wittenberg

Assistant Professors Bavinger, Ingersoll, Pope, and Sherman

Lecturers Blackburn, Colaco, Cunningham, Ford,

Mixon, Reiner, and White

Degrees Offered: B.A., B.Arch., M.Arch., M.Arch. in Urban Design, D.Arch.

Preceptors

Architektengroep loerakker
Amsterdam, The Netherlands

Cambridge Seven Associates
Cambridge, Massachusetts

Gensler and Associates, Inc.
San Francisco, California

Holzbauer Architects
Vienna, Austria

Kaplan, McLaughlin, Diaz
San Francisco, California

Kliment and Halsband
New York, New York

Kohn, Pedersen & Fox Architects
New York, New York

Machado & Silvetti Assoc., Inc.
Boston, Massachusetts

Mitchell/Giurgola Associates
New York, New York

Morphosis
Los Angeles, CA

Murphy/Jahn
Chicago, Illinois

I.M. Pei & Partners
New York, New York

Cesar Pelli & Associates
New Haven, Connecticut

RTKL Associates
Dallas, Texas

RTKL Associates
Baltimore, Maryland

Harry Seidler Associates
Sydney, Australia

Skidmore, Owings & Merrill
Chicago, Illinois

Skidmore, Owings & Merrill
New York, New York

Stein, Doshi & Bhalla Architects
Ahmedabad, India

Robert A. Stern Architects
New York, New York

James Stirling — Michael Wilford &
Assoc.
London, England

Taller De Arquitectura
Barcelona, Spain

Charles Tapley Associates
Houston, Texas

Venturi Rauch, Scott-Brown
Philadelphia, Pennsylvania

Wallace, Roberts & Todd
Philadelphia, Pennsylvania

The School of Architecture seeks to contribute through teaching and research to a more humane environment. Its primary educational missions are teaching and research, development of a broad liberal education for undergraduates in the allied sciences and arts of architecture, and professional education at the graduate and postgraduate level in architecture and urban design.

These programs are offered in the setting of a small school to provide intimate student-faculty interaction, freedom for learning, and unrestricted institutional cooperation within and outside the University.

Degrees Offered. Five degrees are offered: Bachelor of Arts, Bachelor of Architecture, Master of Architecture, Master of Architecture in Urban Design, and Doctor of Architecture. The Bachelor of Arts, a liberal arts degree, may emphasize a major in either architecture or architectural studies; the two programs are described below. The B.A. is awarded after successful completion of the first four years of study. The Bachelor of Architecture is available to recipients of the B.A. degree from Rice and requires two additional years of work, one of which is an in-service preceptorship in a professional office.

The master's degrees are awarded after successful completion of a minimum of two years of study beyond the B.A., depending upon previous undergraduate and professional studies. Recipients of the B.A. degree from Rice normally undertake a minimum of three semesters of further work for one of the Master of Architecture degrees. Approval of Rice students for admission to either bachelor's or master's programs is contingent upon evaluation of the student's undergraduate academic record at the conclusion of the fourth year of study. The Master of Architecture is an accredited first professional degree, whereas the Master of Architecture in Urban Design requires prior or concurrent completion of accredited bachelor's or master's degrees.

Undergraduate Program. For both the B.A. and the B.Arch. degrees, the first two years center upon a carefully integrated study of the principles of architecture. In the third and fourth years, students are encouraged to develop their own interests through more specialized study of particular aspects of the field in studio, seminar, and lecture courses.

Below is a suggested course of study for either the B.A. or the B.Arch. degree. The order in which courses are taken is optional, subject to the following exceptions: (1) health and physical education must be taken in the first year, and (2) failure to take prerequisite courses in the earlier years may result in later scheduling problems.

Typical Curriculum

First semester (fall):

Architecture 101a —

Principles of Architecture I
(studio);

History of Art 205a —

Introduction to the History of Art;

Physics 101a — Mechanics of Physics
or Physics 121a — Technical

Physics

I; two other courses and physical
education.

Second semester (spring):

Architecture 102b —

Principles of Architecture I
(studio);

History of Art 206b —

Introduction to the History of Art;
Architecture 132b — Changing

Perspectives of Architecture;

Physics 102b — Electricity and

Magnetism or

Physics 122b — Technical Physics II;

two other courses and physical
education.

Third semester (fall):

Architecture 201a —
Principles of Architecture II
(studio);
History of Art 345a — Renaissance
and Baroque Architecture;
Architecture 213a — Structural
and Constructional Systems I;
an elective in studio art;
one other course.

Fifth semester (fall):

Architecture 301a — Principles
of Architecture III (studio);
Architecture 315a — Intermediate
Architectural Technology;
an elective in the social sciences;
an elective in studio art or visual
communications;
one other course.

Seventh semester (fall):

Architecture 401a — Principles
of Architecture IV (studio);
an elective in environmental sciences;
three other courses.

Fourth semester (spring):

Architecture 202b — Principles of
Architecture II (studio);
History of Art 346b —
Modern Architecture;
Architecture 214b — Structural
and Constructional Systems II;
two other courses.

Sixth semester (spring):

Architecture 302b — Selected
Architectural Problems I (studio);
Architecture 316b — Intermediate
Architectural Technology;
an elective in social science;
two other courses.

Eighth semester (spring):

Architecture 402b — Selected
Architectural Problems II (studio);
an elective in environmental sciences;
three other courses.

The four-semester Bachelor of Architecture sequence complements the preprofessional undergraduate architecture major offered at Rice. It begins with a two-semester preceptorship (Architecture 500a,b — Preceptorship I and II) assigned to graduating seniors in the offices of leading practitioners in the United States and abroad. The preceptorship is followed by two semesters of studio and course work at the graduate level.

Typical Curriculum

First semester (fall):

Architecture 500a — Preceptorship I.

Third semester (fall):

Architecture 601a —
Architectural Problems (studio) or
Architecture 603a — Urban Design
Workshop; or
Architecture 605a — Building Design
Workshop;
two or three elective courses.

Second semester (spring):

Architecture 500b — Preceptorship II.

Fourth semester (spring):

Architecture 602b —
Architectural Problems (studio) or
Architecture 604b —
Urban Design Problems (studio) or
Architecture 608b — Design
Thesis (studio)
two or three elective courses to satisfy
minimum degree requirement
of five electives.

Architecture 607a — Design Thesis (seminar) is a prerequisite for Architecture 608b. At least one urban design studio must be completed before graduation either as part of the preprofessional undergraduate major or as part of the Bachelor

of Architecture program. Students must also take at least one elective course in urban design and two in building design. Architecture 605a — Building Design Workshop may be taken in lieu of the third semester studio.

The following information outlines the requirements for undergraduate degrees in the School of Architecture:

1. For a **Bachelor of Arts degree with a major in Architecture** the requirements are 95 semester hours credit chosen from architecture and nondepartmental listings in a manner satisfying School of Architecture distribution requirements *plus* 36 semester hours credit of electives for a *total* of 131 semester hours credit that complete University distribution requirements.
2. For a **Bachelor of Arts degree with a major in Architectural Studies** the requirements are 53 hours credit chosen from architecture and nondepartmental listings in a manner satisfying School of Architecture distribution requirements *plus* 78 semesterhours credit of electives for a *total* of 131 semester hours credit that complete university distribution requirements.
3. For a **Bachelor of Architecture degree** the requirements are: completion of a B.A. degree with a major in architecture (see 1 above); completion of a two-semester Preceptorship (30 semester hours credit); and completion of two studios and four lecture-seminar courses (32 semester hours credit).

B.A. students have two options in their choice of a preprofessional major during the third and fourth years:

1. The **architecture major** requires two years of advanced studio courses and additional professional group requirements that permit reasonable elective freedom. This curriculum serves the needs of students who anticipate professional studies at an advanced level and who wish to have the alternatives of doing so through either the Bachelor of Architecture at Rice or various first professional master's degrees at Rice or other institutions.
2. The **architectural studies** major requires two years of advanced work combining architectural studies with other fields. It is focused on an approved, preprofessional theme for interdisciplinary studies chosen by the individual and approved by an adviser. Application to this program must be made during the second year of studies. Reduced architectural course requirements encourage the pursuit of a double major with another department. This curriculum can be regarded as the equivalent of a liberal arts education, but it also offers opportunity to prepare for a wide variety of graduate studies and career options in different design and planning related fields at Rice or other institutions. This program provides opportunity to pursue architectural or urban design master's degree programs at Rice by entering through the Qualifying Graduate Program, but it does not include the option of a Rice Bachelor of Architecture.

Upon satisfactory completion of the B.A. degree with either above major, students may apply during the senior year for admission to the appropriate advanced professional degree programs.

Auxiliary services at Rice span the gap between school and practice: the preceptorship program, the visiting lecturer series, and the visiting critic series. The preceptorship program is designed to bridge classroom studio learning and professional practice. Qualified students who have been admitted to the professional degree programs work for an entire year with outstanding architects throughout the world who are designated by the school as preceptors. The timing of preceptorship service varies according to the level of design and technical proficiency reached during the B.A. program. For those admitted to the Bachelor of Architecture, the preceptorship occurs immediately on the receipt of the B.A.

Notes

1. History of Art 205, 206 are required in the first two years and will be scheduled where history of art electives are noted. History of Art 345, 346 are required for a major in architecture.
2. Electives must satisfy School of Architecture distribution requirements in addition to general University requirements.
3. Studio courses (Architecture 201, 202; 301, 302; and 401, 402) which carry six semester hours each semester in the sophomore, junior, and senior years count toward graduation as the equivalent of one course per semester in the sophomore year and as two courses per semester in the junior and senior years.
4. Students contemplating later specialization in the fields of structural or environmental engineering are advised to take Mathematics 101, 102 and Physics 101, 102 and 132.

Graduate Programs. The School of Architecture offers the degrees of Master of Architecture and Master of Architecture in Urban Design. Within the two degree programs, varied areas of interest are open to students.

An advanced building design curriculum is the basis for the Master of Architecture degree program. This program is designed to provide the student an individual course of study with a wide choice of special project, research, and internship opportunities both within and outside the School of Architecture.

The first year of the urban design curriculum is composed of studio and lecture courses. The second year allows a student choice and specialization in the areas of interest listed above.

Graduate studies are open to candidates who hold the degree of Bachelor of Architecture, Bachelor of Arts with a major in architecture, or Bachelor of Arts in other disciplines. Candidates with a Bachelor of Arts degree with a major in architecture are normally expected to complete four academic semesters plus one semester of clinical education, which may occur in the intervening summer. Students without sufficient architectural background are expected to complete a program of special studies before admission to one of the graduate options. This program takes a minimum of two semesters, depending on the individual's preparation, and stresses history, theory, technology, and design techniques.

Students not possessing a prior first professional degree and completing the urban design program requirements receive a Master of Architecture degree with a certificate in urban design.

For students having a bachelor's degree with no architectural background, the Qualifying Graduate Program is offered. This is normally a seven-semester program leading to the Master of Architecture degree. The first four semesters consist

of special studio offerings plus selected seminar and lecture courses. The last three semesters are spent in the regular graduate programs.

All candidates for a master's degree must complete a written thesis or a design thesis.

Doctor of Architecture. Admission to the Doctor of Architecture program requires a master's degree in architecture. A student entering with a master's degree normally takes one and one-half years of course work before the qualifying examination. Candidates should be prepared for advanced analytic and creative work in their specialized field. Such preparation may include foreign languages, statistics, or a computer language. This requirement is established individually when the student is admitted.

After successful completion of all required course work plus the language examination or equivalent, students may apply for the qualifying examination. At this time, students must submit an outline of their research program for the doctoral dissertation. This dissertation must represent an original contribution to knowledge in the field of architecture. The completion of the dissertation and the passing of the final oral examination required for the doctorate in architecture take a minimum of one year.

Architecture Courses

01,F PRINCIPLES OF ARCHITECTURE I (2-6-4)

Visual studies of restricted dimensions, explorations using simple tools and materials to develop an awareness of the environment. Requisite for architecture majors. Limited enrollment.

Staff

02,S PRINCIPLES OF ARCHITECTURE I (2-6-4)

A development of communication of formal information from further investigation of visual structures and their order. Requisite for architecture majors. By permission of instructor only.

Staff

02,F CHANGING PERSPECTIVES OF ARCHITECTURE (2-0-2)

Introductory tutorial. Reading, field trips, and observation of current events and public affairs to understand the values, institutions, and nature of environmental changes relating to future role and practice of architecture.

Mitchell, O.

02,S CHANGING PERSPECTIVES OF ARCHITECTURE (2-0-2)

Introductory tutorial. Reading, field trips, and observation of current events and public affairs to understand the values, institutions, and nature of environmental changes relating to future role and practice of architecture.

Staff

01,F PRINCIPLES OF ARCHITECTURE II (3-9-6)

Introduction to concepts of beginning architectural design. Manipulation of visual structure to render formal and operational information. Design process as problem solving with emphasis on conscious method. Requisite for architecture majors.

Casbarian, J.

02,S PRINCIPLES OF ARCHITECTURE II (3-9-6)

See Arch 201.

Casbarian, J.

213,F STRUCTURAL AND CONSTRUCTION SYSTEMS I (3-0-3)

Introduction to characteristics of structural & construction systems in architectural technology. Lab experiments are combined with lectures on systems, methods & their historical development.

Staff

214,S STRUCTURAL AND CONSTRUCTION SYSTEMS II (3-0-3)

Application of materials & construction (wood, masonry, concrete & steel). Case studies & field trips.

Cunningham, R

301,F PRINCIPLES OF ARCHITECTURE III (2-12-6)

Intermediate level design problems with emphasis on building technology, programming and formal design. Requisite for preprofessional major in architecture. Prereq- Arch 201 and 202.

Wittenberg, G

302,S SELECTED ARCHITECTURAL PROBLEMS I (2-12-6)

Variety of intermediate level problems for developing comprehensive experience in design methods and processes. Requisite for preprofessional major in architecture. Prereq- Arch 201, 202, 301.

Staff

308,S ARCHITECTURE FOR NON-ARCHITECTS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY 1.2 Designed to increase awareness of architectural issues through site visits and comparative building studies, guest architects, design problems, lectures, reading, and discussion. Impact of architecture on its users and its relation to institutions that produce it. Enrollment by permission of instructor.

Casbarian, J

315,F STRUCTURAL AND CONSTRUCTION SYSTEMS III (3-0-3)

Application of principles of analysis to construction of steel & concrete framed structures. Continuation of Arch 213,214. Prereq- Arch 213, 214.

Cunningham, R

316,S BUILDING CLIMATOLOGY (3-0-3)

An introduction to the thermal performance of buildings. Course is dividedd into 2 parts Building Climatology and Air Conditioning Systems.

Wittenberg, G

321,F INTRODUCTION TO URBAN DESIGN (3-0-3)

Introduction to the field of urban design emphasizing history, theory, and practice. Comparative analyses consider the management of urban growth and change. Open to students outside of architecture.

Mitchell, C

336,F INTRODUCTION TO URBAN ISSUES (3-0-3)

Major issues and problems confronting metropolitan centers; emphasis on 12 physical and built environment. Visiting lecturers on transportation, housing, education, minority problems, new communities, physical development and redevelopment. Course is open to all students.

Reiner, M

343,S CITIES AND HISTORY (3-0-3)

Historical survey of the city from Sumer to the Baroque capitals.

Ingersoll, F

344,S CONSTRUCTION AND DESIGN (3-0-3)

A seminar in which the relationship between the construction of an object and its usefulness is explored. The premise in the course is that the way things are made can be one credible point of departure for the architectural design process.

Parsons, S.

345,F NATURAL ENVIRONMENT FACTORS (3-0-3)

An overview of issues on natural resource consumption and environmental impact pertinent to urban design activities. Also offered as Envi 445.

Blackburn, J.

353,F PHOTOGRAPHY FOR ARCHITECTS (3-0-3)

Exploration of a variety of photographic techniques for architectural research, design, and presentation. Enrollment limited.

White, F.

401,F PRINCIPLES OF ARCHITECTURE IV (12-2-6)

Upper level architectural design problems with an emphasis on program definition in a social context, site planning and building organization. Required for preprofessional major in architecture. Prereq- Arch 301, 302.

Sherman, W.

402,S SELECTED ARCHITECTURAL PROBLEMS II (2-12-6)

See Arch 302.

Staff

412,S ADVANCED DESIGN OF STRUCTURAL SYSTEMS (3-0-3)

Advanced course in structural design. Topics include factors controlling structural design of buildings, floor systems, building systems, facade treatments, long span structures, pneumatic and cable structures, and new structural systems and materials. Case studies will also be conducted. Prereq- Arch 213,214,315, or equivalent.

Colaco, J., Ford, W.

415,F/S ARCHITECTURAL THEORY AND CRITICISM (3-0-3)

Seminar dealing with landmark texts in architectural theory and criticism.

Sherman, W.

418,F LE CORBUSIER/MODERN ARCHITECTURE (3-0-3)

Examine fundamental issues of modernism in architecture emerging from both European & American sources. Systematic analysis of the works & writings of major 20th - century architects.

Ingersoll, R.

420,F/S HISTORY OF BUILDING TECHNOLOGY (3-0-3)

Survey of the history building technology from ancient times to the present. Lectures cover theory, methods & practical applications.

Wittenberg, G.

423,F/S PROFESSIONALISM AND MANAGEMENT IN ARCHITECTURAL PRACTICE (3-0-3)

Introductory survey of professional practice in architecture.

Staff

424,S COMPUTER AIDED DESIGN (3-0-3)

Advanced computer graphic techniques using CAD in architecture as a design and presentation medium. Prereq- Arch 422 or 622 or permission of instructor.

Bavinger, B.

427,F DUALITIES IN ARCHITECTURE (3-0-3)

A course in design theory built around the theme of recurrent dualities in form and function. Course material covers the composition of building forms and culminates with an examination of the urban fabric.

Sta

427,S DUALITIES IN ARCHITECTURE (3-0-3)

A course in design theory built around the theme of recurrent dualities in form and function. Course material covers the composition of building forms and culminates with an examination of the urban fabric.

Sta

434,S INTRODUCTION TO COMPUTER AIDED DESIGN (3-0-3)

Sta

435,F COMPUTER AIDED DESIGN IN ARCHITECTURE (3-0-3)

Continuation of 434 with emphasis on use of advanced software, 3-D, etc.

Sta

436,S COMPUTER AIDED DESIGN (3-0-3)

Advanced computer graphic techniques using CAD in architecture as a design and presentation medium.

DeLaura, L

437,F COMPUTER PROJECTS IN ARCHITECTURE AND URBAN DESIGN (3-0-3)

Individual projects in the application of computer technology to architectural programming, planning, and urban design, graphic display, and problem analysis.

Bavinger, E

438,S COMPUTER PROJECTS IN ARCHITECTURE AND URBAN DESIGN (3-0-3)

Theory and practice of computer-aided design for application to architecture, urban design and planning, including instruction in special programming techniques, graphic display and data base management. Prereq- Arch 437, 637 or permission of instructor.

Bavinger, E

440,S HOUSING TYPOLOGIES (3-0-3)

Exploration of the development and elaboration of housing types at the building and urban scale.

Sta

451 ARCHITECTURAL MEASURED DRAWINGS (3-0-3)

Analysis of historic and contemporary examples of architecture and civil engineering through measured drawings. Permission of instructor required. Not offered every year.

Sta

461,F/S SPECIAL PROJECTS (Credit variable)

Independent research or design arranged in consultation with a faculty member. Subject to approval of faculty adviser and director. Very limited enrollment.

Casbarian, J

500,F/S PRECEPTORSHIP PROGRAM (0-0-15)

Requisite for admission to graduate studies in architecture for all recipients of Rice B.A. degrees in preprofessional or area majors. Student completes nine to twelve months of full time internship under guidance of an appointed preceptor.

Casbarian, J

501,F QUALIFYING GRADUATE WORKSHOP I (10-15-13)

Requisite for admission to graduate professional program options in architecture or urban design for students with nonarchitectural bachelor's degree. Lectures, seminars, laboratories, and design studio projects adjusted to individual needs. Prereq- determined by the Graduate Affairs Committee with the School of Architecture.

Todd, A.

502,S QUALIFYING GRADUATE WORKSHOP II (5-15-10)

See Arch 501.

Waldman, P.

503,F GRADUATE WORKSHOP III (5-15-10)

Design studio to follow Arch 501, 502. Preparation for entering studios in the regular graduate programs in architecture and urban design in the following semester.

Parsons, S.

504,S GRADUATE WORKSHOP IV (5-15-10)

See Arch 503.

Pope, A.

514,S BUILDING TECHNOLOGY AND STRUCTURES I (3-0-3)

A course in structures for students in the Qualifying Graduate Program. Topics include: structure in architecture; forces and equilibrium; structural materials; the behavior, analysis, and design of structural elements and their connections.

Cunningham, R.

515,F BUILDING TECHNOLOGY AND STRUCTURES II (3-0-3)

A second course in structures for students in the Qualifying Graduate Program. Topics include: additional topics in the behavior, analysis, and design of structural elements; synthesis of structural elements into structural systems; integration of structural systems with other building systems. Prereq- Arch 514.

Cunningham, R.

516,S BUILDING CLIMATOLOGY (3-0-3)

See Arch 316.

Wittenberg, G.

541,F ISSUES IN CONTEMPORARY ARCHITECTURE (3-0-3)

A survey of the development reappraisal and transformation of architectural ideals in the period since 1945.

Pope, A.

542,S ISSUES IN CONTEMPORARY ARCHITECTURE (3-0-3)

See Arch 541.

Pope, A.

544,S CONSTRUCTION AND DESIGN (3-0-3)

See Arch 344.

Parsons, S.

600,F QUALIFYING GRADUATE PRACTICAL INTERNSHIP (3-0-3)

Practical work experience for students who have completed at least four semesters in the Qualifying Graduate Program prior to their entrance into the regular Master of Architecture studio sequence. Permission of instructor required. Very limited enrollment.

Todd, A.

600,S QUALIFYING GRADUATE PROGRAM INTERNSHIP (Credit variable)

Practical work experience for students who have completed at least four semesters in the Qualifying Graduate Program prior to their entrance into the regular Master of Architecture studio sequence. Permission of instructor required. Very limited enrollment.

Todd, A.

601,F INVESTMENT BUILDING DESIGN STUDIO (5-15-10)

Emphasis on abstract thought and design capabilities relevant to systematic processes of designing specific buildings and facilities. Prereq-Arch 500; or Arch 501- 504.

Cannady, W.

602,S ARCHITECTURAL PROBLEMS (5-15-10)

Emphasis on abstract thought and design capabilities relevant to systematic processes of designing specific buildings and facilities. Prereq- Arch 500 or Arch 501- 504.

Ingersoll, R., Samuels, D.

603,F URBAN DESIGN WORKSHOP I (5-15-10)

Introductory studio in urban design with an emphasis on exploration of social and environmental forces shaping urban form, as well as the representation of urban design ideas. The workshop is conducted as a sequence of analytical and design exercises. Requisite for M. Arch. Urban Design degree. Prereq- Arch 501-504 or Arch 500.

Staff

604,S URBAN DESIGN WORKSHOP II (5-15-10)

Developing abstract thought, applied design and planning capabilities to total urban systems, large-scale developments, or other broad environmental action. Requisite for M. Arch. Urban Design degree. Prereq- Arch 603.

Visiting Critic

606,F/S THESIS (5-15-10)

Independent investigations in architecture or urban design, culminating in preparation and presentation of a master's thesis.

Staff

608,S DESIGN THESIS: STUDIO (5-15-10)

A design studio, following Arch 607, where a building program is carried from predesign analysis, through design, to design development. Prereq- Arch 501- 504, Arch 607.

Staff

609,S ARCHITECTURE FOR NON-ARCHITECTS (3-0-3)

Classroom teaching under the supervision of the instructor. For elective credit only.

Casbarian, J.

612,S ADVANCED DESIGN-STRUCTURAL SYSTEMS (3-0-3)

See Arch 412.

Colaco, J., Ford, W.

615,F/S ARCHITECTURAL THEORY AND CRITICISM (3-0-3)

Seminar dealing with landmark texts in architectural theory and criticism. See Arch 415
Prereq- permission of instructor.

Sherman, W.

618,F LE CORBUSIER/MODERN ARCHITECTURE (3-0-3)

Same as Arch. 418.

Ingersoll, R.

620,F HISTORY OF BUILDING TECHNOLOGY (3-0-3)

Same as Arch 420.

Wittenberg, G.

620,S HISTORY OF BUILDING TECHNOLOGY (3-0-3)

Same as Arch 420.

Staff

621,F INTRODUCTION TO URBAN DESIGN (3-0-3)

Comparative analysis of recent theory and practice in projecting and controlling urban growth and change. See Arch 341.

Mitchell, O.

622,F INTRODUCTION TO COMPUTER GRAPHICS (3-0-3)

Advanced theory and practice of computer graphics applications in architecture including instruction in both conceptual aspects and programming techniques. See Arch 422.

Bavinger, B.

624,S COMPUTER-AIDED DESIGN (3-0-3)

See Arch 424.

Bavinger, B.

627,F DUALITIES IN ARCHITECTURE (3-0-3)

See Arch 427.

Waldman, P.

627,S RECURRENT DUALITIES IN ARCHITECTURE (3-0-3)

See Arch 427.

Staff

635,F COMPUTER AIDED DESIGN IN ARCHITECTURE (3-0-3)

Special projects for advanced students in computer applications. (Same as Arch 435.) 15
Prereq- permission of instructor.

Staff

635,S COMPUTER PROJECTS IN ARCHITECTURE AND URBAN DESIGN (3-0-3)

Special projects for advanced students in computer applications. (Same as Arch 435.) Prereq-
permission of instructor.

Bavinger, B., DeLaura, L.

636,F INTRODUCTION TO URBAN ISSUES (3-0-3)

See Arch 336.

Reiner, M.

636,S COMPUTER AIDED DESIGN (3-0-3)

See Arch 336.

DeLaura, L.

637,F COMPUTER PROJECTS IN ARCHITECTURE AND URBAN DESIGN (3-0-3)

See Arch 437.

Bavinger, B., DeLaura, L.

638,S COMPUTER PROJECTS IN ARCHITECTURE AND URBAN DESIGN (3-0-3)

See Arch 438.

Bavinger, B.

643,S THE HISTORY OF THE CITY (3-0-3)

See Arch 343.

Ingersoll, R.

645,F NATURAL ENVIRONMENT FACTORS (3-0-3)

See Arch 345.

Blackburn, J.

652,S PLANNING LAW AND LAND DEVELOPMENT (3-0-3)

Legal and economic considerations in practical land and building development; public controls, private/public sector relationships, entrepreneurial objectives, financing methods. Case studies in total development "packaging."

Mixon, J.

665,F GRADUATE SEMINAR - ARCHITECTURAL DESIGN (3-0-3)

Seminars structured around topics dealing with design theory, with special emphasis on participation by visiting critics and professors.

Staff

666,S GRADUATE SEMINAR - ARCHITECTURAL DESIGN (3-0-3)

Same as Arch 665.

Visiting Critics

700,F/S PRACTICUM (3-0-3)

Full-time internship service in approved local offices under interdisciplinary supervision. Emphasis on "real world" design, planning, or research experiences. Special tuition. May be taken in any semester or in summer.

Cannady, W.

701,F/S DESIGN THESIS RESEARCH (3-0-3)

Cannady, W.

702,F/S DESIGN THESIS STUDIO (3-0-3)

Cannady, W.

705,F WRITTEN THESIS RESEARCH (3-0-3)

Seminar for students enrolled in Arch 606.

Cannady, W.

706,F WRITTEN THESIS STUDIO (3-0-3)

Cannady, W.

706,S THESIS (3-0-3)

Wittenberg, G.

711,F/S SPECIAL PROJECTS (Credit variable.)

Independent research or design arranged in consultation with a faculty member subject to approval of the student's faculty adviser and director.

Cannady, W.

714,F/S INDEPENDENT DESIGN PROJECTS (Credit variable.)

Cannady, W.

800,F/S GRADUATE RESEARCH (Credit variable.)

Cannady, W.

Art and Art History

Professor G.L. Winningham, Chair

Professors Camfield, Havens and Poulos

Associate Professors Boterf, (on leave fall 1989), Broker, (on leave 1989-90),

Huberman, (on leave spring 1990), G. Smith and Widrig

Assistant Professors Brown, Manca, Sparagana and Wilson, (on leave fall 1989)

Lecturer, Dobbins

**Visiting Lecturers Davezac, Goldman, McEvilley, Muntasser, Parslow and
Steinhoff-Morrison**

Degrees Offered: B.A., B.F.A., M.A.

The Department of Art and Art History offers courses in three distinct disciplines: the history of art, studio art (painting, drawing, sculpture, etc.), and film and photography. Majors may elect to concentrate their study in any of these areas of specialization.

Undergraduate Program. A minimum of 38 semester hours is required for the full major, including at least 11 semester hours in the history of art and nine semester hours selected from studio, film, or photography. Double majors must take a minimum of 32 semester hours, including at least three courses in both the creative arts and the history of art. All majors must complete the two semesters of the introductory survey, History of Art 205 and 206. For all majors at least 50 percent of the required number of courses must be at the 300- or 400-level, of which more than 50 percent must be taken at Rice.

In addition to the departmental requirements for the major, students must also satisfy all the University requirements for the B.A. degree. See Degree Requirements and Majors, pages 63-84.

A reading knowledge of French, German, or Italian is strongly recommended for all majors, especially those who intend to take 300- or 400-level courses in the history of art.

Students interested in further guidance in planning the Bachelor of Arts degree with a major in art and art history should consult departmental faculty advisers.

Bachelor of Fine Arts Program. The Bachelor of Fine Arts program consists of a fifth year of intensive study in the creative arts to be taken after a student has obtained a B.A. degree in art at Rice or its equivalent at another university. Candidates possessing a B.A. degree with a major in a field other than art may in exceptional cases be admitted to the program. Special fifth-year courses are available to the B.F.A. candidate only, in addition to advanced courses normally offered by the department. Satisfactory completion of a total of 30 semester hours in approved courses or the equivalent in approved major electives at the 300-, 400-, or 500-level is required for the B.F.A. degree.

Admission to the program is determined by the Committee on Examinations and Standing on recommendation of the Bachelor of Fine Arts Committee in the

Department. For further information about application forms, deadlines, admission standards, and the like, write to the chairman of the Department of Art and Art History.

Graduate Program. Qualified students are eligible to apply for the graduate program leading to a degree of Master of Arts in art history with an option in classical archaeology. Areas of concentration in art history are those in the western tradition of European and American Art. Graduate work is also possible in Asian Studies.

Graduate fellowships and scholarships are awarded on the basis of scholarly achievement and available funds. Fellowships consist of a stipend and a waiver of tuition; scholarships provide only a waiver of tuition. Graduate students as part of their training may be expected to render some service as research assistants, tutorial instructors, or curatorial assistants in the Sewall Art Gallery.

Entering students must pass a reading examination in either French or German. In classical archaeology, students must pass a reading examination in one of the following languages: French, German, Italian, Greek, or Latin. Other languages may be required depending on the course of studies chosen by the student. Upon entrance, students may be required to take an examination to be used as a guide in determining their programs.

Requirements for the Degree of Master of Arts:

1. Complete with high standing a minimum of 30 hours of graduate course work to include a 3-hour course in art historical concepts, history, and methods of research; a 9-hour thesis in the second year; and 18 hours of lecture, seminar, and reading courses. For students in classical archaeology, 6 hours must be in archaeological field experience applied to specific research in addition to the above requirements.
2. Pass satisfactorily a comprehensive examination in the second year.

Sewall Art Gallery

Stella Dobbins, Director

Sewall Art Gallery, located on the main floor of Sewall Hall, functions as an extension of the teaching activities in the Department of Art and Art History, but is also oriented to the larger university and Houston community. The gallery actively collects art works which are used for instruction, research, loan, and exhibitions. Four to six exhibitions are mounted during the academic year, focusing on historical and contemporary presentations of painting, sculpture, and graphic, video, and performance arts. The gallery is staffed by a professional coordinator and students, who gain experience in museum registration methods, exhibition techniques, and other aspects of museum work. Junior, senior, or graduate students interested in museum experience may also apply for the Museum Internship, offered in cooperation with local museums (see History of Art 496).

History of Art and Architecture

History of Art Courses

205,F INTRODUCTION - HISTORY OF ART (4-0-4)*** DISTRIBUTION COURSE: CATEGORY I.2**

A survey of painting, sculpture, and architecture from the Paleolithic period to the fourteenth century. An additional hour of tutorial per week will be assigned during the first week.

Widrig, W.

206,S INTRODUCTION - HISTORY OF ART (4-0-4)*** DISTRIBUTION COURSE: CATEGORY I.2**

A survey of painting, sculpture, and architecture from the Renaissance to the twentieth century. An additional hour of tutorial per week will be assigned during the first week. Hart 205 strongly recommended.

Camfield, W.

209 INTRODUCTION TO ASIAN ART (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

A survey of the art of Asia from the Neolithic period to the present. Not offered 89-90.

Wilson, R.

218,S HISTORY OF FILM (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

Classic films from both silent and sound eras. Griffith, Eisenstein, Chaplin, Stroheim, Sternberg, Renoir, Renais, Godard, Bergman, and others. Attention to technique, theory, principles of criticism, relationship to art history in general. Students who have already taken Hart 215 or Hart 216 not eligible for credit.

McEvilley, T.

291,F SPECIAL TOPICS (Variable)

Courses at the introductory level or special research and reading. May be used in awarding transfer credit. Prereq. permission of instructor.

Staff

292,S SPECIAL TOPICS (3-0-3)

Staff

293,F SPECIAL TOPICS (3-0-3)

Staff

294,S SPECIAL TOPICS (3-0-3)

Staff

295,F SPECIAL TOPICS (3-0-3)

Staff

296,S SPECIAL TOPICS IN FILM HISTORY (3-0-3)

A changing set of topics. Will focus attention on themes such as auteur theory, directoral signature, film and semiotics, film and social control, film and revolution, film and Christianity, surrealist film, film and the other arts, etc.

McEvilley, T.

305,F GREEK ART AND ARCHEOLOGY (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

The Bronze Age; tangible remains of Greek culture from its beginning to the end of the Archaic period.

Parslow, C.

192 COURSES OF INSTRUCTION

306,S GREEK ART AND ARCHAEOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY 1.2**

Development from Early Classical through Hellenistic periods.

Parslow, C.

308,S ROMAN ART AND ARCHAEOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY 1.2**

The painting, sculpture, and architecture of ancient Rome from roots in Etruscan art through the Republican and Imperial eras to the age of Constantine.

Staff

309,S LATE ANTIQUE & EARLY CHRISTIAN ART (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY 1.2**

The adaptation of Late Antique art and architecture to Christian content in the centuries following Constantine.

Widrig

319,S GOTHIC ART (3-0-3)

Mr. Davezac

321,S ART AND THE MIND (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY 1.2**

Selected topics in art history, criticism, esthetics, philosophy and the psychology of art. Previous art history courses desirable but not required.

McEvilley, T.

345,F RENAISSANCE AND BAROQUE ARCH (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY 1.2**

Renaissance architecture considered as a conscious break with medieval practice; its stylistic and theoretical development, primarily in Italy, during the fifteenth, sixteenth, and seventeenth centuries.

Widrig, W.

346,S 19TH-20TH CENTURY ARCH.HISTORY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY 1.2**

The origins of modern architecture in rival modes of the eighteenth and nineteenth centuries; the new architecture of Richardson, Sullivan, and Wright; the International Style of Gropius, Le Corbusier, and Mies to the mid-twentieth century.

Widrig, W.

355,F AMERICAN ART--COLONIAL TO 1900 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY 1.2**

Emphasis on painting and architecture, with some consideration of photography, sculpture, and decorative arts.

Staff

356,S TWENTIETH CENTURY AMERICAN ART (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY 1.2**

Survey of painting, sculpture, photography, and architecture in the United States from 1900 to mid-century.

Camfield, W.

361 CHINESE ART (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY 1.2**

Chinese painting, sculpture, and decorative arts with special consideration of recent archaeological finds. Prereq- Hart 209 or permission of instructor. Not offered 89-90.

Wilson, R.

365,S ARTS OF JAPAN (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

From pre-Buddhist Japanese art to the impact of Chinese and Korean culture and the emergence of indigenous Japanese expression in the arts and architecture. Prereq- Hart 209 or permission of the instructor.

Wilson, R.

415,F ITALIAN RENAISSANCE ART (3-0-3)

Painting, sculpture, and architecture from Giotto to Titian. The major stylistic changes from the Proto-Renaissance to Mannerism, with discussion of the social and intellectual context in which art of this period developed.

Manca, J.

417,S MASTERS OF THE BAROQUE ERA (3-0-3)

A study of the works of the greatest painters and sculptors in Europe during the Baroque period, including Rembrandt, Rubens, Caravaggio, Poussin, Claude, and Velazquez.

Manca, J.

419,F THE 18TH CENTURY (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

The art and architecture of the Age of Enlightenment, including Rococo, Neoclassicism, and early Romanticism.

Staff

461,S NINETEENTH CENTURY ART (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

Major developments in painting and sculpture from late eighteenth-century Neoclassicism and Romanticism through Realism, Impressionism, and Post-Impressionism. Brief consideration of architecture, photography, and decorative arts.

Staff

463,S RECENT TRENDS (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

Consideration of trends in the painting and sculpture of American and Europe from Abstract Expressionism to the present. Emphasis on American Art and criticism. Prereq- Hart 475 or permission of instructor.

Camfield, W.

475,F EUROPEAN 20TH CENTURY ART (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

Consideration of major developments in painting and sculpture from the 1880s to the 1940s: Impressionism and Post-Impressionism through Expressionism, Cubism, Abstraction, Dada, and Surrealism. Brief consideration of architecture and photography.

Camfield, W.

480,F APPROACHES TO ART HISTORY (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

Survey of important approaches to the study of art from antiquity to the present; theories of art; biographies of artists; connoisseurship; art history as a discipline beginning with Winckelmann.

Staff

480,F APPROACHES TO ART HISTORY (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

Survey of important approaches to the study of art from antiquity to the present; theories of art; biographies of artists; connoisseurship; art history as a discipline beginning with Winckelmann.

Camfield, W.

194 COURSES OF INSTRUCTION

482,F BUDDHISM: ART AND FAITH (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Buddhist art (writing, painting, sculpture, architecture, crafts) from the 3rd century B.C. to the 16th century A.D. Some background in Asian culture helpful but not required. Not offered 89-90.

Wilson, R.

483,F ARCHAEOLOGICAL FIELD WORK&RES (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Field work and research applied to specific archaeological problems.

Widrig, W.

484,S ARCHAEOLOGICAL FIELD WORK&RES (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

See Hart 483.

Widrig, W.

489,S LEONARDO AND MICHELANGELO (3-0-3)

The art and thought of the two greatest geniuses of the Italian Renaissance.

Manca, J.

491,F SPECIAL TOPIC: ANCIENT CITIES (3-0-3)

Survey of the development of the ancient city from archaic and classical Athens, through the Hellenistic Greek City, to early Rome, its colonies and the later cities of the Roman Empire.

Parslow, C.

495,F MUSEUM INTERN PROGRAM (Credit variable)

Prereq- permission of instructor.

Dobbins, S.

496,S MUSEUM INTERN PROGRAM (Credit variable)

See Hart 495. Prereq- permission of instructor.

Dobbins, S.

497,F SENIOR THESIS (1-0-1)

Thesis written under the direction of a member of the faculty. Limited to senior art majors.

Prereq- permission of faculty.

Staff

498,S SENIOR THESIS (1-0-1)

See Hart 497.

Staff

499,F INDEPENDENT STUDY (3-0-3)

Dobbins, S.

500,F/S APPROACHES-ART HISTORY (3-0-3)

Graduate level. See Hart 480.

Staff

545,F GRADUATE SEMINAR-RENAISSANCE & BAROQUE ARCHITECTURE (0)

Consideration of theoretical issues involved in the development of the Renaissance-Baroque styles. Individual project assignments. Prereq- Hart 345 or equivalent.

Widrig, W.

546,S GRADUATE SEMINAR-19TH & 20TH CENTURY ARCHITECTURE

(0)

Consideration of special issues related to the several movements of modern architecture. Individual project assignments. Prereq- Hart 346 or equivalent.

*Widrig, W.***575,F TOPICS IN MODERN ART (3-0-3)***Staff***583,F ARCHAEOLOGICAL FIELD WORK&RES (3-0-3)**

Graduate level. See Hart 483,484.

*Widrig, W.***584,S ARCHAEOLOGICAL FIELD WORK&RES (3-0-3)**

See Hart 483.

*Widrig, W.***585,F INDEPENDENT READING (3-0-3)***Camfield, W.***586,S INDEPENDENT READING (3-0-3)***Staff***591,F MASTER OF ARTS THESIS (Credit variable)**

Graduate level courses or special research and reading. Prereq- permission of instructor.

*Camfield, W.***592,F/S MASTER OF ARTS THESIS (Credit variable)***Camfield, W.***594,F SPECIAL TOPICS (3-0-3)***Staff***594,S SPECIAL TOPICS: (3-0-3)***Staff***595,F SPECIAL TOPICS (3-0-3)***Staff***596,F/S SPECIAL TOPICS (3-0-3)**

Prereq- Permission of instructor.

*Staff***597,F MUSEUM INTERN PROGRAM (Credit variable)**

See Hart 495. Prereq- permission of instructor.

*Dobbins, S.***598,S MUSEUM INTERNSHIP (Credit variable)**

See Hart 496. 71 Prereq- permission of instructor.

*Dobbins, S.***800,F/S THESIS AND RESEARCH (Credit variable)***Camfield, W.*

Studio Art, Film and Photography

Arts Courses

101,F DESIGN I (0-6-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Principles of two and three-dimensional design problems exploring individual creative solutions in mixed media. Arch 101 accepted as equivalent.

Smith, G.

205,F PHOTOGRAPHY I (0-6-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Exploration of the basic materials and processes of the photographic medium; viewing, analysis, and discussion of the medium's history and current trends.

Brown, P., Winningham, G.

206,S PHOTOGRAPHY II (0-6-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Second semester photography. Continuation of Arts 205.

Brown, P., Winningham, G.

216,S 35MM PHOTOGRAPHY (0-6-3)

* DISTRIBUTION COURSE: CATEGORY I.2

An introductory course in black and white 35mm photography. Exploration of the materials and process involved in the exposure, development, and printing of 35mm negatives. Class critiques, analysis, and discussion of photographic history. Viewing and discussion of contemporary work.

Brown, P.

225,F/S DRAWING I (0-6-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Introduction to the problems of drawing using various media (pencil, charcoal, pen-and-ink, pastel).

Staff

291,F/S SPECIAL PROBLEMS IN DESIGN (Variable)

Problems at the introductory level in creative art with individual instruction and criticism. May be used in awarding transfer credit.

Staff

292,F/S SPECIAL PROBLEMS IN DRAWING (Variable)

* DISTRIBUTION COURSE: CATEGORY I.2

Staff

293,F/S SPECIAL PROBLEMS IN DRAWING (Variable)

Staff

294,F/S SPECIAL PROBLEMS IN STUDIO ART (Variable)

Staff

295,F/S SPECIAL PROBLEMS PHOTOGRAPHY (Variable.)

Staff

296,S SPECIAL PROBLEMS-FILM & VIDEOTAPE MAKING (Variable.)

Not offered 89-90.

Huberman, B.

301,F PAINTING I (0-6-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Problems in painting, both traditional and experimental, in various opaque media. Prereq- Arts 225 or permission of instructor.

*Sparagana, J.***302,S PAINTING I (0-6-3)**

* DISTRIBUTION COURSE: CATEGORY I.2

See Arts 301. Not offered 89-90.

*Staff***305,F PHOTOGRAPHY III (3-3-3)**

Advanced problems in photography. Emphasis on independent pursuit of projects submitted by the students.

*Brown, P.***306,S PHOTOGRAPHY IV (3-3-3)**

Continuance of Arts 305.

*Winningham, G.***311,F PRINTMAKING I (0-6-3)**

* DISTRIBUTION COURSE: CATEGORY I.2

Etching in black and white, color, and monoprint techniques.

*Goldman, J.***312,S PRINTMAKING II (0-6-3)**

* DISTRIBUTION COURSE: CATEGORY I.2

Etching, including advanced color methods; engraving; and history of etching. Not offered 89-90.

*Staff***313,F LITHOGRAPHY I (0-6-3)**

Stone lithography in black and white.

*Goldman, J.***325,F LIFE DRAWING (0-6-3)**

* DISTRIBUTION COURSE: CATEGORY I.2

Drawing from the model in various media. Prereq- Permission of instructor.

*Poulos, B.***326,S LIFE DRAWING (0-6-3)**

* DISTRIBUTION COURSE: CATEGORY I.2

See Arts 325.

*Sparagana, J.***327,F FILM AND VIDEOTAPE MAKING I (0-5-3)**

* DISTRIBUTION COURSE: CATEGORY I.2

A study of the expressive possibilities of the media. Synchronous sound. using super-eight millimeter film, plus video tape.

*Huberman, B.***328,F FILM AND VIDEOTAPE MAKING I (0-5-3)**

One major film project by the class employing 16 mm film and synchronous sound equipment.

Huberman, B.

198 COURSES OF INSTRUCTION

329,F FILM FORM (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Viewing, analysis, and discussion of modern and classic films. Not offered 89-90.

Huberman, B.

337,S COLOR DRAWING (0-6-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Introduction to color using still lifes and employing various media (pastel and watercolor).

Prereq- permission of the instructor.

Poulos, B.

345,F COLOR PHOTOGRAPHY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Fundamental techniques of color photography, including special problems in color camera work, color negative and transparency processing, and color printing. Prereq- Arts 205, 206.

Winningham, G.

346,S COLOR PHOTOGRAPHY II (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Continuance of Arts 345.

Winningham, G.

365,F SCULPTURE I (0-6-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Sculpture in wood, metal welding, and other sculptural media.

Smith, G.

366,S SCULPTURE I (0-6-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

See Arts 365.

Smith, G.

391,F/S SPECIAL PROBLEMS IN DRAWING (Variable.)

Problems in creative art with individual instruction and criticism. May be used in awarding transfer credit. Prereq- permission of instructor.

Staff

392,F/S SPECIAL PROBLEMS-LIFE DRAWING (Variable.)

Staff

393,F/S SPECIAL PROBLEMS IN PAINTING (Variable.)

Staff

394,F/S SPECIAL PROBLEMS-PRINTMAKING (Variable.)

Staff

395,F/S SPECIAL PROBLEMS-PHOTOGRAPHY (Variable.)

Brown, P., Winningham

396,F SPECIAL PROBLEMS-FILM AND VIDEOTAPE (Variable.)

See Arts 391.

Huberman, B.

397,F SPECIAL PROBLEMS IN SCULPTURE (Variable.)

Smith, G.

420,F/S ADVANCED DRAWING (0-6-3)

Not offered 89-90.

*Staff***423,F/S PAINTING ON PAPER (0-6-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

Oil paint, oil stick, collage, and various contemporary mixed media may be employed. Enrollment limited to 15. Prereq- Drawing I or Arts 101.

*Boterf, C.***424,S WATERCOLOR (0-6-3)**

Both transparent and opaque watercolor media used in a variety of methods. Enrollment limited to 15. Prereq- Drawing I and permission of instructor. Not offered 89-90.

*Staff***427,F FILM AND VIDEOTAPE MAKING II (1-5-3)**

One major film project by each student, using either video or 16 mm film.

*Huberman, B.***428,S FILM AND VIDEOTAPE MAKING II (1-5-3)**

See Arts 427. Not offered 89-90.

*Huberman, B.***432,S FILM GENRE: THE WESTERN (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

The essential American film experience spanning all the years of U.S. cinema. Focusing on the Western, the course concerns itself with the mythic function of this film genre. Not offered 89-90.

*Huberman, B.***445,F/S SPECIAL PROBLEMS IN DRAWING (Variable.)**

Advanced problems in creative art with individual instruction and criticism. May be used in awarding transfer credit. Prereq- permission of instructor.

*Staff***446,F/S SPECIAL PROBLEMS IN DRAWING (Variable.)***Staff***447,F/S SPECIAL PROBLEMS IN LIFE DRAWING (Variable.)***Staff***448,F/S SPECIAL PROBLEMS IN LIFE DRAWING (Variable.)***Staff***449,F/S SPECIAL PROBLEMS IN PRINTMAKING (Variable.)***Staff***450,F/S SPECIAL PROBLEMS IN PRINTMAKING (Variable.)***Staff***451,F/S SPECIAL PROBLEMS IN PAINTING (Variable.)***Staff***452,F/S SPECIAL PROBLEMS IN PAINTING (Variable.)***Staff*

200 COURSES OF INSTRUCTION

453,F/S SPECIAL PROBLEMS-PHOTOGRAPHY (Variable.)

Brown, P.

454,F/S SPECIAL PROBLEMS-PHOTOGRAPHY (Variable.)

Staff

455,F SPECIAL PROBLEMS- FILM AND VIDEOTAPE (Variable.)

Huberman, B.

456,F SPECIAL PROBLEMS- FILM AND VIDEOTAPE (Variable.)

See Arts 445.

Huberman, B.

457,F SPECIAL PROBLEMS IN SCULPTURE (Variable.)

Smith, G.

458,F/S SPECIAL PROBLEMS IN SCULPTURE (Variable.)

Smith, G.

465,F/S SCULPTURE II (0-6-3)

Advanced problems in various sculptural media. Prereq- Arts 365, 366.

Smith, G.

466,S/F SCULPTURE II (0-6-3)

Smith, G.

475,F PAINTING II (0-6-3)

Advanced problems in painting. Emphasis on independent development and participation in class critiques. Prereq- permission of instructor.

Poulos, B.

476,S PAINTING II (0-6-3)

See Arts 475.

Poulos, B.

501,F STUDIO I: PAINTING (0-6-3)

Individual work in the studio arts, film, or photography under the direction of one or more staff members. Restricted to B.F.A. degree candidates.

Staff

502,S STUDIO I: PAINTING (0-6-3)

See Arts 501.

Staff

503,F STUDIO I: SCULPTURE (0-6-3)

See Arts 501.

Smith, G.

504,S STUDIO I: SCULPTURE (0-6-3)

See Arts 501.

Staff

505,F STUDIO I: DRAWING (0-6-3)

See Arts 501.

Smith, G.

506,S STUDIO I: DRAWING (0-6-3)

See Arts 501.

*Staff***507,F STUDIO I: LIFE DRAWING (0-6-3)**

See Arts 501.

*Staff***508,S STUDIO I: LIFE DRAWING (0-6-3)**

See Arts 501.

*Staff***509,F STUDIO I: DESIGN (0-6-3)**

See Arts 501.

*Staff***510,S STUDIO I: DESIGN (0-6-3)**

See Arts 501.

*Staff***511,F STUDIO I: PRINTMAKING (0-6-3)**

See Arts 501.

*Staff***512,S STUDIO I: PRINTMAKING (0-6-3)**

See Arts 501.

*Staff***513,F STUDIO I: PHOTOGRAPHY (0-6-3)**

See Arts 501.

*Winningham, G.***514,S STUDIO I: PHOTOGRAPHY (0-6-3)**

See Arts 501.

*Staff***515,F STUDIO I: FILMMAKING (0-6-3)**

See Arts 501.

*Huberman, B.***516,S STUDIO I: FILMMAKING (0-6-3)**

See Arts 501.

*Staff***520,F STUDIO II: PAINTING (0-12-6)**

The same as Arts 501-516 with increased credit hours.

*Staff***521,S STUDIO II: PAINTING (0-12-6)**

See Arts 520.

*Staff***522,F STUDIO II: SCULPTURE (0-12-6)**

See Arts 520.

Smith, G.

202 COURSES OF INSTRUCTION

523,S STUDIO II: SCULPTURE (0-12-6)

See Arts 520. 20

Smith, G

524,F STUDIO II: DRAWING (0-12-6)

See Arts 520.

Staff

525,S STUDIO II: DRAWING (0-12-6)

See Arts 520.

Staff

530,F STUDIO II: PRINTMAKING (0-12-6)

See Arts 520.

Staff

531,S STUDIO II: PRINTMAKING (0-12-6)

See Arts 520.

Staff

532,F STUDIO II: PHOTOGRAPHY (0-12-6)

See Arts 520.

Staff

533,S STUDIO II: PHOTOGRAPHY (0-12-6)

See Arts 520.

Staff

534,F STUDIO II: FILMMAKING (0-12-6)

See Arts 533.

Huberman, B.

535,S STUDIO II: FILMMAKING (0-12-6)

See Arts 520.

Staff

546,F STUDIO III: PHOTOGRAPHY (0-18-9)

See Arts 540.

Winningham, G.

547,S STUDIO III: PHOTOGRAPHY (0-18-9)

See Arts 540.

Staff

548,F STUDIO III: FILMMAKING (0-18-9)

See Arts 540.

Huberman, B.

549,S STUDIO III: FILMMAKING (0-18-9)

See Arts 540. Not offered 89-90.

Staff

Theater Courses

227,F/S SPECIAL PROBLEMS (3-0-3)

Topics in theater production, history, or literature tailored to the individual student. Prereq- permission of instructor.

Havens, N.

228,F/S SPECIAL PROBLEMS (3-0-3)

Havens, N.

229,F/S SPECIAL PROBLEMS (3-0-3)

See Thea 227.

Havens, N.

301,F ACTING I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Development of the actor's technique through exercises in body work, concentration, creative imagination, sensory perception, and improvisation. Prereq- permission of instructor.

Havens, N.

302,S ACTING II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Script analysis, characterization, work on acting roles. Prereq- Permission of instructor.

Havens, N.

430,F/S SPECIAL PROBLEMS (3-0-3)

Advanced topics in theater production, history, or literature. Prereq- permission of instructor.

Havens, N.

431,F/S SPECIAL PROBLEMS (3-0-3)

Havens, N.

432,F/S SPECIAL PROBLEMS (3-0-3)

See Thea 430.

Havens, N.

Biochemistry and Cell Biology

Professor K.S. Matthews, Chair

Professors Campbell, Glantz, Olson, Palmer, Rudolph, Schroeffer, Stewart, and J.B. Walker

Associate Professors Beckingham, Bennett, and G. N. Phillips

Assistant Professors Gomer, Gustin, and King

Instructor Cooper

Ecology and Evolutionary Biology

Professor Harcombe, Chair

Professors F.M. Fisher, Philpott, Sass, Subtelny, and C.H. Ward

Associate Professor J.E. Strassman

Assistant Professor Queller
Adjunct Associate Professor Schroder
Instructor Knox
Laboratory Director Caprette

Degrees Offered: B.A., M.A., Ph.D.

The Departments of Biochemistry and Cell Biology and Ecology and Evolutionary Biology offer a broad range of courses in the biosciences: biophysics, biochemistry, ecology, evolutionary biology, plant and animal biology, molecular biology, cell biology, genetics, developmental biology, neurobiology, and advanced courses in these and related areas. B.A. students may elect a major in biology or biochemistry and select courses from this range of topics.

Undergraduate Program. The biological science departments at Rice University have been reorganized, and the curriculum will be integrated and courses offered as Biosciences (BIOS) as of Fall, 1990. Students entering Fall 1989 will enter under the new integrated curriculum and will follow the course plan indicated below.

Students entering prior to Fall 1989 may elect to follow this new course plan, but otherwise are bound to the program previously in effect (see below).

Biochemistry Undergraduate Program for entry prior to Fall 1989

Undergraduate biochemistry majors must complete the following courses

First-year level: Mathematics 101, 102 or 121, 122; Chemistry 101, 102, 105; Physics 101, 102, 132.

Second-year level: Mathematics 211, 212; Chemistry 211, 212, 213, 214; and any advanced physics or mathematics course or Mathematical Science 223 or other approved computer science course.

Advanced level: Biochemistry 361, 362, and 367; Chemistry 311, 312; at least six semester hours of advanced level biochemistry (Biochemistry 461, 472, 481, 482 and/or 466); an additional three semester hours of advanced chemistry, biology, or biochemistry (300-level or above). For double majors, part of the requirement for six hours of advanced biochemistry may be satisfied by 300-level or above science courses in their other major. However, waiver of this requirement must be obtained in writing from the undergraduate advisor and the Chair of the Biochemistry Department.

An undergraduate major in biochemistry must have 48 semester hours in courses numbered 300 or higher to obtain a Bachelor of Arts degree.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester

hours outside the departmental requirements for a total program of at least 129 semester hours. See Degree Requirements and Majors, pages 63-84.

Undergraduate majors in biochemistry are encouraged but not required to pursue independent supervised research in Biochemistry 401 and 402. Concurrent registration in Biochemistry 411 and a thesis are required.

Biology Undergraduate Program for entry prior to Fall 1989

Undergraduate biology majors are required to take eight semester hours in introductory mathematics (Mathematics 101, 102 or 121, 122), seven semester hours of introductory physics (Physics 101, 102, and 132 or 121, 122, 123, or 124), eight semester hours of introductory chemistry (Chemistry 101, 102, and 105), eight semester hours of organic chemistry (Chemistry 211, 212, and 213, 214), eight semester hours of general biochemistry (Biochemistry 361 and 362), and the following courses in biology: Biology 201, 202, 203, and 384. They must take at least six additional advanced biology courses (300-level or higher) for a total of 68 semester hours, plus 60 semester hours beyond the biology requirements.

Students interested in research should contact the departmental undergraduate advisor prior to enrolling in Biology 401 and 405. Students may, under exceptional circumstances, receive credit for research done outside of Rice *only if they have received in advance the authorization of the departmental undergraduate advisor*. They should enroll in Biology 403. *Either Biology 401 or 403 may be taken (but not both), and no more than four semester hours may be applied to the requirements for a biology major.*

Students interested in laboratory teaching should contact the laboratory instructor prior to enrolling in Biology 402.

Students interested in taking a graduate (500-level) course must obtain the consent of the instructor prior to enrollment.

Either Biology 402 or a 500-level course may be taken (but not both), and no more than four semester hours may be applied to the requirements for a biology major.

Premedical. Premedical students who are not majoring in biology are advised to take the following courses: Biology 201, 202, 203, and 360. They may wish to take Biology 122 for review purposes.

Biology courses required for distribution requirements. Biology 122 (Fundamental Concepts of Biology) is designed for nonmajors and thus cannot be used for biology credit toward a biology major.

Biology 201 and 202 (Introductory Biology) does not require a prerequisite. Biology 311 (Animal Behavior and Evolution) is recommended to students in the social sciences. Biology 350 (Plant Biology) is normally offered every other year.

Recommended Schedule of Courses.

First year:	Mathematics, physics, and chemistry.
Second year:	Organic chemistry, Biology 201, 202, and 203.
Third year:	Biochemistry 361, 362, and Biology 384.
Third and fourth years:	Biology advanced electives.

Biology 203 (Laboratory in Experimental Biology) should be taken in the sophomore year and Biology 384 (Laboratory in Advanced Experimental Biology) in the junior year. Students enrolling in these courses should sign up for section assignments in Room 141A Biology at the time of preregistration.

Transfer credit. Students must complete more than 50 percent of the advanced level requirements in their major field at Rice. This is a minimum.

Transfer credit for no more than 14 semester hours taken during the summer in an accredited college or university other than Rice is granted if the courses are individually acceptable for transfer credit. All transfer students must earn at least 60 semester hours at Rice, regardless of the amount of transfer credit awarded, and spend at least four semesters in residence.

For more information consult page 85 of this bulletin. Students desiring transfer credit for a biology course should contact the undergraduate advisor.

Biosciences Undergraduate Program for entry Fall 1989

Undergraduate **biochemistry** majors must complete the following courses:

First-year level: Mathematics 101, 102; Chemistry 101, 102, 105; Physics 101, 102, 132.

Second-year level: Mathematics 211; Chemistry 211, 212, 213, 214; Biosciences 201, 202, 6 credits of Biosciences 211-218 and 311-318 (over a two-year period).

Advanced level: Biosciences 301, 302, 352. Biosciences 481 or 482 and two additional Biosciences courses listed as Group A (see course listings for designation as Group A or B); an additional advanced course in Mathematics, Physics, or Computer Science, and an additional advanced course in either Chemistry or Biosciences Group A. One semester of Bios 401 or 402 may be counted as one of the courses from Group A provided the faculty supervisor is from the Department of Biochemistry and Cell Biology. The recommended courses for those taking a limited number of Group A courses are Bios 341, 344, 482.

Undergraduate **biology** majors must meet the course requirements indicated above for first and second year level.

Advanced level: Bios 301, 302; two Bios courses from Group A and one Bios course from Group B; three additional Bios Courses from Groups A

and B. It is recommended, particularly for those planning research careers, that Bios 352 be chosen as one of those courses. One semester of Bios 401 or 402 may be counted as one of the courses from Group A (if the faculty supervisor is from the Department of Biochemistry and Cell Biology) or from Group B (if the faculty supervisor is from the Department of Ecology and Evolutionary Biology). The recommended courses for those taking a limited number of Group A courses are Bios 341, 344, and 352.

An undergraduate major in biosciences must have 48 semester hours in courses numbered 300 or higher to obtain a Bachelor of Arts degree.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 129 semester hours. See Degree Requirements and Majors, pages 63-84.

Undergraduate majors are encouraged but not required to pursue independent supervised research in Bios 401 and 402. Concurrent registration in Bios 411/412 and a thesis are required.

Transition Rules. The following table lists courses in the new curriculum that are similar to courses from the old curriculum. Students who have already received credit for the course in the old curriculum cannot receive credit for the corresponding course in the new curriculum (i.e., retake the course); students wishing to take a course required by the old curriculum can select the corresponding course from the new curriculum.

Course from Old Curriculum	Course from New Curriculum
Biol 122 Biology for Non-Majors	Bios 121 Biology for Non-Majors
Biol 201 Introductory Biology	Bios 201 Introductory Biology
Biol 202 Introductory Biology	Bios 202 Introductory Biology
Bioc 361 Introductory Biochemistry	Bios 301 Introductory Biochemistry
Bioc 362 Introductory Biochemistry	Bios 302 Introductory Biochemistry
Biol 203 Sophomore Laboratory	Bios 211-218 Sophomore Laboratory
Biol 384 Advanced Laboratory	Bios 311-318 Junior Laboratory
Bioc 367 Biochemistry Laboratory	Bios 211-218, Bios 311-318
Biol 381 Cell Biology	Bios 341 Cell Biology
Biol 302 Developmental Biology	Bios 343 Developmental Biology
Biol 360 Genetics	Bios 344 Molecular Biology and Genetics
Bioc 461 Molecular Biology	Bios 344 Molecular Biology and Genetics
Chem 311-312 Physical Chemistry	Bios 352 Physical Chemistry for the Biological Sciences
Biol 428 Endocrinology	Bios 422 Endocrine Physiology
Biol 471 Microbiology	Bios 424 Microbiology and Biotechnology
Bioc 462 Physical Biochemistry	Bios 481 Molecular Biophysics
*Biol 322 General Cell Physiology	Bios 421, 422 or 442

*Can receive credit for Biol 322 and Bios 421, 422 or 442.

The biochemistry major previously required two courses which could be chosen from among Bioc 461, Bioc 462, Bioc 466 and Bioc 472. New courses which can be used as substitutes (though not exclusive) are Bios 344, Bios 424, Bios 481, and Bios 482.

Coherent Minor. Students seeking a coherent minor in Biological Sciences are advised to take either Bios 121, 201, and 202, or Bios 121, 321, and 325.

Graduate Program in Biochemistry and Cell Biology

Admission to graduate study in the Department of Biochemistry and Cell Biology requires: (1) a bachelor's degree in biochemistry, biology, chemistry, or the equivalent; and (2) demonstrated quality and motivation as indicated by the student's previous academic record, Graduate Record Examination scores, and recommendation letters. Although the Department offers an M.A. degree, only on rare occasions will a student who does not intend to pursue the Ph.D. degree be admitted to the graduate program. Both degree programs require the submission of a thesis based on original research work. The advanced degree requirements outlined below are those established by the Department of Biochemistry and Cell Biology and are above and beyond the general requirements of Rice University for the M.A. and Ph.D. degrees. The student should be familiar with the general University regulations and policies for graduate students (listed on pages 136-139). For further information, interested applicants should contact the Department Chair.

A. Doctor of Philosophy Degree Program in Biochemistry and Cell Biology. Most of the formal course studies will be completed in the first year of residence so that the student will commence thesis research at the end of the second semester of residence. The course program to be pursued during the first year of residence will be determined by the biochemistry and cell biology graduate student advisory committee in consultation with each student. All students are expected to complete the following courses, unless equivalent educational experience has been obtained previously: Biochemistry 501, 502, 517, 561, 566, 572, 575, 583, and 584 (a minimum of 26 hours). Biosciences 301, 302, 311-318, 344, 352, 575, 583, 584 (minimum of 26 hours) will be the requirements beginning Fall 1990. Students will be responsible for the content of these courses in their Admission to Candidacy Examination (see below). Students may also be required to take courses in other fields which are fundamental to their education in biochemistry and cell biology. These requirements will be determined by the graduate advisory committee. Most, if not all, students will pursue advanced studies in chemistry and biology. Correction of any deficiencies in physical chemistry or organic chemistry must be completed within the first year of residence. Once the student selects a thesis advisor, the individual faculty advisor may require additional course work of a more specialized nature. All such additional courses must be completed prior to the Admission to Candidacy Examination.

Students will gain experience in teaching by serving as discussion leaders in sections of undergraduate courses for one semester during their second year of residence and by serving as graders throughout this year.

Six procedures are used in the evaluation of a graduate student's progress. (1) At the completion of the first two semesters in residence, each student's course record, motivation, and general competence will be reviewed at a meeting of the entire faculty. A graduate student in biochemistry and cell biology is required to maintain at least a B average to continue in the program. (2) Continual review of research progress will be made by the thesis advisor. (3) A written and oral research progress review examination will be held each year by three members of the student's Progress Review Committee which excludes his or her thesis advisor. (4) All students are required to present a research seminar at least once a year until they have submitted a completed doctoral thesis. (5) An oral Admission to Candidacy Examination shall be completed prior to the beginning of the student's sixth semester of residence. (6) The final written Ph.D. thesis will be reviewed by the student's thesis committee and defended orally in a public seminar. A detailed description of these examinations and reviews can be obtained from the Departmental office.

B. Master of Arts Degree Program in Biochemistry and Cell Biology. The formal course requirements for a candidate for the Master of Arts degree will be determined by the graduate advisory committee. As in the case of Ph.D. candidates, all students will be expected to complete the following courses, unless equivalent educational experience has been obtained previously: Biochemistry 501, 502, 517, 561, 566, 572, 575, 583, and 584 (a minimum of 26 hours). Biosciences 301, 302, 311-318, 344, 352, 575, 583, 584 (26 hours) will be the requirements beginning Fall 1990. In addition to these courses, students will be required to take courses in other fields which are fundamental to their education in biochemistry and cell biology or which are required for the pursuit of the student's thesis research. Students must achieve an overall average of B in the formal courses offered by the Department to be a candidate for the M.A. degree. The student's overall performance will be evaluated by the faculty as a whole after the second semester in residence.

One progress review session will be held for M.A. students during their second full year of residence. This research review session will be identical in format to that for the Ph.D. students but, in the case of M.A. students, replaces the admission to candidacy examination since no other preliminary examination will be held prior to the final oral defense of the Master's thesis. Master of Arts degree candidates are required to submit a formal written thesis. The final examination will consist of a public oral presentation of the research work to the thesis committee members followed by a question and answer session.

Graduate Program in Ecology and Evolutionary Biology

The graduate program is open to qualified applicants who hold a bachelor's degree or equivalent. Prospective graduate students must take the Graduate Record Examination, including the advanced examination in biology. The entering student generally is expected to have a strong background in biology; in addition, completion of courses in physics (one year), mathematics (including calculus), chemistry (including organic), and biochemistry is required. The above requirements do not preclude admission of qualified applicants who have majored in areas other than biology. Any deficiencies should be made up no later than the first year of residence in graduate study, including the first summer. It is strongly

recommended that deficiencies be made up during the summer preceding the first semester of residence. An examination is administered during the first year. Students entering with the master's degree are normally exempt from this examination.

Requirements for the Degree of Master of Arts. The degree of Master of Arts may be obtained after the completion of 30 semester hours of graduate study, six hours of which must be earned by the completion and public defense of a thesis embodying the results of an original investigation.

Requirements for the Degree of Doctor of Philosophy. In addition to the general University requirements for advanced degrees (pages 130, 136-139), the following departmental requirements must also be met.

1. Three or more years of graduate study with at least two years in residence at Rice
2. An original investigation worthy of publication in a scientific journal and a doctoral thesis as described in the *General Announcements*
3. A grade average of "B" or better in courses taken in the department and satisfactory grades in courses taken outside the department
4. Satisfactory performance in Biology 503 for at least three semesters
5. Satisfactory performance on a candidacy examination administered by the advisory committee; this examination may be oral and/or written
6. Public defense of the thesis
7. Presentation of a departmental seminar on the candidate's research

Fellowships. A limited number of graduate fellowships are available on a competitive basis.

Biochemistry Courses for 1989-1990 Only

201,F/S INDEPENDENT STUDY-UNDERGRADUATES (0-TBA-2 each semester)

Independent program of study and research for students with previous training in biochemistry. Requires permission of supervising faculty member and the departmental chair.

Matthews, K.

361,F GENERAL BIOCHEMISTRY (4-0-4)

The chemistry, biological function, and metabolism of molecules in living cells. Topics include protein structure, enzymic catalysis, nucleic acid structure/function and molecular biology. Prereq- Chem 211,212

Gomer, R., Olson, J.

362,S GENERAL BIOCHEMISTRY (4-0-4)

A continuation of Bioc 361. Topics include metabolism, metabolic regulation and control and energy production and utilization. Prereq- Bioc 361.

Palmer, G., Rudolph, F.

367,F/S EXPERIMENTAL BIOCHEMISTRY (1-9-4)

Modern techniques of biochemical investigation: chemistry of lipids, carbohydrates, nucleic acids; separation techniques; spectroscopy; measurement and safe handling of radioisotopes; enzyme purification and methods of kinetic analysis. Prerequisite: Bioc 361.

Cooper, B., Staff

401,F UNDERGRADUATE RESEARCH (0-15-5)

Open only to undergraduate majors with the permission of the research supervisor and the chair. Prerequisites: Bioc 361, 362, 367, and concurrent enrollment in Bioc 411.

Staff

402,S UNDERGRADUATE RESEARCH (0-15-5)

See Bioc 401.

Staff

411,F UNDERGRADUATE RESEARCH SEMINAR (1-0-1)

Discussion of current research in area under investigation. Prerequisite: Enrollment in Bioc 401.

Matthews, K.

412,S UNDERGRADUATE RESEARCH SEMINAR (1-0-1)

See Bioc 411. Prerequisite: Enrollment in Bioc 402.

Matthews, K.

461,F BIOCHEMISTRY OF THE GENE (3-0-3)

A survey of the structure, expression, and regulation of procaryotic and eucaryotic genes. Prerequisites: Bioc 361 and 362.

Bennett, G., Beckingham, K.

466,S ADVANCED EXPERIMENTAL BIOCHEMISTRY (2-3-2)

An advanced laboratory course using modern molecular biological techniques. Prerequisites: Bioc 461 and consent of instructor. Limited enrollment.

Bennett, G.

472,S BIOCHEMISTRY OF ANTIBIOTICS AND STEROLS (3-0-3)

Advanced lectures on current research in certain specialized fields of biochemistry. Prerequisite: Bioc 361 and completion or concurrent enrollment in Bioc 362.

Schroepfer, G., Walker, J.

481,F MOLECULAR BIOPHYSICS (3-0-3)

Topics include interaction of light with matter, various biophysical spectroscopic techniques, and NMR of biomolecules. Prerequisites: Bioc 361, 362, Math 211 or equivalents, and permission of instructor.

Palmer, G., King, G.

482,S MOLECULAR BIOPHYSICS (3-0-3)

A survey of the application of biophysical techniques to biological problems. Topics include: x-ray diffraction and crystallography, neutron scattering, electron microscopy, fast kinetics, imaging techniques, theoretical protein dynamics, and protein engineering. Prerequisite: Bioc 361.

Olson, J., Phillips, G.

501,F GEN BIOCHEMISTRY FOR GRADUATE STUDENTS (4-0-4)

Chemical nature of molecules in living cells and their biological functions; protein structure; enzymic catalysis; nucleic acid structure/function and molecular biology. Prerequisite: Graduate status, one year of organic chemistry.

Olson, J., Gomer, R.

502,S GEN BIOCHEMISTRY FOR GRADUATE STUDENTS (4-0-4)

A continuation of Bioc 501. Topics include metabolism, regulation of metabolism, physiology, control and energy production and utilization. Prerequisite: Bioc 501.

Palmer, G., Rudolph, F.

517,F/S EXPERIMENTAL BIOCHEMISTRY (1-9-4)

Modern techniques of biochemical investigation: chemistry of lipids, carbohydrates, nucleic acids; separation techniques; spectroscopy; measurement and safe handling of radioisotopes; enzyme purification and methods of kinetic analysis. Prerequisite: Graduate status and enrollment in Bioc 501 or equivalent.

Cooper, B., Staff

561,F BIOCHEMISTRY OF THE GENE (3-0-3)

A survey of the expression and regulation of procaryotic and eucaryotic genes. Prerequisite: Bioc 501, 502 or equivalent, and graduate status.

Beckingham, K., Bennett, G.

566,S ADVANCED EXPERIMENTAL BIOCHEMISTRY (1-9-3)

A graduate laboratory course using modern molecular biological and biophysical techniques. Prerequisite: Bioc 561, and consent of instructor.

Bennett, G.

572,S BIOCHEMISTRY OF ANTIBIOTICS AND STEROLS (3-0-3)

Subjects to be announced. Prerequisite: Bioc 501 or equivalent.

Schroepfer, G., Walker, J.

575,F INTRODUCTION TO RESEARCH (1-0-1)

Introduction of first-year graduate students to the research programs and laboratories of individual faculty members.

Matthews, K.

581,F GRADUATE SEMINAR (1-0-1)

A discussion of selected research topics.

Matthews, K.

582,S GRADUATE SEMINAR (1-0-1)

See Bioc 581.

Matthews, K.

583,F FIRST YEAR GRADUATE SEMINAR (1-0-1)

Presentation of seminars on current biochemical topics.

Matthews, K.

584,S FIRST YEAR GRADUATE SEMINAR (1-0-1)

Continuation of Bioc 583.

Matthews, K.

611,F RESEARCH SEMINAR (3-0-3)

Discussion of individual laboratory research. Prerequisite: Bioc 800.

Staff

612,S RESEARCH SEMINAR (3-0-3)

Continuation of Bioc 611.

Staff

621,F THESIS SEMINAR (1-0-1)

Staff

622,S THESIS SEMINAR (1-0-1)

Staff

800,F/S GRADUATE RESEARCH (Variable)

Staff

Biology Courses for 1989-1990 Only

122,F FUNDAMENTAL CONCEPTS OF BIOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

A survey for non-majors of the basic principles of cell biology, cell chemistry, metabolism, genetics, developmental biology, physiology and population biology.

Subtelny, S.

201,F INTRODUCTORY BIOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

Principles of cell biology, cell chemistry, metabolism, physiology, and behavior. May be taken either before or after Biol 202.

Sass, R.

202,S INTRODUCTORY BIOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

Principles of Mendelian, molecular, and population genetics, development, evolution, ecology, and organismic diversity. May be taken either before or after Biol 201.

Philpott, C., Fisher Jr., F.

203,F LABORATORY IN EXPERIMENTAL BIOLOGY (1-3-2)

Experimental approaches to the study of morphology, function, and behavior in animal systems. Students must sign up for section assignments at time of preregistration.

Caprette, D.

302,S DEVELOPMENTAL BIOLOGY (3-0-3)

Analysis of processes and principles in development of organisms at the molecular, cellular, and tissue level of organization. Prerequisites: Biol 201, 202 or permission of instructor.

Subtelny, S.

311,F ANIMAL BEHAVIOR AND EVOLUTION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

Evolutionary theory is used to evaluate behavior adaptations of organisms to their environment.

Staff

313,F LABORATORY IN ANIMAL BEHAVIOR (1-3-2)

Field and laboratory studies of fireflies, hummingbirds, guppies, and more. Not offered every year. Corequisite: Biol 311.

Staff

316,S EVOLUTION (3-0-3)

Principles of biological evolution. Topics include natural selection, adaptation, molecular evolution, formation of new species, the fossil record, biogeography, and principles of classification. Prerequisite: Biol 201, 202, or permission of instructor.

Knox, R.

322,F GENERAL CELL PHYSIOLOGY (3-0-3)

Basic principles and mechanisms of cell physiology. Special emphasis on physical and chemical mechanisms of cellular and subcellular processes. Prerequisite: Introductory physics and chemistry. Corequisite: Bioc 361 or permission of instructor.

Glantz, R.

341,F ECOSYSTEM BIOLOGY (3-0-4)

* DISTRIBUTION COURSE: CATEGORY III.5

Analysis of population dynamics, species interactions, plant and animal community organization, and ecosystem function.

Harcombe, P.

343,F ECOSYSTEM BIOLOGY LABORATORY (1-3-2)

Field studies of natural ecosystems. Some Saturday field trips required. Corequisite: Biol 341.

Harcombe, P.

350,S PLANT BIOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

Analysis of the physiology, morphology, and evolution of plants in terms of adaptation to environment. Normally offered every other year.

Harcombe, P.

352,S LABORATORY IN PLANT BIOLOGY (1-3-2)

Field and laboratory studies of plant adaptation to environment. Limited to twenty students. Normally offered every other year. Corequisite: Biol 350 or permission of instructor.

Harcombe, P.

355,F ANIMAL BIOLOGY (3-0-3)

The evolution and systematics of animals with consideration of their functional morphology, physiology and behavior. Prerequisites: Biol 201 and 202.

Fisher Jr., F.

360,S GENETICS (3-0-4)

Analysis of the structure, function, and transmission of the genetic material. It is recommended that Biol 202 or its equivalent be taken first.

Stewart, C.

381,F CELL BIOLOGY (3-0-3)

The morphology and function of cell components; cells and tissues as revealed by light and electron microscopy and associated histo- and cytochemical methods. Prerequisite: Biol 361 or permission of instructor.

Philpott, C.

384,S ADVANCED EXPERIMENTAL BIOLOGY (1-6-3)

Advanced experimental techniques in electrophysiology, microbiology, cell biology, and genetics. Students must sign up for section assignment at time of preregistration. Prerequisite: Biol 322 or permission of undergraduate adviser.

Caprette, D.

401,F/S UNDERGRADUATE RESEARCH (Variable)

Normally limited to senior biology majors with superior academic records. Prerequisite: Permission of undergraduate adviser. Corequisite: Biol 405.

Subtelny, S.

402,F/S UNDERGRADUATE TEACHING (Variable)

Normally limited to advanced biology majors with superior academic records. Prerequisite: Permission of laboratory instructor.

Subtelny, S.

403,F/S SPECIAL TOPICS (Variable)

Used for transfer credit and other special circumstances. Permission of undergraduate advisor required.

Subtelny, S.

405,F/S RESEARCH SEMINAR (1-0-1)

Discussion of contemporary research areas in the biological sciences. Required for students enrolled in Biol 401.

Stewart, C.

418,S BIOLOGICAL OCEANOGRAPHY (3-0-3)

Study of the biological aspects of oceanography, emphasizing planktonic, nektonic, and benthonic organisms. Not offered every year.

Staff

428,S ENDOCRINOLOGY (3-0-3)

A study of the primary endocrine glands of vertebrates and the molecular and cellular mechanisms for their synthesis, secretion, and action. Prerequisite: Bioc 361. Biol 381 recommended.

Campbell, J.

471,S MICROBIOLOGY (3-0-3)

Structure and function of microorganisms with emphasis on bacteria. Corequisite: Bioc 361 or consent of the instructor.

Williams, R.

501,F/S GRADUATE SEMINAR (1-0-1)

General departmental seminar. Required of all graduate students.

Harcombe, P.

503,F/S GRADUATE TEACHING (3-0-3)

Supervised instruction in teaching the various areas of biology. Prerequisite: Graduate standing in biology.

Harcombe, P.

511,S EVOLUTIONARY BIOLOGY (3-0-3)

A discussion of research literature on topics of current interest. Prerequisite: Biol 311 and permission of instructor.

Strassmann, J.

525,S CONCEPTS IN NERVOUS SYSTEM FUNCTION (3-0-3)

Current topics in neurobiology. Open to seniors with permission of instructor.

Glantz, R.

533,F/S SPEC PROJECTS - DEVELOPMENTAL BIOL (0-6-3)

Laboratory training in experimental manipulations on developing embryos; supervised individual research projects. Prerequisites: Biol 302 and permission of instructor.

Subtelny, S.

534,F ADVANCED DEVELOPMENTAL BIOLOGY (3-0-3)

Seminars on selected topics of current interest in developmental biology. Prerequisites: Biol 302 and permission of instructor.

Subtelny, S.

543,S COASTAL BIOLOGY (3-0-3)

Student reports, conferences, and field trips. The nearby estuarine and marine environment will receive major emphasis. Field trips on weekends. Not offered every year. Prerequisite: Permission of instructor.

Fisher Jr., F.

216 COURSES OF INSTRUCTION

547,F TOPICS IN ECOSYSTEM BIOLOGY (3-0-3)

Discussion, seminars, and projects concerning organization, structure, and function of ecosystems. Prerequisite: Permission of instructor.

Harcombe, P.

569,S TOPICS IN MOLECULAR GENETICS (3-0-3)

Student seminars analyzing recent research on subjects of current interest in molecular genetics. May be taken by undergraduates who have earned a grade of B or better in either Biol 360 or Bioc 461 or the equivalent. Not offered every year.

Stewart, C.

582,F/S TOPICS IN CELL BIOLOGY (3-0-3)

Discussion of recent literature. Prerequisites: Biol 381 and 384 or permission of instructor.

Staff

601,F/S GRADUATE RESEARCH (Variable)

Independent research open to first-year graduate students.

Harcombe, P.

800,F/S THESIS RESEARCH (Variable)

Harcombe, P.

Biological Sciences Curriculum Beginning Fall 1990

121,S FUNDAMENTAL CONCEPTS IN BIOLOGY (3-0-3)

A survey for non-majors of the basic principles of cell biology, biochemistry, metabolism, genetics, developmental biology, physiology and population biology.

Gomer, R., Matthews, K., Schroepfer, G.

201,F INTRODUCTORY BIOLOGY (3-0-3)

The first in an integrated sequence of four courses (Bios 201, 202, 301, 302). Chemistry and energetics, cell physiology, cell biology, organ system physiology and immunology, plant physiology. Prerequisites: Chem 101 and 102.

Gustin, M., Philpott, C.

202,S INTRODUCTORY BIOLOGY (3-0-3)

The second in an integrated sequence of four courses (Bios 201, 202, 301, 302). Classical genetics, modern genetics, development, behavior, evolution, ecology, diversity. Prerequisites: Bios 201 or consent of instructor.

Sass, R., Subtelny, S.

211-218,F/S and 311-318,F/S LABORATORY IN EXPERIMENTAL BIO-SCIENCES (variable-variable)

A series of modular laboratory units covering topics in modern laboratory and field techniques in the biosciences. A combination of lecture and laboratory exercises to develop skills in experimental science.

Bennett, G., Campbell, W., Caprette, D., Cooper, B., Harcombe, P., King, G., Rudolph, F., Sass, R., Schroepfer, G., Walker, J.

221,F/S INDEPENDENT STUDY FOR UNDERGRADUATES (0-TBA-2 each semester)

An independent program of study and research for students with previous training in biochemistry and cell biology. Requires permission of supervising faculty member and the departmental chair.

Matthews, K., Harcombe, P.

301,F INTRODUCTORY BIOCHEMISTRY (4-0-4).

The third in an integrated sequence of four courses (Bios 201, 202, 301, 302). Structure and function of proteins, enzymes, and nucleic acids. Molecular Biology. Prerequisites: Chem 211, 212, Bios 201, 202 or consent of instructor.

Gomer, R., Olson, J.

302,S INTRODUCTORY BIOCHEMISTRY (4-0-4)

The final in an integrated sequence of four courses (Bios 201, 202, 301, 302). Introduction to metabolism, membranes, electron transport, oxidative phosphorylation, general metabolism and regulation. Prerequisites: Bios 301 or consent of instructor.

Palmer, G., Rudolph F.

321,F ANIMAL BEHAVIOR (3-0-3) Group B.

Evolutionary theory is used to evaluate behavior adaptations of organisms to their environment. Prerequisites: Bios 201, 202 or Bios 121 or two courses in physical anthropology and/or statistics.

Strassmann, J.

323,F LABORATORY IN ANIMAL BEHAVIOR (1-3-2)

Field and laboratory studies of fireflies, hummingbirds, guppies, and more. Not offered every year. Corequisite: Bios 321.

Strassmann, J.

325,F ECOSYSTEM BIOLOGY (4-0-4) Group B.

Analysis of population dynamics, species interactions, plant and animal community organization, and ecosystem function. Prerequisites: Bios 201, 202 or Junior standing in a Science/Engineering major or consent of instructor.

Harcombe, P.

327,F ECOSYSTEM BIOLOGY LABORATORY (1-3-2)

Field studies of natural ecosystems. Some Saturday field trips required. Corequisite: Bios 325.

Harcombe, P.

329,F ANIMAL BIOLOGY (3-0-3) Group B.

The evolution and systematics of animals with consideration of the functional morphology, physiology, and behavior. Prerequisites: Bios 201 and 202.

Fisher, F.

334,S EVOLUTION (3-0-3) Group B.

Principles of biological evolution. Topics include natural selection, adaptation, molecular evolution, formation of new species, the fossil record, biogeography, and principles of classification. Prerequisites: Bios 201, 202, and 301.

Queller, D.

336,S PLANT BIOLOGY (3-0-3) Group B

Analysis of the physiology, morphology, and evolution of plants in terms of adaptation to environment. Normally offered every other year. Prerequisites: Bios 201 and 202.

Harcombe, P.

338,S LABORATORY IN PLANT BIOLOGY (1-3-2)

Field and laboratory studies of plant adaptation to environment. Limited to twenty students. Normally offered every other year. Corequisite: Bios 336 or permission of instructor.

Harcombe, P.

341,F CELL BIOLOGY (3-0-3) Group A.

Molecular mechanisms of the processes common to all cells, including exposition of structure and function of all subcellular organelles. Emphasis will be on cytoplasmic events; molecular studies of transcription will be taught in Bios 344. Prerequisites: Bios 201 and 202.
Gustin, M., Philpott, C.

343,F DEVELOPMENT (3-0-3) Group A.

Analysis of the processes and principles of development as seen in a broad spectrum of eukaryotic organisms. Prerequisites: Bios 201 and 202.
Subtelny, S.

344,S MOLECULAR BIOLOGY AND GENETICS (3-0-3) Group A.

Fundamentals of genetics, genome mapping, and genetic analysis of disease. Molecular mechanisms of translation, transcription, RNA processing, DNA replication and recombination in both prokaryotes and eukaryotes. Prerequisites: Bios 201, 202, and 301 or consent of instructor.
Beckingham, K., Stewart, C.

352,S PHYSICAL CHEMISTRY FOR THE BIOSCIENCES (3-0-3) Group A.

Selected aspects of physical chemistry as it relates to the biosciences, including thermodynamics, statistical mechanics, reaction rate theory, atomic structure, and quantum mechanics. Prerequisites: Chem 211, 212, Phys 101, 102 or permission of instructor.
Olson, J., Phillips, G.

401,F UNDERGRADUATE HONORS RESEARCH (0-15-5)

Open only to undergraduate majors with the permission of the research supervisor and chair. Prerequisites: Bios 201, 202, 301, 302 and concurrent enrollment in Bios 411. Registration for Bios 401/402 implies a commitment to participate in research for at least 2 semesters.
Staff

402,S UNDERGRADUATE HONORS RESEARCH (0-15-5)

See Bios 401. Concurrent enrollment in Bios 412.
Staff

411,F UNDERGRADUATE RESEARCH SEMINAR (1-0-1)

Discussion of current research in area under investigation. Corequisite: enrollment in Bios 401.
Matthews, K., Harcombe, P.

412,S UNDERGRADUATE RESEARCH SEMINAR (1-0-1)

See Bios 411. Corequisite: enrollment in Bios 402.
Matthews, K., Harcombe, P.

421,F NEUROBIOLOGY (3-0-3) Group A.

Cellular and molecular mechanisms of nervous system function. Emphasis on membrane and synaptic biophysics, sensory and motor systems, neuronal plasticity, and development. Prerequisites: Bios 201, 202, 301, 302.
Glantz, R.

422,S ENDOCRINE PHYSIOLOGY (3-0-3) Group A.

Molecular and cellular mechanisms of hormone synthesis and of target cell responses; hormonal interactions in mammalian homeostasis. Prerequisites: Bios 201, 202, 301, 302.
Campbell, W., Philpott, C.

424,S MICROBIOLOGY AND BIOTECHNOLOGY (3-0-3) Group A.

Structure and functions of microorganisms with emphasis on their environmental, industrial and medical importance. Prerequisites: Bios 201, 202, 301 or consent of instructor. Corequisite: Bios 302 or consent of instructor.
Bennett, G., Walker, J.

442,S SPECIALIZED CELL FUNCTION (3-0-3) Group A.

The structure/function specializations seen in the major cell types of higher animals and plants. Prerequisites: Bios 201, 202, 301, and 302. Bios 341 is recommended as a prerequisite.

Philpott, C., Subtelny, S.

445,F ADVANCED MOLECULAR BIOLOGY AND GENETICS (3-0-3) Group A.

Molecular and genetic aspects of the regulation of gene expression as seen in simple prokaryotic systems and the model eukaryotic systems used for studies of development. Prerequisites: Bios 201, 202, 301, and 344.

Beckingham, K., Stewart, C.

481,F MOLECULAR BIOPHYSICS I (3-0-3) Group A.

Interaction of light with matter, various biophysical spectroscopic techniques, and NMR of biomolecules. Prerequisites: Bios 352 or permission of instructor.

King, G., Palmer, G.

482,S MOLECULAR BIOPHYSICS II (3-0-3) Group A.

X-ray diffraction and crystallography, neutron scattering, electron microscopy, theoretical protein dynamics, fast kinetics, and protein engineering. Prerequisites: Bios 352 or permission of instructor.

Phillips, G., Staff

541,F/S SPECIAL TOPICS IN BIOSCIENCES (3-0-3)**575,F INTRODUCTION TO RESEARCH(1-0-1)**

Introduction of first-year graduate students to the research programs and laboratories of individual faculty members.

581,F GRADUATE SEMINAR (1-0-1)

A discussion of selected research topics. Required of all graduate students.

Matthews, K., Harcombe, P.

582,S GRADUATE SEMINAR (1-0-1)

See Bios 581.

Matthews, K., Harcombe, P.

583,F FIRST-YEAR GRADUATE SEMINAR (1-0-1)

Presentation of seminar on current biosciences research.

Matthews, K.

584,S FIRST-YEAR GRADUATE SEMINAR (1-0-1)

Continuation of Bios 583.

Matthews, K.

611,F RESEARCH SEMINAR (3-0-3)

Discussion of individual laboratory research or current topics in particular areas. Corequisite: Bios 800 or permission of instructor.

612,S RESEARCH SEMINAR (3-0-3)

Continuation of Bios 611.

621,F THESIS SEMINAR (1-0-1)

622,S THESIS SEMINAR (1-0-1)

800,F/S GRADUATE RESEARCH (Variable).

Chemistry

Professor W. E. Billups, *Chair*

**Professors Berry, Brooks, Curl, Engel, Fukuyama, Glass, Hayes, Kinsey
Lewis, Margrave, Parry, Sass, Schroepfer, Smalley, and L. J. Wilson**

Adjunct Professor Willcott

Associate Professors Hutchinson, Weisman and Whitmire

Assistant Professors Burgess, Ciufolini, D'Evelyn, Hwu, and Scuseria

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. Undergraduates electing chemistry as a major are expected to take the following courses in their first year: Mathematics 101, 102 (or equivalent honors courses); Physics 101, 102 and 132; Chemistry 101, 102, and 105. In general, students take Chemistry 211, 212, 213, 214 and Mathematics 211, 212 (or equivalents) in the sophomore year. Physics 201 and 202, although not required, are recommended. The Department further requires satisfactory completion of the following courses:

Junior and Senior Years

Chemistry 311, 312 and 313, 314

Chemistry 401 and 403

Chemistry 491, 492 or 493 (at least three semester hours)

Chemistry 460 or 495

Two additional courses in advanced chemistry, physics, mathematics, mathematical sciences, or biochemistry. Students may substitute further undergraduate research (Chemistry 491, 492, 493) for one or two semesters of classroom instruction.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 126 semester hours. See Degree Requirements and Majors, pages 63-84.

American Chemical Society Certification. The Rice Department of Chemistry is on the approved list of the Committee on Professional Training of the American Chemical Society and as such can certify that graduates have met the appropriate standards. For certification, two additional advanced courses are required. Chemistry 460 and 495 are both required; one can be counted as an advanced course. A foreign language, preferably German, is recommended.

Accelerated Ph.D. Plan. Because of the high level of training provided in the Rice B.A. program, it is possible for certain especially qualified undergraduate students to be admitted to an accelerated program that could lead to the Ph.D. degree in about two years after completion of the B.A. program. In order to

complete the work in this time, the student initiates research during the summer following the junior year and continues research by taking Chemistry 491, 492 during the senior year. The student may start taking cumulative examinations during the senior year and should be able to complete all courses and examinations before the end of the second year after the B.A. The student may, in favorable cases, be able to complete the thesis in this time as well.

Interdepartmental Majors. An interdepartmental major in chemical physics is offered jointly with the Physics Department. Advice about this program should be obtained from both departments. Double majors with several other departments, such as biochemistry, materials science, physics, and mathematics have also been used since the programs have many required courses in common.

Graduate Program. Students who have completed work equivalent to that required for the bachelor's degree in chemistry offered at Rice University may be admitted to graduate standing. Preference is normally given to applicants who earn high scores on the Graduate Record Examination, including the advanced test in chemistry (see page 136). A minimum of two years of graduate study is required for the degree of Doctor of Philosophy. A nominal amount of undergraduate teaching is normally considered an integral part of the graduate program.

Candidates for the degree of Master of Arts are required to complete six one-semester courses, present in a thesis the results of a program of research approved by the department, and pass a final oral examination; alternatively, admission to candidacy for the Ph.D. completes all of the requirements for the Master of Arts.

Candidates for the degree of Doctor of Philosophy must complete for publication a thesis which represents a distinctly original and significant contribution to the field of chemistry. Candidates must further have acquired through course work and independent study a broad fundamental knowledge of chemistry in addition to those areas of the subject encompassed by their own research interests. Cumulative examinations for the Ph.D. degree are given periodically, and a final oral examination on the thesis is required for all candidates.

Chemistry Courses

101.F INTRODUCTORY CHEMISTRY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

The basic phenomena and principles of chemistry. With Chem 102, the three courses (or equivalent) are prerequisite to advanced courses in chemistry. Prereq- high school chemistry.

Hutchinson, J.

102.S INTRODUCTORY CHEMISTRY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

See Chem 101. Prereq- Chem 101

Wilson, L.

105.F/S INTRODUCTORY LAB IN QUANTITATIVE CHEMISTRY (1-4-2)

Laboratory measurements of chemical composition, molecular weights, equilibrium constants, heats of reaction, optical spectra, and reaction kinetics using a variety of classical and instrumental methods. Normally taken with Chem 101, 102. The three courses (or equivalent) are prerequisite for advanced courses in chemistry. (One afternoon lab per week.)

F/Weisman, R.B., S/Curl, R.

222 COURSES OF INSTRUCTION

106,S HONORS LABORATORY (0-4-1)

Independent projects in synthesis and characterization of compounds. Prereq- Chem 101, 105, and permission of instructor.

Margrave, J.

211,F ORGANIC CHEMISTRY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY III.5**

Aliphatic and aromatic organic chemistry with emphasis on structure, bonding, and reaction mechanisms. Second semester: greater emphasis on the chemistry of various functional groups. Normally accompanied by Chem 213, 214. Chem 212 must be preceded by Chem 211. Prereq- Chem 101, 102.

Ciufolini, M.

212,S ORGANIC CHEMISTRY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY III.5**

See Chem 211. Prereq- Chem 211.

Engel, P.

213,F ORGANIC CHEMISTRY LAB (0-4-1)

Synthesis, purification, and characterization of organic compounds. Experiments related to topics covered in Chem 211, 212. Second semester includes identification of unknown organic compounds. (One hour lecture precedes each lab.) One lab per week. Coreq- Chem 211, 212 Prereq- Chem 105.

Fukuyama, T.

214,S ORGANIC CHEMISTRY LAB (0-4-1)

See Chem 213 Prereq- Chem 213.

Parry, R.

311,F PHYSICAL CHEMISTRY (3-0-3)

Principles of thermodynamics, including applications to chemical equilibria, solutions, and electrochemistry. Prereq- Math 211, 212; Phys 101, 102; Chem 101, 102.

Curl, R.

312,S PHYSICAL CHEMISTRY (3-0-3)

Elements of quantum chemistry, spectroscopy, statistical thermodynamics, kinetic theory of gases; chemical kinetics; reaction dynamics and properties of liquids, solids and macromolecules. Prereq- Chem 311; Phys 202 is recommended.

Brooks, P.

313,S EXPER PHYSICAL CHEM (1-4-2)

Experiments illustrating techniques employed in high resolution optical spectroscopy, electrochemistry, calorimetry, surface area measurements, and kinetics. Lab meets alternate weeks. Prereq- Chem 105, 311; Phys 132.

D'Evelyn, M.

314,S ADV INSTRUMENTAL LABORATORY (0-8-2)

Principles and application of modern instrumental methods to inorganic and physical chemistry. Prereq- Chem 311 and co-requisite chem 313.

Glass, G.

401,F ADVANCED ORGANIC CHEMISTRY (3-0-3)

The course develops, in detail, the concepts of modern organic chemistry. A major portion is devoted to reactions of synthetic importance. Prereq- Chem 211, 212.

Billups, W.E.

403,F ADVANCED ORGANIC LABORATORY (1-8-2)

Covers the techniques of modern organic chemistry. Designed to accompany Chemistry 401. Prereq- Chem 212, 213, 214.

Burgess, K.

411,S SPECTRAL METHODS IN ORGANIC CHEM (3-0-3)

Elucidation of organic structures by physical techniques. Interpretation of infrared, ultraviolet, nuclear magnetic resonance, and mass spectra. Prereq Chem 401.

Fukuyama, T.

415,F CHEMICAL KINETICS (3-0-3)

Description and analysis of the rates of unimolecular, bimolecular and composite chemical reactions in gas and solution phases. Both macroscopic kinetics and microscopic reaction dynamics are covered. Prereq- Chem 311, 312.

Brooks, P.

420,S STATISTICAL THERMODYNAMICS (3-0-3)

A review of thermodynamic principles plus a development of their basis in statistical mechanics and applications to problems of chemical interest. Prereq- Chem 311, 312. Also offered as Ceng 540.

Robert, M.

430,F QUANTUM CHEMISTRY (3-0-3)

Quantum mechanical principles, atomic structure and chemical bonding. Prereq- Chem 312. Phys 202 is recommended.

Hayes, E.

445,F PHYSICAL-ORGANIC CHEMISTRY (3-0-3)

Organic reaction mechanisms, substituent and medium effects, linear free energy relations and acidity functions. Coreq- Chem 401. Prereq- Chem 311, 312.

Lewis, E.

460,S INORGANIC CHEMISTRY (3-0-3)

Survey of the periodic table; atomic and molecular structure; bonding in covalent, ionic, and electron deficient systems; thermochemical principles and experimental techniques for analysis, structure determination, and synthesis. Prereq- Chem 211, 212, 213, 214.

Margrave, J.

471,S MOLECULAR SPECTROSCOPY (3-0-3)

The spectra of simple molecules, including microwave, infrared, visible, ultraviolet, and Raman spectra; introductory aspects of molecular symmetry and group theory; resonance spectroscopy. Prereq- Chem 430 or equivalent.

Smalley, R.

491,F RESEARCH FOR UNDERGRADUATES (Variable)

Open only to chemistry majors. Written report required.

Smalley, R.

492,S RESEARCH FOR UNDERGRADUATES (Variable)

See Chem 491.

Staff

495,F TRANSITION METAL CHEMISTRY (3-0-3)

Structure, bonding, and reactivity of coordination and organometallic compounds; ligand field theory; electronic spectroscopy; magnetism; reaction mechanisms; catalysis. Chem 460 recommended. Prereq- Chem 311, 312.

Hwu, S.-J.

521,F CHEMICAL THERMODYNAMICS (3-0-3)

An intensive review of thermodynamics designed primarily for first-year graduate students.
Curl, R.

541,F SPECIAL TOPICS (3-0-3)

Topics in biosynthesis.

Parry, R.

561,F ADVANCED ORGANIC CHEMISTRY (3-0-3)

Organic mechanisms, modern structure theory, and synthetically important reactions; designed primarily for first-year graduate students.

Billups, W.E.

562,S ADVANCED ORGANIC CHEMISTRY (3-0-3)

Continues in the same vein as Chem 561 but with emphasis on very recent advances in stereoselective synthesis.

Burgess, K.

590,S SURFACE CHEMISTRY

Topics in the chemistry of solid surfaces including surface structure, surface composition and gas-surface interactions.

D'Evelyn, M.

596,S TOPICS IN SOLID STATE CHEM (3-0-3)

Hwu, S.-J.

611,F HI TEMP & HI PRESSURE CHEM (3-0-3)

The techniques for generation and measurement of high temperature and high pressures and of the nature of phenomena under extreme conditions.

Margrave, J.

800,F/S GRADUATE RESEARCH (Variable)

Staff

Classics

Professor Levin
Associate Professor Wallace
Assistant Professor Yunis
Lecturer Eaker

Degrees Offered: B.A. in Classics (Greek and Latin), B.A. in Latin.

Undergraduate Program. The program in Classics offers instruction in the languages, literature, history, and culture of ancient Greece and Rome. We offer two types of major: Classics, which entails the study of both ancient Greek and Latin, and Latin. Both majors stress the study of the literature of the classical civilizations in the original languages. The student who chooses one of these two majors will learn that the study of ancient Greek and Latin is a demanding, but rewarding discipline. Both majors can also be pursued as part of a double major, in which case the requirements are slightly reduced. For our majors we advise, and will try to facilitate, travel to Greece or Italy and experience on a dig or study at the

Intercollegiate Center for Classical Studies in Rome. Rice is now a supporting member of the Intercollegiate Center.

Each year we also offer courses about various aspects of the classical civilizations using English translations. These courses are organized below under the rubric 'Classical Studies'. All courses offered in the Classics program count towards the interdisciplinary major entitled Ancient Mediterranean Civilization.

A major in Classics is essential preparation for graduate study in Classics, ancient history, ancient philosophy, ancient religion (especially early Christianity), and ancient art history. Knowledge of Greek and Latin is useful for graduate study in English, the Romance languages, German, the Slavic languages, theology, European history, and linguistics. A Secondary Teaching Certificate in conjunction with a B.A. in Latin or Classics is available through the department of Education. Students seeking a Secondary Teaching Certificate may also offer Latin as one of their teaching fields without majoring in Latin. The program in Classics is formally administered as part of the department of Spanish, Portuguese, and Classics. Students interested in majoring in Classics or finding out more about the program should see Professor Yunis.

Requirements for the Major. Students may choose a major in either Classics (Greek and Latin) or Latin.

For the major in Classics, the student must take 27 semester hours (9 courses):

1. 21 semester hours (7 courses) in Greek and Latin at the 200 level or above including at least 6 semester hours (2 courses) in each language.
2. 3 semester hours (1 course) at the 300 level in Classical Studies or one of the following fields from outside the Classics program: Greek and Roman history, philosophy, art or religion.
3. Latin 493 in the spring semester of the senior year, in order to prepare for and then take the comprehensive examination in the 9th week of the semester. Latin 493 is to be taken in addition to the 21 semester hours required above.

For the major in Latin, the student must take 24 semester hours (8 courses):

1. 18 semester hours (6 courses) in Latin at the 200 level or above.
2. 3 semester hours (1 course) at the 300 level in Classical Studies or one of the following fields from outside the Classics program: Greek and Roman history, philosophy, art or religion.
3. Latin 493 in the spring semester of the senior year, in order to prepare for and then take the comprehensive examination in the 9th week of the semester. Latin 493 is to be taken in addition to the 18 semester hours required above.

For Classics (Greek and Latin) or Latin as part of a double major, the student must take 21 semester hours (7 courses):

1. 15 semester hours (5 courses) in Greek and Latin at the 200 level or above. The double major in Classics must include at least 6 semester hours (2 courses) in each language.
2. 3 semester hours (1 course) at the 300 level in Classical Studies or one of the following fields from outside the Classics program: Greek and Roman history, philosophy, art or religion.
3. Latin 493 in the spring semester of the senior year, in order to prepare for and then take the comprehensive examination in the 9th week of the semester. Latin 493 is to be taken in addition to the 15 semester hours required above.

Classical Studies

211,F CLASSICAL CIVILIZATION:GREECE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Introductory survey of the various aspects of ancient Greek culture, including political and social history, art and architecture, religion, philosophy, and literature.

Wallace, K

212,S CLASSICAL CIVILIZATION: ROME (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Introductory survey of the various aspects of Roman civilization, including the rise of Christianity, political and social history, art and architecture, religion, philosophy, and literature.

Wallace, K

214,S GREEK & LATIN ELEMENTS-ENGLISH (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

The relationship of English to the classical languages; a systematic guide to understanding vocabulary and an example of historical and cultural development. Does not count toward major in classics.

Eaker, H

222,S PERSPECTIVES ON GREEK TRAGEDY (3-0-3)

We shall read several crucial works by each of the three great tragedians: Aeschylus' *Seven against Thebes*, and the *Oresteia* trilogy; Sophocles' *Ajax*, *Philoctetes*, and *Oedipus at Colonus*; and Euripides' *Hippolytus*, *Suppliant Women*, *Heracles*, and *Orestes*. We shall attempt to understand the nature of Greek tragedy by considering the civic setting and production, the mythological tradition, contemporary philosophical issues, and the poetic conventions of the genre. Not offered 1989-90.

Yunis, H

315,S SOCRATES: THE MAN AND HIS PHILOSOPHY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

An appraisal of Socrates' life, thought, and achievements. Extensive readings in Plato's Socratic dialogues, especially the *Gorgias* and *Protagoras*.

Yunis, H

335,S CLASSICAL MYTHOLOGY I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Survey of Greek myths and their extension to Rome and modern European literature. All works are read in English translation.

Levin D

336,F CLASSICAL MYTHOLOGY II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Survey of Greek myths and their extension to Rome and modern European literature. All works are read in English translation. To be offered fall 1990.

Levin, D

352,S PERICLEAN ATHENS (3-0-3)

Not offered 1989-90.

Yunis, H

491,F SPECIAL TOPICS (3-0-3)

Independent work for qualified juniors and seniors.

Staf,

92,S SPECIAL TOPICS (3-0-3)

Independent work for qualified juniors and seniors.

Staff

*Greek***01,F ELEMENTARY GREEK I (3-0-3)**

DISTRIBUTION COURSE: CATEGORY I.1

NOTE: 102 must be completed to receive dist. credit for 101. Fundamentals of ancient Greek grammar with emphasis on acquisition of reading skills.

Eaker, H.

02,S ELEMENTARY GREEK II (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Continuation of Gree 101.

Eaker, H.

01,F INTERMEDIATE GREEK I (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Review of forms and syntax followed by readings in Greek prose (Plato, *Apology*).

Yunis, H.

02,S INTERMEDIATE GREEK II (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Former: Reading of selections from the *Odyssey*.

Wallace, K.

91,F DIRECTED READING (3-0-3)

Independent work for qualified juniors and seniors in genres or authors not presented in other courses.

Staff

92,S DIRECTED READING (3-0-3)

Independent work for qualified juniors and seniors in genres or authors not presented in other courses.

Staff

*Latin***01,F ELEMENTARY LATIN I (3-0-3)**

DISTRIBUTION COURSE: CATEGORY I.1

NOTE: 102 must be completed to receive dist. credit for 101. Fundamentals of Latin grammar with emphasis on acquisition of reading skill.

Wallace, K.

02,S ELEMENTARY LATIN II (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Continuation of Lati 101.

Yunis, H.

01,F INTERMEDIATE LATIN I PROSE (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Review of grammar and readings in Caesar. Prereq- Lati 101, 102 or equivalent.

Eaker, H.

228 COURSES OF INSTRUCTION

301,F HORACE (3-0-3)

Reading of selections from the Epodes, Odes, Satires and Epistles. Not offered 1989-90.

302,S TACITUS (3-0-3)

Not offered 1989-90.

303,F CICERO (3-0-3)

Selections from Cicero's *Letters*, with some consideration of his speeches and philosophical works as well.

304,S LUCRETIUS (3-0-3)

Selections from the *De Rerum Natura*.

305,F VIRGIL (3-0-3)

To be offered fall, 1990.

306,S OVID (3-0-3)

To be offered spring, 1991.

312,S MEDIEVAL LATIN (3-0-3)

Readings in medieval Latin prose and poetry. Not open to freshmen. Prereq-Lati 101, 102 equivalent.

402,S TACITUS (3-0-3)

Not offered 1989-90.

403,F CICERO (3-0-3)

Enriched version of Latin 303.

404,S LUCRETIUS (3-0-3)

Enriched version of Latin 304.

491,F DIRECTED READING (3-0-3)

Independent work for qualified juniors and seniors in genres or authors not presented other upper level courses.

492,S DIRECTED READING (3-0-3)

Independent work for qualified juniors and seniors in genres or authors not presented other courses.

493,S COMPREHENSIVE EXAMINATION (3-0-3)

Reading course to be taken by all majors in the spring semester of the senior year. Preparation for the comprehensive examination which is to be taken in the ninth week of the semester. For Classics and Latin majors only.

Cognitive Sciences

Professor Grandy, *Chair*

**Professors Cartwright, Cheatham, Copeland, P.W. Davis, de Figueiredo,
Lamb, Roediger, J.R. Thompson, Tyler, Watkins
Associate Professors D.M. Lane, R.C. Martin
Assistant Professors Cooke, Waters**

Degree Offered: B.A.

The Cognitive Sciences are concerned with how the mind works. The word cognitive refers to perceiving and knowing. Thus cognitive science is the science of mind. Cognitive scientists seek to understand perceiving, thinking, remembering, understanding language, learning, concept formation, and other mental phenomena. This field of study constitutes, under a new name and aided by new technologies, a restoration of lines of study that were pursued before a restructuring of universities in the eighteenth century broke it up into separate disciplines. As a result of that dismemberment, Cognitive Science is now treated as an interdisciplinary field.

Research in cognitive science ranges from observing children, through programming computers to do complex problem solving, to analyzing the nature of meaning. The methods include scientific observation and analysis, model building, experimentation, and computer simulation of mental structures and processes.

Some students see cognitive science as a way to study the last frontier, the mind. Some see it as a way to get in on the ground floor of the information society. Some see it as a way to get useful experience with computers.

Suggested preparation for the major: Computer Science 200; Psychology 101; Philosophy 106 or mathematical maturity; and calculus or probability theory.

Requirements: A student majoring in Cognitive Sciences must complete twelve 3-hour or 4-hour courses plus Cognitive Sciences 491, a 1-hour course to be taken in the fall term of the senior year. The twelve courses include eight core courses as follows:

Cognitive Sciences 492, Cognitive Sciences Seminar (spring term of senior year);

Computer Science 210, Introduction to Scientific Computation (4 hours);

Computer Science 440, Artificial Intelligence,

or Electrical Engineering 437, Introduction to Artificial Intelligence;

Linguistics 200, Language,

or Linguistics 300, Linguistic Analysis;

Linguistics 306, Cognitive Linguistics,

or Linguistics 315, Information Structures;

Philosophy 305, Mathematical Logic;

Psychology 203, Introduction to Cognitive Psychology;

Psychology 351, Psychology of Perception,

or Psychology 362, Physiological Psychology.

230 COURSES OF INSTRUCTION

Of the four additional courses, no more than two courses from a single department can be counted toward the requirements for the major; and student may not count both Psychology 339 and Statistics 301 toward the major requirements.

Courses:

Anthropology

406 COGNITIVE ANTHROPOLOGY (3-0-3)

Mr. Tyle

Cognitive Science

491,F COGNITIVE SCIENCES SEMINAR (2-0-1)

Faculty, graduate students, and invited guests meet weekly to present reports on current research and to discuss issues and problems in Cognitive Science. Seniors majoring in Cognitive Sciences will attend and participate in discussions. Juniors are invited to attend as auditors. Content varies from year to year.

Staff

492,S COGNITIVE SCIENCES SEMINAR (2-0-3)

Continuation of 491. Seniors majoring in Cognitive Sciences will work on projects and present reports.

Staff

Computer Science

210 INTRODUCTION TO SCIENTIFIC COMPUTATION (4-0-4)

Staff

320 INTRODUCTION TO COMPUTER ORGANIZATION (3-0-3)

Staff

382 DESIGN AND ANALYSIS OF ALGORITHMS (3-0-3)

Staff

425 COMPUTER SYSTEMS (3-0-3)

Staff

440. ARTIFICIAL INTELLIGENCE (3-0-3)

Staff

Electrical Engineering

326 DIGITAL LOGIC DESIGN (3-0-3)

Staff

437 INTRODUCTION TO ARTIFICIAL INTELLIGENCE (3-0-3)

Staff

498 INTRODUCTION TO ROBOTICS (3-0-3)

Mr. Cheatham

Linguistics

200. LANGUAGE (3-0-3) *Staff*
300. LINGUISTIC ANALYSIS (3-0-3) *Mr. Copeland*
301. PHONOLOGY (3-0-3) *Mr. Copeland*
- 306 COGNITIVE LINGUISTICS (3-0-3) *Mr. Lamb*
- 315 INFORMATION STRUCTURES (3-0-3) *Mr. Lamb*
- 402 SYNTAX AND SEMANTICS (3-0-3) *Mr. Davis*
- 411 NEUROLINGUISTICS (3-0-3) *Mr. Tyler*
- 417 COMPUTATIONAL LINGUISTICS (3-0-3) *Staff*
- 467 COMPUTATIONAL PROJECTS (3-0-3) *Mr. Lamb*

Philosophy

- 303 THEORY OF KNOWLEDGE (3-0-3) *Staff*
- 305 MATHEMATICAL LOGIC (3-0-3) *Mr. Grandy*
- 312 PHILOSOPHY OF MIND (3-0-3) *Staff*
- 353 PHILOSOPHY OF LANGUAGE (3-0-3) *Staff*
- 357 ADVANCED TOPICS IN MATHEMATICAL LOGIC (3-0-3) *Mr. Grandy*

Psychology

- 203 INTRODUCTION TO COGNITIVE PSYCHOLOGY (3-0-3) *Staff*
- 308 HUMAN LEARNING AND MEMORY (3-0-3) *Mr. Watkins*

232 COURSES OF INSTRUCTION

309 PSYCHOLOGY OF LANGUAGE (3-0-3)

Ms. Martin

339 STATISTICAL METHODS (3-0-3)

Sta

340 RESEARCH METHODS (3-0-3)

Mr. Watkin

351 PSYCHOLOGY OF PERCEPTION (3-0-3)

Ms. Martin

362 PHYSIOLOGICAL PSYCHOLOGY (3-0-3)

Sta

Statistics

301 MODEL BUILDING (3-0-3)

Mr. Thompson

Economics

Professor G.W. Smith, *Chair*

Professors Brito, Brown, Bryant, Huddle, Mieszkowski, Sickles, Soligo and Young

Associate Professors Hartley, and Zodrow

Adjunct Associate Professors Lairson and Swint

Assistant Professors Chae, Jun, Strassmann, and Yi

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. Undergraduates may major in either economics or mathematical economic analysis.

Economics majors are required to take a minimum of ten courses including nine in Economics plus one in quantitative methods as specified in (5) below.

Course requirements include:

1. Economics 211 and 212;
2. Economics 370 or 372;
3. Economics 375;
4. At least three of the following: Economics 301, 355, 415, 416, 417, 420, 430, 435, 436, 438, 440, 445, 448, 450, 455, 461, 483, 485, 486
5. One course in quantitative methods selected from Economics 382, 400, 471, 475, 476, Mathematical Sciences 223, Stat 301, 381, 382, 480, 481, 482, Computer Science 211, and Accounting 305 or an approved equivalent.
6. No more than three of the nine Economics courses may be transferred from other schools. Additional transfer credits in Economics may count toward meeting University graduation requirements but not toward

fulfillment of the departmental major requirements. The required course in quantitative analysis may also be transferred.

Mathematical economic analysis majors are required to take a minimum of 15 courses, including:

1. Economics 211, 212, 372, 375;
2. At least three of the following: Economics 301, 355, 415, 416, 417, 420, 430, 435, 436, 438, 440, 445, 448, 450, 455, 461, 483, 485, 486;
3. Economics 400.
4. Mathematics 101 and 102 (or 121 and 122), 212, either Mathematics 211 or 355 or Mathematical Sciences 310, and Econ. 382 or Stat 480, 481 or 482.
5. At least one of the following: Economics 440, 471, 472, 475, 476, 477, 478; Mathematical Sciences 451, 460, 472, Stat 485, 486, 487, 488, or an approved equivalent;
6. At least one research course, with prior approval, selected from: Economics 403, 404, 495, 496, or a graduate course.
7. Students may graduate with "Honors in Economics" by achieving a B+ (3.33) average in all Economics courses and writing a senior thesis while taking Econ. 403 and 404 (two semesters of independent research).

The major in Mathematical Economic Analysis is recommended for students intending to do graduate work in economics. Additional information regarding major requirements can be obtained from the departmental office.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors.

Graduate Program. Admission to graduate study in economics is granted each year to a limited number of students who hold an undergraduate degree (or the equivalent), whether in economics or another field. The graduate program is designed primarily for students qualified to pursue a course of study leading to the Ph.D. degree.

Training in mathematics including at least two semesters in calculus and one in linear algebra is a prerequisite for admission to the Ph.D. program. Students who have not met these requirements may be admitted to the master's program or may take these prerequisites as Class III students. All applicants are required to pass the Graduate Record Examination.

Candidates for the Ph.D. degree who have good undergraduate preparation in economics should expect to devote two to two and one-half years to full-time course work plus a minimum of one additional year for the completion of the dissertation.

Requirements for the Degree of Master of Arts:

1. Demonstrate proficiency in the use of statistics.
2. Complete an approved program of at least six courses including at least three 500-level graduate courses. A total of 30 semester hours (including 6 hours for the thesis and 24 for courses), 24 of which must be in residence at Rice, is required. Candidates for the master's degree should expect to devote a minimum of one year to full-time course work.
3. Complete and defend orally a thesis presenting in prescribed form the results of original research.

Requirements for the Degree of Doctor of Philosophy:

1. Complete an approved program of at least 14 courses. At least two years of full-time study, or the equivalent of 60 semester hours, must be in residence at Rice. Candidates for the Ph.D. degree who have good undergraduate preparation in economics should expect to devote two to two and one-half years to full-time course work plus a minimum of one additional year for the completion of the dissertation. Completing the program in four years is a reasonable goal.
2. Perform satisfactorily on written general examinations in economic theory;
3. Demonstrate proficiency in a major field by:
 - a. Taking the relevant courses in that field;
 - b. Performing satisfactorily on a written field examination.
 Fields may be chosen from the following areas of interest: (1) econometrics, (2) economic development and history, (3) economic theory, (4) industrial organization and regulation, (5) international trade and finance, (6) macroeconomics/monetary theory, (7) Public Finance.
4. Complete and defend orally a doctoral dissertation setting forth in publishable form the results of original research.

*Economics Courses***211.F/S PRINCIPLES OF ECONOMICS I (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

Nature of economics; the price system; household decisions; cost and supply; marginal productivity and capital theory; industrial organization and control; economic efficiency; externalities, and public goods.

Soligo, J.

212.F/S PRINCIPLES OF ECONOMICS II (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Measurement and determination of national income; money, banking, and fiscal policy; business cycles, unemployment, and inflation; international trade and balance of payments; other contemporary economic problems. Prereq- Econ 211.

Sta

301.F HISTORY OF ECONOMIC ANALYSIS (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

The fundamental ideas of great economic thinkers from Plato to the present. Prereq- Econ 211. Not offered every year.

Sta

355.F MONEY AND BANKING (3-0-3)

Demand and supply of money and other financial assets. American and international institutional trends and reforms.

Sta

370.F/S MICROECONOMIC THEORY (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Intermediate level analysis of markets, firms, households, income distribution, and general equilibrium. Prereq- Econ 211.

Zodrow, C.

72,S MATHEMATICAL MICROECONOMICS (3-0-3)

DISTRIBUTION COURSE: CATEGORY II.3

Mathematical approach to microeconomic theory. Recommended for engineering and science students. Students may not receive credit for both Econ 370 and Econ 372. Prereq- Econ 211, Math 101, 102.

*Brito, D.***75,F/S MACROECONOMIC THEORY (3-0-3)**

DISTRIBUTION COURSE: CATEGORY II.3

Intermediate level analysis of relationships between the levels of income, employment, interest, investment, consumption, and government spending. Prereq- Econ 211, 212.

*Hartley, P.***82,F ELEMENTS OF STATISTICAL METHODS (3-0-3)**

Basis concepts and techniques of probability and statistics. Applications to economics, marketing, and finance. Prereq- Econ 211 and Math 102. Also offered as STAT 382.

*Sickles, R.***00,S ECONOMETRICS (3-0-3)**

Estimation and forecasting models; topics include multiple regression time series, contingency table analysis, and Bayesian inference. Prereq- Econ 382 or Stat 381 or 382.

*Staff***03,F SENIOR INDEPENDENT RESEARCH (3-0-3)**

Independent research project for seniors on an approved topic of their own choosing. Prereq- permission of instructor.

*Zodrow, G.***03,S SENIOR INDEPENDENT RESEARCH (3-0-3)**

Independent research project for seniors on an approved topic of their own choosing. Prereq- permission of instructor.

*Staff***04,S SENIOR INDEPENDENT RESEARCH (3-0-3)**

See Econ 403.

*Zodrow, G.***05,S HUMAN RESOURCES, WAGES & WELFARE (3-0-3)**

DISTRIBUTION COURSE: CATEGORY II.3

Study of labor markets and wage determination. Special emphasis on "investment in human capital" through education, training, and health services.

*Huddle, D.***16 ECONOMIC HISTORY OF THE U.S.: 1700-1945 (3-0-3)**

Economic history of the United States from the Colonial Period to the end of World War II. Attention focuses upon the trends in per capita income and the forces behind these trends. Prerequisite: Economics 211. Not offered every year.

*Staff***17 COMPARATIVE HISTORY OF INDUSTRIALIZATION (3-0-3)**

Comparative historical analysis of industrialization of Western Europe, the United States, and Russia from the eighteenth century to World War I. Prerequisite: Economics 211. Not offered every year.

Staff

420,F INTERNATIONAL ECONOMICS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

A study of the economic relationships between countries. Trade theory, tariffs and other trade restrictions, international finance, trade and development, and current policy issues. Prereq- Econ 211,212.

Smith, G.

430,F COMPARATIVE ECONOMIC SYSTEMS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Theoretical models of various economic systems as a basis for analyzing the operation and the institutional characteristics of economies including the U.S., the U.S.S.R., Yugoslavia, and China. Prereq- Econ 211.

Soligo, R.

435,F INDUSTRIAL ORGANIZATION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Market structure, concentration, barriers to entry, and oligopoly pricing. Application of micro theory to industry problems. Prereq- Econ 211 or permission of instructor.

Strassmann, D.

436,S GOVERNMENT REGULATION OF BUSINESS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Analysis of governmental regulatory activities under antitrust laws and in such regulated industries as communications, energy, and transportation. Prereq- Econ 211. Econ 370, 435 recommended.

Johnson, W.

438,S ECONOMICS OF THE LAW (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

The role of economic reasoning in understanding the enactment, interpretation, and enforcement of the law. Applications to contracts, property, torts, discrimination, and criminal just. Prereq- Econ 211.

Soligo, R.

440,S ECONOMICS OF UNCERTAINTY (3-0-3)

Decision making under uncertainty with applications to the choice of financial assets, the operation of insurance markets, research in markets with imperfect information and the microeconomic foundations of macroeconomics. Prereq- Econ 211, 212, Math 101, 102 and some familiarity with probability theory as gained in Econ 382, Stat 381 or 382.

Staff

445,F MANAGERIAL ECONOMICS (3-0-3)

Application of economics to decision making within the firm; organization theory, cost, pricing, and problems of control. Econ 212 desirable. Prereq- Econ 211.

Johnson, W.

448,F/S CORPORATION FINANCE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Financial analysis, planning, and control in modern corporations; includes valuation, cost and allocation of capital, capital markets. Prereq- Econ 211 and Acco 305.

Staff

450,F WORLD ECONOMIC AND SOCIAL DEVELOPMENT (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Examines past and future development in advanced and poor countries emphasizing resources, population, entrepreneurship, education, and planning. Prereq- Econ 211,212. Not offered every year.

Huddle, D.

455,S MONEY AND FINANCIAL MARKETS (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Determinants of the demand and supply of money, bonds, stocks, and other financial assets. Financial intermediaries. Monetary policy. Inflation. International linkages of financial markets. Prereq- Econ 375.

Bryant, J.

461,S URBAN ECONOMICS (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Economic analysis of the development and problems of urban areas with particular attention to current policy issues. Prereq- Econ 211 or permission of instructor.

Mieszkowski, P.

471,F LINEAR PROGRAMMING (3-0-3)

Formulation of managerial and technical problems; simplex method; revised simplex method; duality theory and applications; transportation problems; decomposition techniques. Also offered as Masc 471.

Boyd, A.

472,S INTRODUCTION TO GAME THEORY (3-0-3)

Solution concepts for different games: strategic form game, coalition form game and extensive form game. Elementary application to economics and political science.

Staff

475,S OPERATIONS RESEARCH DETERMINISTIC MODELS (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Optimization problems in a managerial and economic context. Familiarity with linear programming and microeconomic theory is strongly recommended. Also offered as Masc 475.

Boyd, A.

476,S STOCHASTIC MODELS (3-0-3)

Decision theory, waiting line theory, Markov chains, inventory models, replacement models, simulation. Prereq- Stat 381. Also offered as Masc 476.

Pfeiffer, P.

477 MATHEMATICAL STRUCTURE OF ECONOMIC THEORY I (3-0-3)

Competitive economics from a mathematical perspective, unifying calculus, matrix algebra, and set-theoretic approaches. Theories of household, firm; production models. Prerequisite: Economics 211, Mathematics 212, Mathematical Sciences 310. Also offered as Mathematical Sciences 477. Not offered every year.

Staff

478,S ECONOMIC APPLICATIONS OF MATHEMATICAL PROGRAMMING (3-0-3)

Topics include: Activity Analysis; Computational General Equilibrium, Intertemporal Optimization; Market Games; Peak Load and Public Good Pricing. Prereq. Masc/Econ 471 and Masc 461. Not offered every year.

Young, R.

479,S OPERATIONS RESEARCH, ELEMENTARY DISCRETE OPTIMIZATION (3-0-3)

Elementary treatment of ill-behaved optimization problems. Discrete dynamic programming and integer programming. Emphasis on theory, formulation, and computational methods. Prereq. Econ 471/Masc 471. Not offered every year.

Young, R.

483,F PUBLIC FINANCE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Tax and expenditure policies at the federal, state, and local levels; emphasizes resource allocation and equity. Prereq- Econ 211.

Zodrow, G.

486,S CONTEMPORARY ECONOMIC PROBLEMS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

This special course examines the status and causes of poverty in the contemporary United States. Both economic and social science theories and models are analyzed as well as media depictions of the poor. Students formulate and carry out a field research project as the culminating element of the course.

Staff

495a,496b SENIOR SEMINAR (3-0-3 each semester)

Reading and discussion of topics in advanced economics. Open to seniors with special approval.

Staff

500,F/S M A THESIS RESEARCH (Variable)

Research on an approved topic in partial fulfillment of the requirements for the master's degree.

Smith, G.

501,F MICROECONOMIC THEORY I (3-6-5)

Theory of the firm, the theory of consumer behavior, duopoly, bilateral monopoly, imperfect competition, capital theory, and the theory of income distribution.

Brito, D.

502,F MACROECONOMICS/MONETARY THEORY I (3-6-5)

Macroeconomic theory of output, consumption, investment, interest rates, inflation and employment.

Hartley, P.

504,S ADVANCED ECONOMIC STATISTICS (3-6-5)

Statistical inference and the testing of hypotheses multiple and partial correlation analysis; analysis of variance and regression.

Sickles, R.

505,S MACROECONOMICS/MONETARY THEORY (3-6-5)

More detailed discussion of selective Macroeconomic and Monetary topics. 41

Staff

506,F TOPICS IN MACROECONOMICS/MONETARY THEORY (3-6-5)

Selected topics of current interest. The purpose of the course is to introduce students to active research issues and methods to the neoclassical school.

Staff

507,F MATHEMATICAL ECONOMICS I (4-0-5)

Theory of household, firm; activity analysis; set theory, matrix algebra, vector calculus, metric spaces, separation theory, constrained optimization.

Young, R.

508,S MATHEMATICAL ECONOMICS II (4-0-5)

Continuation of Economics 507. Set theoretic approach to general equilibrium; aggregate linear and nonlinear production models; existence, stability, optimality.

Jun, B.

510,F ECONOMETRICS I (3-6-5)

Estimation and inference in single equation regression models, multicollinearity, autocorrelated and heteroskedastic disturbances, distributed lags, asymptotic theory, and maximum likelihood techniques. Emphasis is placed on the ability to analyze critically the literature. Prereq- Econ 504.

Staff

511,S ECONOMETRICS II (3-6-5)

Topics in linear and nonlinear simultaneous equations estimation, including qualitative and categorical dependent variables models and duration analysis. Applied exercises use SAS and the Wharton Quarterly Econometric Model. Prereq- Econ 510.

Sickles, R.

512,F INTERNATIONAL TRADE THEORY (3-6-5)

Classical, neoclassical, and modern trade theory; some welfare aspects of trade, including the theory of commercial policy. Applications are emphasized.

Staff

514b INDUSTRIAL ORGANIZATIONS AND CONTROL (3-6-5)

Industrial markets and public policy.

Staff

515 LABOR ECONOMICS (3-6-5)

The economics of the labor market and the economic implication of trade unions. Attention is given to major public policy issues. Not offered every year.

Staff

516 ECONOMIC HISTORY AND DEVELOPMENT (3-6-5)

Historical analysis of economic growth and industrialization of the U.S., Western Europe, and Russia in the last 150 years. Stresses conditions which favored or retarded growth. Not offered every year.

Staff

517,F HISTORY OF ECONOMIC ANALYSIS (3-6-5)

The development of economic analysis from the scholastics to the neoclassical school. Not offered every year.

Staff

518,S INTERNATIONAL FINANCE (3-6-5)

International monetary problems, foreign exchange theory, international investments.

Staff

519b ECONOMIC GROWTH AND DEVELOPMENT (3-6-5)

Analysis of theory and policy questions relating to the level and rate of economic development.

Soligo, R.

521,F PUBLIC FINANCE I (3-6-5)

Theory of public goods and externalities, political mechanisms and public choice, theory of local public goods, cost-benefit analysis and project evaluation issues of income redistribution.

Mieszkowski, P.

522,S PUBLIC FINANCE II (3-6-5)

Effects of taxation on individual and firm behavior, general equilibrium tax incidence analysis, optimal taxation theory, optimal implementation of tax reform, analysis of comprehensive income and consumption taxes.

Zodrow, G.

523,F OPTIMIZATION & CAPITAL THEORY (3-6-5)

Dynamics, capital theory and intertemporal optimization.

Brito, D.

530 COMPARATIVE ECONOMIC SYSTEMS (3-6-5)

Analysis of theoretical models of market and centrally planned economics; national economic systems of the Soviet Union, China, Yugoslavia, Western European countries, and the United States. Not offered every year.

Soligo, R.

536b GOVERNMENT REGULATION OF INDUSTRY (3-6-5)

Advanced analysis of the economics of antitrust and other forms of regulation. Not offered every year.

Staff

561,S URBAN ECONOMICS (3-6-5)

Analysis of urban development and such urban problems as housing, land use, transportation, discrimination, and pollution.

Mieszkowski, P.

565 HEALTH ECONOMICS (3-6-5)

Economic aspects of health; production, cost demand and supply factors; methods of payment and effects of regulation.

Lairson, D., Swint, J.

573 NONLINEAR PROGRAMMING (3-0-3)

Theory and computational methods for nonlinear programming, including: Kuhn-Tucker conditions, duality theory, methods for constrained optimization of convex and nonconvex problems. Also offered as Mathematical Sciences 573. Not offered every year.

Young, R.

577 TOPICS IN ECONOMIC THEORY I (3-0-3)

Selected topics in advanced economic theory. Prerequisite: Economics 508. Not offered every year.

Chae, S.

578,S ECONOMIC THEORY II (3-0-3)

Selected topics in advanced mathematical economics. Not offered every year. Prereq- Econ 508 or Econ/Masc 478.

Jun, B.

579 TOPICS IN ECONOMIC THEORY III (3-0-3)

Selected topics in advanced economic theory. Prerequisite: Economics 508. Not offered every year.

Staff

591a, 592b TOPICS IN POLICY AND APPLIED ECONOMICS (3-6-5 each semester)

Staff

593,F WORKSHOP IN ECONOMETRICS (3-0-3)

The course is designed to expose graduate students to advanced topics in applied and theoretical econometrics through guest lectures by leading researchers in the field. Students participating in the seminar are expected to prepare, over the course of the year, a research paper and present it in the workshop.

Sickles, R.

594,S WORKSHOP IN ECONOMETRICS (3-0-3)

The course is designed to expose graduate students to advanced topics in applied and theoretical econometrics through guest lectures by leading researchers in the field. Students participating in the seminar are expected to prepare, over the course of the year, a research paper and present it in the workshop.

Sickles, R.

595,F READINGS IN ADVANCED TOPICS (3-0-3)

Staff

596,S READINGS IN ADVANCED TOPICS (3-0-3)

Staff

800,F/S GRADUATE RESEARCH (Variable)

Smith, G.

Education

Associate Professor L. McNeil, *Chair*

Associate Professor J.D. Austin

Assistant Professor D. Shirley

Clinical Professor Marvin Hoffman

Lecturer R. Duke

Degrees Offered: Secondary Teaching Certificate in conjunction with B.A. in major field; Master of Arts in Teaching

Teacher Education and Certification. Rice University seeks to contribute graduates to society able to think and to question, educated to comprehend and to cope with a rapidly changing world. Although professional instruction is not the primary ingredient of undergraduate education, the University's role in preparing students for their future life work cannot be ignored. While maintaining complete institutional integrity, Rice University supports the intention as well as the letter of regulations promulgated by the state governing the development and presentation of teacher preparation and certification programs.

To this end, the Rice University Department of Education closely cooperates with departments offering work in subject matter fields. It is the function of this department to provide rigorous professional courses and to administer the established teacher education programs.

The Rice University teacher education program strives to fit the prospective teacher to perform all the roles which may be expected of a teacher. To accomplish this objective, it gives sustained close attention to the following vitally interrelated components:

1. A sound liberal or general education.
2. An extended knowledge of the subject(s) or area(s) to be taught.
3. Professional knowledge (i.e., relevant historical, philosophical, social, and psychological material).
4. Skills in classroom teaching, in working with children and adults, and in supervising the learning process.

Admission to the Teacher Education Program. Students who have satisfied the following requirements may apply to the Rice University Teacher Education Council for admission to the teacher education program:

1. Junior standing at Rice University.
2. A grade of "C" or better in all semester hours attempted in applicant's teaching field(s).
3. Evidence of satisfactory speech patterns.
4. Evidence of adequate physical vigor and strength, and absence of obvious physical conditions which might interfere materially with performance as a teacher in a classroom.
5. Approval of a completed Teacher Certification Program form by the appropriate departmental representatives and the Teacher Education Council prior to registration for the junior year.
6. Satisfactory scores on all preprofessional skills tests.

Requirements for a Texas Provisional Teaching Certificate (Grades 7-12). Rice University is approved by the State of Texas to offer teacher preparation programs in the following fields: art, biology, chemistry, computer education, earth science, economics, English, French, German, health education, history, Latin, mathematics or mathematical sciences, physical education, physics, political science, psychology, Russian, general science, social studies, sociology, and Spanish.

After satisfactory completion of the Rice University teacher education program, the student will be recommended for a Texas teaching credential. The Texas Education Agency will then award the student a Texas Provisional Teaching Certificate, Grades 7-12.

The Rice University teacher preparatory program requires the following:

1. A bachelor's degree.
2. Foundations in Arts and Sciences (recommended to be completed during the freshman and sophomore years):
 - Fine arts, 3 semester hours;
 - Mathematics, 3 semester hours;
 - Laboratory science, 3 semester hours;
 - Computer proficiency;
 - English, 12 semester hours;
 - American history, 6 semester hours, (History 211 and 212);
 - Government, 3 semester hours (Political Science 210); and
 - University distribution requirements.
3. Academic Specialization (student selects one of the following plans):
 - Plan I. Preparation to teach one field: At least 36 hours in field with at least 21 semester hours of advanced work. All courses must be approved by the Rice Teacher Education council.
 - Plan II. Preparation to teach two fields: At least 24 semester hours in each field with 12 semester hours of advanced work in each field. Courses must be approved by the Rice Teacher Education Council.
 - Plan III. Preparation to teach related fields: At least 48 semester hours in a composite field (general science or social studies)

with at least 18 semester hours of advanced work. Courses must be approved by the Rice Teacher Education Council.

4. Professional Education, 18 semester hours consisting of the following: Educ 311, 312, 409, 3 semester hours in Seminar in Teaching (e.g., 304 and 404, 304 and 402, only 410, only 416), and 6 hours in student teaching (Principles of Teaching).

Supervised Teaching Experience. Either of two plans may be followed by teacher education candidates.

1. Apprenticeship Plan (Plan A):

Prerequisite: Educ 304, 311, 312.

Apprenticeship is designed for students who wish to complete preparation for their teaching careers in four years and two six-week summer sessions. Candidates will enroll for the summer session following their junior year. The apprentice will assist and teach under the supervision of a master teacher and University faculty in the Rice Summer School for High School Students.

Educ 409 and a 400-level course, Seminar in Teaching, are to be completed during the senior year.

Following graduation from Rice, the apprentice will again teach in the Rice Summer School for High School Students under the supervision of a master teacher and University faculty. The apprentice is not remunerated for teaching either summer. He or she is recommended for the Texas Provisional Teacher's Certificate following successful completion of the second summer and state ExCET tests.

2. Internship Plan (Plan B):

Prerequisite: Completion of all course work except student teaching.

Under this plan, students are expected to attend a six-week summer session immediately following their graduation from Rice. Each intern will observe and teach classes under the supervision of a master teacher and University faculty in the Rice Summer School for High School Students. During the following fall semester, interns will teach in a neighboring school system. Such placement will be subject to the availability of openings in the intern's teaching field(s).

The intern will be employed for full-time duty and will teach under the supervision of a member of the cooperating school system and a faculty member from the University. During the half year of service, the intern will be paid a salary commensurate with the salary being paid a full-time teacher with a degree and an emergency teaching permit by the cooperating school system. Upon successful completion of the internship semester and upon the recommendation of the secondary school principal, the intern will be offered a regular teaching contract for the spring semester if a suitable vacancy exists. He or she will be recommended for a Texas Provisional Teacher's Certificate after successful completion of state ExCET tests.

Program for the Master of Arts in Teaching. Most candidates entering the program will have had no professional education courses. During the program,

candidates usually fulfill all requirements for a Texas Provisional Teaching Certificate. The program consists of the following components:

1. Courses in secondary school educational theory, teaching strategies, educational objectives, and evaluation.
2. Graduate and upper division courses in the candidate's teaching field(s).
3. Supervised full-time teaching in the Rice Summer School for High School Students for two summers. Candidates will be responsible for the design and implementation of courses, for teaching, and for evaluation.
4. Supervised teaching internship for one semester in a cooperating public school system. (With the approval of the Department of Education a second semester internship may be substituted for the second summer of student teaching.)

Candidates with a valid secondary teaching certificate *may* be exempted from the professional education courses and the second summer of student teaching.

Normally, the degree program will consist of 11 semester courses. However, some candidates may need to remove deficiencies for certification and may therefore require additional courses.

Students in the program will not normally be eligible for Rice Graduate Fellowships or scholarship support since the cooperating school districts pay a salary for internship teaching. However, a limited number of tuition waivers is available.

Please refer to page 132 for additional information regarding admission to the graduate program in education.

Education Courses

304,S SEMINAR IN TEACHING (1-0-1)

A study of procedures and materials used in teaching various subject areas. Preparation of teaching units, orientation to secondary school teaching. Prerequisite Educ 311. Science Education, English Education, Social Studies Education, Physical Education, Art, Foreign Language Education, Mathematics Education. (See appropriate section designation.)

Staff

311,F HISTORICAL AND PHILOSOPHICAL FOUNDATIONS (3-0-3)

Analysis of historical and contemporary theories and practice in American education. Prerequisite (those intending to complete Rice teacher preparatory program): History 211, 212, 105, 106; or permission of instructor; and filing of Teacher Certification Plan.

McNeil, L.; Austin, J.; Shirley, D.

312,S PSYCHOLOGY OF HUMAN LEARNING (3-0-3)

Introduction to theoretical systems of human learning with emphasis on implications for secondary education; introductory tests and measurements.

Austin, J.

400,S SEMINAR IN TEACHING (2-0-2)

(Apprentice English teachers only) Prerequisites: Educ 304, 409.

McNeil, L.; Hoffman, M.

402,S SEMINAR IN TEACHING (2-0-2)

(Apprentice social studies teachers only) Prerequisites: Educ 304, 409.

Shirley, D.

404,S SEMINAR IN TEACHING (2-0-2)

(Section 1, apprentice teachers in mathematics education only; section 2, apprentice teachers in science education only) Prerequisites: Educ 304, 409.

Austin, J.

406,S SEMINAR IN TEACHING (2-0-2)

(Apprentice health and physical education teachers only) Prerequisites: Educ 304, 409.

Staff

407,S SEMINAR IN TEACHING (2-0-2)

(Apprentice art teachers only) Prerequisites: Educ 304, 409.

Staff

408,S SEMINAR IN TEACHING (2-0-2)

(Apprentice foreign language teachers only) Prerequisites: Educ 304, 409.

McNeil, L., Staff

409,F FUNDAMENTALS OF SECONDARY EDUCATION (3-0-3)

Background, purposes, and organization of modern secondary education curriculum and current trends in administration of secondary schools. Introductory educational research.

Austin, J., McNeil, L.

410,S SEMINAR IN TEACHING (3-0-3)

(English teachers only) Students with credit in Educ 304 may not enroll. Prerequisites: Educ 311, 409.

Hoffman, M.

412,S SEMINAR IN TEACHING (3-0-3)

(Social studies teachers only) Students with credit in Educ 304 may not enroll. Prereq- Educ 311, 409.

Shirley, D.

414,S SEMINAR IN TEACHING (3-0-3)

(Section 1, mathematics education; section 2, science education.) Same as Educ 304. Students with credit in Educ 304 may not enroll. Prerequisites: Educ 311, 409.

Austin, J., Staff

416,S SEMINAR IN TEACHING (3-0-3)

(Health and physical education teachers only) Students with credit in Educ 304 may not enroll. 43 Prerequisites: Educ 311, 409.

Staff

417,S SEMINAR IN TEACHING (3-0-3)

(Art teachers only) Students with credit in Educ 304 may not enroll. Prerequisites: Educ 311, 409.

Staff

418,S SEMINAR IN TEACHING (3-0-3)

(Foreign language teachers only) Students with credit in Educ 304 may not enroll. Prerequisites: Educ 311, 409.

McNeil, L.

419,F/S SUPERVISED TEACHING (3-0-3)

Field-based practicum for secondary teachers with accompanying seminar.

Shirley, D.

509

MAT equivalent of Educ 509.

Austin, J., McNeil, L.

511

MAT equivalent of Educ 311.

Austin, J.; Shirley, D., McNeil, L.

512

MAT equivalent of Ed 312

Austin, J.

519,F/S SUPERVISED TEACHING (3-0-3)

Field-based practicum for secondary teachers with accompanying seminar.

Staff

590c CONTEMPORARY TOPICS IN SECONDARY SCHOOL MATHEMATICS (6-0-6)

Selected topics in secondary school mathematics. Offered in summers as needed. Enrollment by consent of instructor.

Austin, J.

591,S INDEPENDENT STUDY AND RESEARCH (3-0-3)

Staff

595c CONTEMPORARY TOPICS IN SECONDARY SCHOOL SCIENCE AND MATHEMATICS (3-0-3)

Offered in summers as needed. Enrollment by consent of instructor.

Austin, J.

Engineering and Applied Science

The George R. Brown School of Engineering

Rice's engineering programs have been prominent since the early days of the University. Seven departments, each of which is strong in teaching and research, now comprise the George R. Brown School of Engineering. The school was dedicated in 1975 at ceremonies honoring the distinguished Rice alumnus, trustee, and benefactor who was a founding partner in Brown & Root, Inc.

B.S. programs are accredited by the Accreditation Board for Engineering and Technology (ABET) in chemical engineering, civil engineering, electrical engineering, mechanical engineering, and materials science and engineering.

General Undergraduate Information. Curricula in engineering at Rice University lead to either Bachelor of Arts or Bachelor of Science degrees in the fields of chemical engineering, civil engineering, electrical and computer engineering, mechanical engineering, and in materials science and engineering. In computer science and in mathematical sciences, curricula lead to the Bachelor of Arts degree. These curricula may also be used as part of integrated five-year programs that lead to professional master's degrees in each of the above fields and in environmental science or environmental engineering.

A student taking the B.A. program is required to pass a total of at least 120 semester hours (40 courses). The major department may require no more than 80 specific semester hours for the major and may require fewer. Students must complete at least 60 semester hours in addition to the departmental major requirements. Some departments require more than 120 hours for graduation.

A student following a B.S. program in engineering (other than chemical engineering) must pass a total of at least 134 semester hours (137 semester hours for chemical engineering). Except for chemical engineering, which may require up to 104 semester hours in specific course requirements, no department may require more than 92 semester hours in specific courses for the B.S. degree.

Each student should get a list of required courses from the appropriate department. First- and second-year students should have their programs approved each semester by an engineering adviser as well as by their college adviser. Before registering for the junior year, students must associate themselves with an adviser in the department of their major and have the choice of major approved. Registration for every semester thereafter must be approved by an adviser in the major department.

The undergraduate courses listed below are offered for the preparation of students majoring in all branches of engineering.

Engineering Courses

200,S CLASSICAL THERMODYNAMICS (3-0-3)

Fundamental exposition of the laws of classical thermodynamics and deductions therefrom. Applications illustrations with particular attention to pure substances. Prereq- Phys 101, 102.

Cohen, R.

211,F ENGINEERING MECHANICS (3-0-3)

Equilibrium of static systems, dynamics of a particle, dynamics of particle systems, and rigid-body dynamics. Elements of vibrational analysis. Prereq- Phys 101, 102, Math 101, 102.

Wang, C.

241,F/S ELECTRICAL CIRCUITS (3-0-3)

Basic circuit elements, mesh and node analysis, Thevenin and Norton equivalent circuits, controlled sources and op-amps solution of circuits, differential equations, use of phasors and impedance for sinusoidal AC analysis, frequency response. Laboratory on basic electrical measurements. Prereq- Math 101, 102 or equivalent. 49

Henson, T., Massey, R.

Chemical Engineering

The George R. Brown School of Engineering

Professor C. A. Miller, *Chair*
 Professors Akers, Armeniades, Davis, Dyson, Hellums,
 Hightower, Kobayashi, and L. V. McIntire
 Visiting Professor R. Jackson
 Adjunct Professor G. D. Fisher
 Associate Professors Robert and Zygourakis
 Adjunct Associate Professors W. House and Papoutsakis
 Assistant Professors Glacken, San, and Shanks
 Adjunct Assistant Professors Hokanson and Moorhead
 Lecturer Hirasaki

Degrees Offered: B.A., B.S., M.Ch.E., M.S., Ph.D.

Undergraduate Program. The undergraduate curriculum in chemical engineering is designed to provide a sound scientific and technical basis for further professional development. Concurrently, the student has the opportunity to concentrate on a particular technical specialty such as applied mathematics, biomedical engineering, biotechnology, environmental quality, kinetics and catalysis, engineering economics, petroleum production, solid state materials, or polymer science and engineering.

In the four-year curriculum, a student may qualify for either the Bachelor of Arts degree or the Bachelor of Science degree. The Bachelor of Arts program is highly flexible and allows a student to pursue other areas of interest with or without a double major. The Bachelor of Science program has a higher content of required scientific and professional courses. On completion of either bachelor's program, a student is eligible to apply for a fifth year of specialized study leading to the degree of Master of Chemical Engineering. The curriculum is designed so that outstanding students interested in careers in research and teaching may enter graduate school after either bachelor's degree.

The Department of Chemical Engineering requires 78 semester hours in the major for the B.A. degree, prerequisites and laboratory courses included. In addition to these requirements, students must also satisfy the distribution requirements and complete no fewer than 59 semester hours outside the departmental requirements for a total of at least 137 semester hours.

The B.S. degree is accredited by the Accreditation Board for Engineering and Technology. Students enrolled in the B.S. program must take:

Chemistry 101, 102, 105, 211, 212, 213, 214, 311, 312, 313;
 Chemical Engineering 301, 302, 343, 370, 390, 401, 402, 403, 404, 411,
 412, 443, 444;
 Mathematics 101, 102, 211, 212 or equivalent honors courses;
 Mathematical Sciences 340 or Mathematics 381;
 Physics 101, 102, and 132;
 Computing requirements: four hours of Mathematical Sciences 223;

Engineering 211;

An approved basic science course;

Two courses selected from Engineering 241, Materials Science 301, and Civil Engineering 300.

In addition to these courses, students must satisfy the distribution requirements and complete sufficient courses outside the departmental requirements for a total of at least 137 semester hours. A specific B.A. option in biochemical engineering is available.

Graduate Program. Graduate study in chemical engineering can lead to the Master of Chemical Engineering, the Master of Science, or the Doctor of Philosophy. University requirements for the professional degree M.Ch.E. are given on page 129. The Department requires that at least six of the courses taken must be at the advanced level in chemical engineering. In addition, four semesters of chemical engineering design, a computer science course, and an approved mathematics course must have been taken some time in the student's curriculum. Suggested course combinations are available with emphasis in the areas of biochemical engineering, petroleum engineering, and electronics materials.

University requirements for the research degrees M.S. and Ph.D. are outlined on pages 129-130.

Candidates for the Master of Science degree are required to complete a minimum of 18 approved semester hours with high standing. They must also submit an original research thesis and defend it in a public oral examination.

Candidates for the Doctor of Philosophy degree must demonstrate competence in the areas of applied mathematics, thermodynamics, transport processes, and chemical kinetics and reactor design by passing qualifying examinations, normally during the first year of study. They must also complete a minimum of 36 approved semester hours with high standing and submit a thesis that provides evidence of their ability to carry out original research in a specialized area of chemical engineering. With departmental approval, the course requirements may be reduced to 24 hours for students already having an M.S. degree. The thesis must be defended in a public oral examination.

Prerequisites for Undergraduate Chemical Engineering Courses

<i>Course</i>	<i>Prerequisites</i>
Ceng 301	Math 101, 102; Chem 101, 102; 1 hr credit in Masc 223 (MATLAB)
Ceng 302	Ceng 301; Masc 223; co-requisite Math 212
Ceng 370	Ceng 301, 302; Math 211, 212; Phys 101, 102
Ceng 390	Ceng 301; Math 211, 212; co-/pre-requisite Chem 311, Ceng 343
Ceng 401	Phys 101, 102; Ceng 302; Chem 311, 312; Math 381 or Masc 340
Ceng 402	Ceng 401
Ceng 403	Phys 101, 102; Math 211, 212; Ceng 302, 390; co-/pre-requisite Engi 211, Ceng 370
Ceng 404	Ceng 370, 390, 401, 403, and 411
Ceng 411	Math 381 or Masc 340; Chem 311, 312
Ceng 412	Ceng 411

Note: With the *written* consent of the instructor, a student may register for a course without having completed the required prerequisite(s), but such consent can be expected only in unusual circumstances and will not carry forward. For example, if the instructor for Chemical Engineering 411 waives Chemistry 311 for a person, then the person upon completing Chemical Engineering 411 may not proceed to Chemical Engineering 412 without the consent of that instructor since Chemistry 311 is an implied prerequisite for Chemical Engineering 412.

Chemical Engineering

Chemical Engineering Courses

301,F CHEMICAL ENGINEERING FUNDAMENTALS (3-0-3)

Use of basic mathematical concepts, physical laws, stoichiometry, and the thermodynamic properties of matter to obtain material and energy balances for steady and unsteady state systems. Required for sophomores intending to major in chemical engineering.

Davis, Jr., S., Shanks, J.

302,S SEPARATION PROCESSES (3-0-3)

Systematic treatment of single and multistage contacting operations involving binary and multicomponent systems. Prereq- Ceng 301.

Dyson, D.

343,F CHEMICAL ENGINEERING LAB (1-3-2)

Experiments demonstrating the principles presented in Ceng 301, 302, 390.

Glacken, M.

370,S PROCESS DYNAMICS AND CONTROL (3-0-3)

Fundamentals of complex variables. Modeling of dynamic processes. Response of uncontrolled systems. Transfer functions. Feedback controllers. Response and stability of controlled systems. Frequency response and Nyquist Stability Criterion. Design of feedback controllers. Cascade feedforward and multivariable control systems. Introduction to digital computer control. Students will use simulators for designating feedback controllers and experiment with a laboratory computer control system.

San, K., Zygorakis, K.

390,F KINETICS AND REACTOR DESIGN (3-0-3)

Principles and significance of chemical kinetics; procedures for evaluating kinetic parameters from reaction rate data; application of these methods to design and predict the performance of various types of ideal and nonideal chemical reactors in both homogeneous and heterogeneous systems.

Hightower, J.

401,F INTRO TO TRANSPORT PHENOMENA (3-0-3)

Fundamental principles of heat, mass, and momentum transport applied to the continuum; analysis of macroscopic physical systems based on the continuum equations. Prereq- Ceng 302 or permission of instructor.

Dyson, D.

402,S INTRO TO TRANSPORT PHENOMENA (3-0-3)

Continuation of Ceng 401.

Hellums, J.

403,S EQUIPMENT DESIGN I (3-3-4)

Introduction to macroscopic balances in fluid flow. Pipe flow, centrifugal pump operation and control valves. Design of fluid flow equipment and piping networks. Material selection and corrosion. Design of solid-liquid separation equipment.

Glacken, M.

404,S EQUIPMENT DESIGN II (3-3-4)

Optimal design of chemical reactors and heat exchange equipment; industrial economic principles. Special process design projects in small groups. 26

Akers, W.

411,F FUNDAMENTALS OF THERMODYNAMICS (3-0-3)

Development and application of the first and second laws of thermodynamics.

Jackson, R.

412,S THERMODYNAMICS II (3-0-3)

Advanced treatment of chemical and physical equilibrium in multicomponent systems. Detailed study of nonideal solutions.

Robert, M.

443,F CHEMICAL ENGINEERING LAB (1-3-2)

Experiments demonstrating transport coefficient measurement, forced and free convection transfer operations, and thermodynamic principles as covered in Ceng 401, 402, 411.

Dyson, D.

444,S CHEMICAL ENGINEERING LAB (1-3-2)

An extension of Ceng 443.

Dyson, D.

483,F UNDERGRADUATE RESEARCH (Variable)

Independent investigation of a specific topic or problem in modern chemical engineering research under the direction of a selected faculty member. Prereq- permission of the department.

Hightower, J.

484,S UNDERGRADUATE RESEARCH (Variable)

Same as Ceng 483.

Hightower, J.

501,F FLUID MECHANICS AND TRANSPORT PROCESSES (3-0-3)

Advanced study in fluid mechanics and transport processes including analytical and numerical approximation methods, boundary layer theory, and hydrodynamic stability.

Hellums, J.

503,F CHEMICAL ENGINEERING PROCESSES I (2-3-3)

Synthesis course applying the principles of staged processes, transport phenomena, kinetics, and economics to the simulation, design, and operation of equipment and processes.

Akers, W.

504,S CHEMICAL ENGINEERING PROCESSES II (2-3-3)

Continuation of Ceng 503, with emphasis on the use of available process design computer programs.

Kobayashi, R.

540,S STATISTICAL THERMODYNAMICS (3-0-3)

A development of the equilibrium theory of statistical mechanics. Applications to imperfect gas theory and the calculation of thermodynamic properties of matter. Prereq- Chem 311, 312, 430; Math 211, 212; Phys 201, 202 or 211, 212. Also offered as Chem 421.

Robert, M.

560,S INTERFACIAL PHENOMENA (3-0-3)

Interfacial Tension, Wetting and Spreading, Contact Angle Hysteresis, Interaction between Colloid Particles, Stability of Interfaces, Flow and Transport near Interfaces.

Miller, C.

571,F RESERVOIR ENGINEERING (3-0-3)

Basic reservoir engineering principles-single and two phase flow in porous media.

Miller, C.

580,S BIOCHEMICAL REACTORS (3-0-3)

Description, analysis, and design of biochemical reactors. Interplay of heat and mass transfer with biochemical kinetics in biochemical reactors. Fermentation, enzyme, and tissue culture reactors. Prereq- Bioc 361, 501 or 471 and Ceng 390 or equivalent.

San, K., Glacken, M.

584,S M.C.H.E. RESEARCH PROJECT (3-0-3)

Independent investigation of a specific topic or problem in modern chemical engineering research under the direction of a selected faculty member. Prereq- Permission of the department.

Staff

591,S HETEROGENEOUS CATALYSIS (3-0-3)

Principles of heterogeneous catalyst, catalyst preparation, measurement and significance of surface physical and chemical properties, absorption, heterogeneous kinetics, diffusion in porous media, catalyst poisoning and regeneration, aspects of reactor engineering, and a review of selected commercial catalytic reactions.

Hightower, J., Zygorakis, K.

593,F POLYMER SCIENCE & ENGINEERING (3-0-3)

Basic concepts in macromolecular chemistry and their application in the synthesis and chemical modification of polymers. Prereq- Chem 211, 212.

Armeniades, C.

594,S PROPERTIES OF POLYMERS (3-0-3)

Molecular organization and physical properties of polymerneric materials; elastomeric, semi-crystalline, and glassy polymers; processing and technology of polymeric systems. Also offered as Msci 594. 27

Armeniades, C.

601,S FLUID MECHANICS AND TRANSPORT (3-0-3)

Advanced study in one of several areas of fluid mechanics or transport, including tensor analysis, continuum mechanics, rheology, and mathematical methods of special interest in fluid mechanics.

McIntire, L.

602,S PHYSICO-CHEMICAL HYDRODYNAMICS (3-0-3)

Topics in hydrodynamics including areas such as waves on liquid surfaces, convective diffusion in liquids, motion of drops and bubbles, and electrophoresis.

McIntire, L.

611,F ADVANCED TOPICS-THERMODYNAMICS (3-0-3)

An advanced treatment of the classical thermodynamics of pure and multicomponent systems. Topics include first and second law analysis of engineering problems, property estimation and prediction, mixture theories, phase and chemical equilibria, and availability analysis.

Robert, M.

661,F GRADUATE SEMINAR (1-0-1)

Glacken, M.

662,S GRADUATE SEMINAR (1-0-1)

Shanks, J.

671,S RESERVOIR ENGINEERING II (3-0-3)

Computational methods in reservoir engineering; application to reserves estimation, recovery prediction, history matching, tertiary recovery operations.

Hirasaki, G.

672,F APPLIED MATHEMATICS I (3-0-3)

Linear algebra and its applications; direct and iterative methods for the solution of linear systems of equations, eigenvalues and eigenvectors, systems of ordinary differential equations, quadratic forms, series solution of ordinary differential equations and special functions and applications to chemical engineering problems.

Zygourakis, K.

673,S APPLIED MATHEMATICS II (3-0-3)

Linear operator theory, Green's functions, integral equations, perturbation and numerical methods, and functional analysis used in the solution of chemical engineering problems. Prereq- Ceng 672 or permission of instructor.

Davis, Jr., S.

675,S PROCESS DYNAMICS (3-0-3)

Dynamic equations for discrete and continuous models of chemical systems; lumped parameter systems and state space representation and multivariable control techniques; nonlinear systems, linearization, and phase plane analysis; sampled data systems; digital simulation techniques.

San, K.

683,F M S RESEARCH AND THESIS (Variable)

Miller, C.

684,S M S RESEARCH AND THESIS (Variable)

Miller, C.

692,S CHEMICAL REACTION ENGINEERING (3-0-3)

Modeling of stirred tank and tubular reactors. Multiplicity and stability of steady states. Nonideal flow patterns and models. Diffusion and reaction in porous catalyst pellets. Catalyst deactivation. Fluid-solid noncatalytic reactions. Design of fixed bed catalytic reactors. Fluidized bed reactors. Material from current literature.

Zygourakis, K.

720,S ADVANCED TOPICS (3-0-3)

Jackson, R.

730,F ADVANCED TOPICS (3-0-3)

Biomechanics and biomaterials; structure and function of extracellular supportive tissue in skeletal and cardiovascular systems; design, development, and evaluation of synthetic polymers for structural tissue replacement.

Armeniades, C.

800,F/S GRADUATE RESEARCH (3-0-3)

Miller, C.

Civil Engineering

The George R. Brown School of Engineering

Professor Merwin, *Chair*
Professors Holt, Spanos, and Veletsos
Associate Professor Durrani
Assistant Professor Dakoulas
Lecturers Bay, Gosain, Hanks, and Haris

Degrees Offered: B.A., B.S.C.E., M.C.E., M.S., Ph.D.

The profession of civil engineering is concerned with the development, planning, design, construction, and operation of large facilities and systems. These include buildings, bridges, and other structures of various forms; transportation systems, water supply systems, drainage and flood control and systems for waste disposal and pollution control. The planning of new communities and the redevelopment of existing cities are also within the spectrum of civil engineering activities.

Undergraduate Program. The professional degree is the Bachelor of Science in Civil Engineering. The programs leading to this degree are accredited by the Accreditation Board for Engineering and Technology. The student may choose to take a quite general basic program, or a more specialized option: the Environmental Engineering Option (offered in conjunction with the Department of Environmental Science and Engineering). The departmental requirements are as follows:

Basic Program

Mathematics 101, 102, 211, 212, and Mathematical Sciences 223 and 381 or 382
 Physics 101, 102, 132, Chemistry 101, 102

One of the following: Chemistry 211, Geology 101, 102, Environmental Engineering 201, 443, Physics 201, Biology 122

Two of the following: Engineering 200, 241, Materials Science 301, Geology 352
 Engineering 211, Environmental Engineering 403

Civil Engineering 251, 300, 302, 304, 305, 306, 363, 365, 403, 404, 451, 464, 470

One of the following: Civil Engineering 530, 532, 540, 570

One of the following: Civil Engineering 511, 512, 530, 532, 540, 570

Environmental Engineering Option

Mathematics 101, 102, 211, 212, and Mathematical Sciences 223 and 381 or 382
 Physics 101, 102, 132, Biology 122, Chemistry 101, 102, 107, 211, 213

Engineering 211, Environmental Engineering 201, 412, 401, 403
 Civil Engineering 300, 302, 304, 306, 363, 365, 403, 404, 470
 Two of the following: Environmental Engineering 517, 518, 536, 550
 One of the following: Geology 341, 352, Environmental Engineering 443
 Chemistry 212 and 214, 311

In addition to the departmental requirements above, students must satisfy the University distribution requirements (page 63-84), and must complete a total program of at least 134 semester hours. More information on the civil engineering program, including a recommended course of study by semesters and suggestions for selecting electives, may be obtained from the departmental office. The program of each student is formulated in consultation with a departmental adviser. As soon as students decide on an engineering major, they should consult the departmental advisers.

A Bachelor of Arts degree with a civil engineering major is also available for students not interested in a professional career in civil engineering. The B.A. program has less technical content than the B.S.C.E. program and hence more flexibility with electives. It is not accredited as a professional engineering curriculum. The detailed curriculum may be obtained from the departmental office. This curriculum requires at least 124 semester hours of which no fewer than 60 must be outside of the specific departmental requirements.

The Bachelor of Science in Civil Engineering is a suitable terminal degree for students interested in a professional career, but a master's degree is highly desirable. The Doctor of Philosophy degree is generally required for a career in teaching or in research and development.

Graduate Program. Programs of study in structural engineering and structural mechanics and geotechnical engineering can lead to the degrees of Master of Civil Engineering, Master of Science, and Doctor of Philosophy. Special attention is given to developing the student's interest in and ability for independent study and research in the M.S. and Ph.D. degree programs.

Applicants for graduate study are generally required to have a Bachelor of Science in Civil Engineering, with a significant emphasis on structural engineering. Consideration may be given to applicants with some other undergraduate degrees if they have adequate preparation in mathematics, mechanics, and structural analysis and design. Curricula such as engineering technology or construction technology do not represent adequate preparation.

The requirements for a professional Master of Civil Engineering degree are described on page 132. University requirements for other advanced degrees are described on pages 136-139. Departmental requirements for the M.S. and Ph.D. degrees are as follows. A candidate for the Master of Science degree is required to (1) complete at least 21 semester hours of approved courses; (2) complete an acceptable thesis; and (3) pass a final oral examination on the thesis. A candidate for the degree of Doctor of Philosophy must satisfy the following requirements: (1) complete at least 48 semester hours of approved courses with high standing; (2) pass a comprehensive preliminary examination designed to test the candidate's knowledge of the field and ability to think in a creative manner; (3) pass an oral qualifying examination on the proposed thesis research and related topics; (4) complete a thesis which shall constitute an original contribution to knowledge; and (5) pass a final public oral examination on the thesis and related topics. If the

departmental faculty concludes at any stage of a student's doctoral program that he or she is unqualified to continue, the student is denied further registration.

The research interests of the members of the civil engineering faculty lie in the areas of structural and foundation dynamics, including earthquake engineering and offshore structures, applications of probability theory to civil engineering problems, particularly random vibrations and structural fatigue; behavior of concrete components and structural systems; experimental studies of fatigue in steel structural assemblies; and mechanical properties of soils.

M.S. and Ph.D. students are expected to participate in the instructional activities of the Department as part of their educational experience. This service will not usually be required for more than one semester of an M.S. program or two semesters of a Ph.D. program, nor for more than ten hours per week in any semester.

Civil Engineering Courses

251,F PLANE SURVEYING (2-3-3)

Fundamental surveying principles and techniques.

Hanks, M.

300,S MECHANICS OF SOLIDS (3-0-3)

Stresses and deformations due to various loads. Study of engineering properties of materials and failure theories. Prereq- Engi 211.

Merwin, J.

302,S STRENGTH OF MATERIALS LABORATORY (0-3-1)

Standard tension, compression, and torsion tests of ferrous and nonferrous metals; experimental techniques, behavior of structural elements. Enrollment limited, preference given to Civi majors.

Merwin, J.

304,S STRUCTURAL ANALYSIS I (3-0-3)

Analysis of statically determinate structures; stability and determinacy; influence lines and moving loads. Calculation of deflections. Introduction to analysis of indeterminate structures. Prereq- Engi 211 and concurrent registration in Civi 300.

Holt, E.

305,F STRUCTURAL ANALYSIS II (3-0-3)

Force and displacement methods of analysis of indeterminate structures; influence lines; energy methods. Limit analysis of beams and frames. Prereq- Civi 304.

Holt, E.

306,S STEEL DESIGN (3-0-3)

Design of steel members, connections, and assemblies. Behavior of steel members as related to design. Prereq- Civi 304.

Holt, E.

341,F APPLICATIONS OF PERSONAL COMPUTERS TO CIVIL ENGINEERING PROBLEMS (2-3-3)

Topics covered include graphical presentation of data; curve fitting; eigenvalue problems; linear optimization; and two dimensional structural analysis. Limited enrollment. Prereq- Civi 300, knowledge of computer programming. Permission of instructor. Not offered every year.

Staff

363,F APPLIED FLUID MECHANICS (3-0-3)

Fluid properties, fluid statics and incompressible fluid steady flow. Energy and momentum equations with many applications. Similitude and dimensional analysis. Viscous fluid flow in pipes and pipe networks.

Merwin, J.

365,F HYDRAULICS LABORATORY (0-3-1)

Laminar and turbulent flow through pipes and fittings; open channel flow and hydraulic machinery.

Merwin, J.

403,S REINFORCED CONCRETE DESIGN (3-0-3)

Material properties, flexural strength of rectangular and T-sections; strength design of beams, one-way slabs and footings; shear strength; deflections; and column design. Use of handbooks and computer programs for design. Prereq- Civi 304. 31

Durrani, A.

404,S CONCRETE LABORATORY (0-3-1)

Tests of materials and reinforced concrete members. Prereq- Civi 403 (concurrent).

Durrani, A.

451,S INTRODUCTION TO TRANSPORTATION (3-0-3)

Operational characteristics of transport modes, elements of transportation planning, and design of stationary elements.

Bay, P.

464,S HYDROLOGY & WATERSHED ANALYSIS (3-3-4)

Fundamentals of the hydrologic cycle, hydrography techniques, flood routing, and open channel flow; local watershed application and laboratory. Also offered as Envi 412.

Bedient, P.

470,F BASIC SOIL MECHANICS (3-3-4)

Soil exploration, soil properties and behavior, soil classifications, hydraulics of soil moisture, consolidation and settlement, strength characteristics, soil stabilization, lateral earth pressure, slope stability, and retaining wall design.

Dakoulas, P.

499,F/S SPECIAL PROBLEMS (Variable)

Study of selected topics including individual investigations, special lectures, and seminars. Offered upon mutual agreement of faculty and student.

Staff

500,F ADVANCED MECHANICS OF SOLIDS (3-0-3)

Advanced topics in stress analysis, curved beams, beams on elastic supports, plates, torsion of noncircular sections, columns, buckling, plate analysis. Enrollment normally limited to seniors and first-year graduate students.

Merwin, J.

503,F STRUCTURAL ANALYSIS BY MATRIX METHODS (3-0-3)

Flexibility and stiffness of structural elements. Compatibility and equilibrium. Force and displacement methods of analysis. Finite element methods. Nonlinear structures. Prereq- Civi 305 or equivalent.

Holt, E.

508,S ENGINEERING ANALYSIS (3-0-3)

Numerical integration of initial value problems. Energy methods, variational calculus. Finite difference, discrete element, and series methods for continuous boundary value problems. Applications in structural mechanics.

Staff

511,F/S OPTIMALITY IN DESIGN (3-0-3)

Application of optimization techniques to design and operation of civil engineering systems. Topics include problem formulation, linear and nonlinear optimization, and scheduling problems. Offered irregularly.

Staff

512,F APPLICATIONS OF PROBABILITY (3-0-3)

Probability, statistics, and decision theory applied to problems of design and operation of civil engineering systems. Prereq- Masc 381 or 382.

Staff

515,S STRUCTURAL PLASTICITY, FATIGUE, AND FRACTURE (3-0-3)

Problems in limit analysis and design, plastic behavior of structures, fatigue failure and brittle fracture of structural components. Also offered as Mech 515.

Merwin, J.

516,F PLATES (3-0-3)

Introduction to theories of plates with applications to practical problems.

Staff

519,S SHELLS (3-0-3)

Introduction to theories of shells with applications to practical problems.

Veletsos, A.

521,F STRUCTURAL DYNAMICS I (3-0-3)

Dynamics of force-excited discrete linear systems with applications to design. Prereq- permission of instructor for undergraduates not in Structural Option Program.

Veletsos, A.

522,S STRUCTURAL DYNAMICS II (3-0-3)

Dynamics of force-excited continuous linear systems and ground-excited linear and yielding structures. Fundamentals of earthquake engineering. Prereq- Civi 521.

Veletsos, A.

523,S PROBABILISTIC STRUCTURAL DYNAMICS (3-0-3)

Dynamic response of structural systems to excitations characterized as stochastic processes. Prereq- Civi 521 or Mech 412 and basic knowledge of probability theory. Also offered as Mech 523.

Spanos, P.

525,S STRUCTURAL DYNAMICS III (3-0-3)

Special topics in structural dynamics, including problems of wave propagation, response of structures to waves, dynamics of foundations, 32 soil-structure and fluid-structure interaction. Offered irregularly. Prereq- Civi 521.

Veletsos, A.

526,S STRUCTURAL STABILITY (3-0-3)

Stability criteria. Flexural and torsional buckling of columns and frames, lateral buckling of beams, plate buckling. Effect of imperfections on strength. Beam-columns. Evaluation of design code provisions. Offered irregularly.

Staff

530,F CONCRETE BUILDING DESIGN (3-0-3)

Design of reinforced concrete building structures and floor slab systems. Case histories will be discussed. Prereq- Civi 403.

Gosain, N.

531,F BEHAVIOR OF REINFORCED CONCRETE MEMBERS (3-0-3)

Moment-curvature relationship for beams and columns, biaxially loaded columns, slenderness effects, interaction diagrams, shear and torsion in members, shear wall-frame interaction, behavior under large load reversals; extensive use of microcomputers. Prereq- Civi 403.
Durrani, A.

532,S PRESTRESSED CONCRETE (3-0-3)

Prestressing techniques, prestress losses, deflections, shear and torsion, analysis and design of members using microcomputers, composite members, continuous beams and prestressed slabs. Prereq- Civi 403.

Durrani, A.

540,S HIGH-RISE BUILDING DESIGN (3-0-3)

Practical considerations from the conceptual stage to the final analysis; including design parameters and serviceability limitations. Prereq- Civi 305, 306, 403.

Haris, A.

570,S FOUNDATION ENGINEERING (3-0-3)

Geotechnical engineering applications to the analysis, design, and construction of shallow and deep foundations and earth retaining structures. Prereq- Civi 470.

Dakoulas, P.

571,F/S SOIL DYNAMICS (3-0-3)

Introduction to Vibrations and Wave Propagation in Elastic Media. Behavior of soil subjected to dynamic and cyclic loading, including field and laboratory testing. Engineering applications, focusing on earthquake engineering problems such as modification of ground shaking caused by the soil, liquefaction of sands, machine foundations, etc.

Dakoulas, P.

699,F/S SPECIAL PROBLEMS (Variable)

Study of selected topics including individual investigations under the direction of a member of the civil engineering faculty. Offered upon mutual agreement of faculty and student.

Staff

800,F/S RESEARCH AND THESIS (Variable)

Staff

Computer Science

The George R. Brown School of Engineering

Professor Cartwright, Chair

Professor Kennedy

Adjunct Professors Dongarra, Fox, Gorry, Sorensen

Associate Professors Boehm, Hood, and Zwaenepoel

Assistant Professors Almes, Felleisen, Krentel, Pollock, Schäffer, and J. Warren

Adjunct Assistant Professors Callahan, S. Warren

Research Scientists Cooper, and Torczon

Lecturer Pearlman

Degrees Offered: B.A., M.C.S., M.S., and Ph.D.

Undergraduate Program. During the first two years, all computer science majors are required to take the following courses:

Mathematics 101, 102 (or 121, 122)
 Physics 101
 Computer Science 210, 212, 280, 320

In addition, the following courses are strongly recommended:

Mathematics 211, 212
 Physics 102, 132

During the spring semester of the sophomore year, prospective majors should apply for admission into the program. Because enrollment in the major is limited to the number of students that the facilities can handle, some applications may be turned down. After admission, a student will plan a course of study for the junior and senior years with a departmental undergraduate adviser. To complete the major, a student must fulfill the following requirements:

Software engineering: Computer Science 310
 Algorithms: Computer Science 382
 Linear algebra: Mathematical Sciences 310 or Mathematics 355
 Probability/Statistics: Statistics 381 or 382
 Software systems: Computer Science 412 or 421
 Hardware and architecture: Electrical and Computer Engineering 326 or 425
 Computational mathematics: one of Mathematical Sciences 353, 451, 452, 453, 454, 471
 Mathematics: one of 212, 312, 356, 425, or 463

plus two of the following courses not used to satisfy the above requirements:

Computer Science 411, 412, 421, 425, 440, 460, 480, 481

The courses required for the major sum to between 59 and 61 hours. Since the University requires 60 hours in addition to those used for the major, as many as 121 hours may be needed to graduate.

Undergraduate Honors Program. A student can, with the permission of the department, join the undergraduate honors program in Computer Science. The requirements for the freshman and sophomore years of the program are identical to the first two years in the standard program above. In order to complete the requirements for the major, a student must take the following courses:

Software engineering: Computer Science 310
 Algorithms: Computer 382
 Linear algebra: Mathematical Sciences 310 or Mathematics 355
 Probability/Statistics: Statistics 381 or 382
 Software systems: Computer Science 412 and 421
 Formal languages: Computer Science 481
 Hardware systems: Electrical and Computer Engineering 425
 Computational mathematics: one of Mathematical Sciences 451, 452, 453, 454, 471
 Mathematics: 425 or 463

plus one of

Computer Science 411, 460, 480, 492

For more information about the program, please contact the departmental secretary.

Graduate Program. The department offers three graduate programs, the professional master's, the research master's and the doctoral. The professional program, a terminal degree program for students intending to pursue a technical career in the computer industry, awards the Master of Computer Science degree. To earn the degree, the student must successfully complete thirty semester hours of coursework approved by the department. A minimum grade point average must be achieved over all courses counting toward the degree. The professional master's program normally requires three semesters of study.

The research master's program requires a thesis in addition to coursework and culminates in the Master of Science degree. Admission to this program, however, is reserved for special situations.

The doctoral program, offered to students planning to pursue a career in computer science research and education, awards the degree of Doctor of Philosophy. To earn this degree, the student must pass a comprehensive examination covering the core areas of computer science, pass a qualifying examination in an area of specialization, conduct original research, submit an acceptable thesis proposal, successfully defend the thesis proposal, submit an acceptable thesis reporting research results, and pass a final oral defense. Upon successful completion of the comprehensive examination, the qualifying examination and the proposal defense, the student will be awarded the Master of Science degree. After a successful thesis defense and the completion of all departmental and university requirements, the student will be awarded the Doctor of Philosophy degree. The doctoral program normally requires four to five years of study.

Fellowships and research assistantships are available to students in the doctoral program. Both provide a monthly stipend for the academic year and cover all tuition expenses. More substantial monthly stipends may be available during the summer for students working on departmental research projects. In all cases, continued support is contingent on satisfactory progress in the program. During the academic year, students in the doctoral program assist the department in the teaching and administration of undergraduate and graduate courses. However, such duties will not be required of any student for more than four semesters and will not exceed an average of ten hours per week.

Current research interests of the faculty include algorithms, compiler construction, distributed systems, geometric modeling and robotics, parallel processing, performance evaluation, programming environments, programming languages, program verification, semantics, symbolic computation, and the theory of computation.

For further information and application materials, write the Department of Computer Science, Rice University, Post Office Box 1892, Houston, Texas 77251-1892.

Computer Science Courses

Note that course registrations at the 300 and 400 level may be restricted. In addition, course registrations at the 500 level and above require the permission of the instructor.

100,F/S INTRODUCTION TO COMPUTING (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Introduction to computer organization, operating systems, programming languages, artificial intelligence, and programming. Not intended for science-engineering students. May not be taken for credit after any other programming course.

Staff

200,S ELEMENTS OF COMPUTER SCIENCE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

A broad introduction to the major topics of computer science, including algorithms, mathematical models of computation, machine organization and design, programming languages, communication, and artificial intelligence. Not intended for science-engineering students.

Staff

210,F,S INTRODUCTION TO PRINCIPLES OF SCIENTIFIC COMPUTATION (3-3-4)

Fundamental concepts of scientific computation including recursive and iterative problem decomposition. Functional and imperative programming paradigms. Basic numerical methods. Laboratory assignments using Scheme and MATLAB, a high-level language for matrix computations and graphics. A student may receive credit for only one of Computer Science 210 and 211. Limited enrollment.

Staff

211,F INTRODUCTION TO PROGRAMMING (3-1-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Introduction to programming using Pascal. Problem solving and algorithms, elementary data structures, procedures and functions, debugging. NOTE: Only ONE of Computer Science 211 or 212 may be counted for distribution.

Staff

212,F/S INTERMEDIATE PROGRAMMING (3-1-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Programming methodology, problem solving, recursion, data structures, introduction to analysis of algorithms, sorting techniques. NOTE: Only ONE of Computer Science 211 or 212 may be counted for distribution. Prerequisite: Computer Science 210 or 211 or permission of instructor.

Staff

280,F MATHEMATICS OF COMPUTER SCIENCE (4-0-4)

Mathematical induction, recursive definitions and recurrence equations, finite state machines, computability, logic. Prerequisites: Mathematics 102, Computer Science 210.

Staff

290,F/S COMPUTER SCIENCE PROJECTS (1-4)

Theoretical and experimental investigations under staff direction. Prerequisite: permission of department.

Staff

310,F PROGRAMMING STUDIO (2-6-4)

Advanced programming methods, including structured programming, team programming, program specification and testing. Prerequisites: Computer Science 212, 280.

Staff

320,S INTRODUCTION TO COMPUTER ORGANIZATION (3-3-4)

Basic computer architecture and assembly language programming. System software, including loaders and assemblers. Input-output devices and programming. Prerequisite: Computer Science 212.

Staff

340,S SYMBOLIC COMPUTATION (3-3-4)

Introduction to the functional, equational and logic programming paradigms. Topics include data abstraction, higher-order functions, rewriting systems, interpretation, lazy evaluation, unification and resolution. Prerequisites: Computer Science 212, 280.

Staff

382,S DESIGN AND ANALYSIS OF ALGORITHMS (4-0-4)

Design and analysis of efficient computer algorithms and data structures. Prerequisites: Computer Science 212, 280. Also offered as Electrical and Computer Engineering 322.

Staff

390,F/S COMPUTER SCIENCE PROJECTS (1-4)

See Computer Science 290.

Staff

411,F PROGRAMMING LANGUAGES (3-3-4)

The design, definition and abstract implementation of programming languages including methods for precisely specifying syntax and semantics. Prerequisites: Computer Science 280, 320.

Staff

412,S COMPILER CONSTRUCTION (3-3-4)

Topics in the design of programming language translators, including parsing, run-time storage management, error recovery, code generation and optimization. Prerequisite: Computer Science 382.

Staff

421,S OPERATING SYSTEMS AND CONCURRENT PROGRAMMING (3-3-4)

Introduction to the design, construction, and analysis of concurrent programs with an emphasis on operating systems, including filing systems, schedulers, and memory allocators. Specific attention is devoted to process synchronization and communication within concurrent programs. Prerequisites: Computer Science 212, 320. Also offered as Electrical and Computer Engineering 421.

Staff

425,F COMPUTER SYSTEMS (3-3-4)

Memory hierarchy, storage management, addressing, control, and input-output. Microprogramming. Comparison of solutions to computer system design problems. Prerequisites: Computer Science 320 and Electrical and Computer Engineering 326. Also offered as Electrical and Computer Engineering 425.

Staff

440,F ARTIFICIAL INTELLIGENCE (3-0-3)

Techniques for simulating intelligent behavior by machine, problem solving, game playing, pattern perceiving, theorem proving, semantic information processing, and automatic programming. Prerequisites: Computer Science 382, Statistics 381 or 382. Also offered as Electrical and Computer Engineering 521.

Staff

460,S INTRODUCTION TO COMPUTER GRAPHICS (3-0-3)

2D graphics techniques including fast line and curve drawing and polygon filling. 3D graphics problems including representation of solids, shading, and hidden surface elimination. Fractals, graphics standards. Not necessarily offered every year. Prerequisite: Computer Science 382.

Staff

480,S CONCRETE MATHEMATICS (3-0-3)

Discrete and combinatorial mathematics, including sums and products, integer functions, elementary number theory, factorials, binomial coefficients, harmonic numbers, Fibonacci numbers, generating functions, asymptotic representations. Applications to advanced algorithm analysis. Not necessarily offered every year. Prerequisite: Computer Science 382.

Staff

481,F AUTOMATA, FORMAL LANGUAGES, AND COMPUTABILITY (4-0-4)

Finite automata, regular expressions, regular languages, pushdown automata, context-free languages, Turing machines, recursive languages, computability, and undecidability. Prerequisite: Computer Science 382.

Staff

490,F/S COMPUTER SCIENCE PROJECTS (1-9)

Theoretical and experimental investigations under staff direction. Prerequisite: permission of department.

Staff

491,F/S COMPUTER SCIENCE TEACHING (3-0-3)

A combination of in-service teaching and a seminar. Prerequisite: permission of department.

Staff

492,F/S COMPUTER SCIENCE HONORS PROJECT (3-9)

Theoretical and experimental investigations under staff direction. Open only to students in the undergraduate honors program in Computer Science. Prerequisite: permission of the department.

Staff

511,S ADVANCED PROGRAMMING LANGUAGES (3-0-3)

Formal methods for the specifications of operational semantics. Operational equivalence and programming language calculi. Approaches to a formalization of the programming language design space.

Staff

512,F ADVANCED COMPILER CONSTRUCTION (3-3-4)

Advanced topics in the design and implementation of programming language translators. Data flow analysis and optimization, code generation and register allocation, attribute grammars and their evaluation, translation within programming environments, the implementation of advanced language features. Prerequisite: Computer Science 412.

Staff

513,F IMPLEMENTATION OF PROGRAMMING LANGUAGES (3-3-4)

Automatic storage management. Representation of function closures and continuations. Implementation of logic programming. Type checking in the presence of polymorphic typing and overloading. Compiler generation from formal semantics.

Staff

514,F PROGRAMMING LOGICS (3-0-3)

Formal systems for specifying and verifying properties of programs. First order predicate logic, models of programming languages, and deductive systems for proving properties of programs.

Staff

515,S ADVANCED COMPILATION FOR VECTOR AND PARALLEL PROCESSORS (3-0-3)

Advanced compilation techniques for vector and parallel computer systems, including the analysis of program dependence, program transformations to enhance parallelism, compiler management of the memory hierarchy, interprocedural data flow analysis, and parallel debugging.

Staff

519,F/S TOPICS IN PROGRAMMING LANGUAGE (3-0-3)

Content varies at the discretion of the instructor.

Staff

520,F DISTRIBUTED SYSTEMS (3-3-4)

Distributed systems: workstations, local area networks, server machines. Multiprocess structuring and interprocess communication. File access and memory management. User interfaces: window systems and command interpreters. Case studies of selected distributed systems. Emphasis on performance aspects of system software design. Prerequisites: Computer Science 421, 425. Also offered as Electrical and Computer Engineering 520.

Staff

525,F/S ADVANCED COMPUTER ARCHITECTURE (3-0-3)

Design issues of pipelined, vector, and multiprocessor architectures. Development of performance evaluation techniques to model and simulate configuration of concurrent architectures. Software aspects of processing and their effects on performance. Prerequisite: Computer Science 425. Also offered as Electrical and Computer Engineering 525.

Staff

526. COMPUTER NETWORKS: DESIGN AND ANALYSIS (3-0-3)

Design and comparison of computer networks, techniques for performance analysis, connectivity and reliability, capacity assignment. Network topologies. Local area networks, including rings, busses, and contention networks. Prerequisite: Electrical and Computer Engineering 428. Also offered as Electrical and Computer Engineering 526.

529,S COMPUTER NETWORKS: ARCHITECTURE AND PROTOCOLS (3-0-3)

Introduction to computer networks and computer communication. Design of protocols for error recovery, reliable delivery, routing and congestion control. Store-and-forward networks, satellite networks, local area networks and locally distributed systems. Case studies of networks, protocols and protocol families. Emphasis on software design issues in computer communication. Prerequisites: Statistics 382, Computer Science 421. Also offered as Electrical and Computer Engineering 529.

Staff

530. DATABASE SYSTEM (3-0-3)

Survey of database system implementation and design techniques. File structures, relational, hierarchical and network schemes, query languages, protection and concurrent access. Prerequisite: Computer Science 382. Not offered every year.

541,S KNOWLEDGE-BASED SYSTEMS (3-0-3)

The uses of artificial intelligence to augment human capabilities. Decision support systems, expert systems with emphasis on applications in complex organizational settings. Conceptual and technical limitations of existing expert systems technology and possible remedies. Prerequisite: Computer Science 440.

Staff

561,F GEOMETRIC MODELING (3-0-3)

Curves and surfaces: parametric form, implicit form, conversion between forms. Representation of solids: wireframes, octtrees, boundary representations, constructive solid geometry. Applications: graphics, motion planning, simulation, finite element mesh generation. Prerequisite: Computer Science 382.

Staff

581,F/S THEORY OF COMPUTATION (3-0-3)

Computational complexity, abstract complexity, NP- and PSPACE-completeness, polynomial hierarchy, cryptography, Kolmogorov complexity, parallel algorithms, random algorithms. Prerequisite: Computer Science 481.

Staff

582,F/S ADVANCED ALGORITHMS (3-0-3)

Advanced design and analysis of efficient computer algorithms and data structures, lower bound techniques, semi-numerical algorithms, and fast Fourier transforms. Prerequisite: Computer Science 481.

Staff

583,S VLSI ALGORITHMS (3-0-3)

Models of parallel computation. Design and analysis of parallel algorithms. VLSI complexity. Area-time tradeoffs. Area efficient VLSI networks. Prerequisite: Computer Science 382. Also offered as Electrical and Computer Engineering 519.

Staff

584,F COMPUTATIONAL GEOMETRY (3-0-3)

Point location, range searching, convex hulls, proximity algorithms, intersections, geometry of rectangles.

Staff

589,F TOPICS IN THEORY OF COMPUTATION (3-0-3)

Staff

590,F/S COMPUTER SCIENCE PROJECTS (1-9)

Advanced theoretical and experimental investigations under staff direction.

Staff

600,F/S GRADUATE SEMINAR (1-0-1)

A discussion of selected topics in computer science.

Staff

610,F/S GRADUATE SEMINAR IN PROGRAMMING LANGUAGES (3-0-3)

A discussion of programming language semantics in computer science.

Staff

611,F/S DENOTATIONAL SEMANTICS OF PROGRAMMING LANGUAGES (3-0-3)

The operational and denotational semantics of programming languages. Prerequisites: Computer Science 411, 481, 511.

Staff

612,F/S GRADUATE SEMINAR IN COMPILER CONSTRUCTION (2-0-2)

Topics in construction of programming language translators. Prerequisite: Computer Science 412. Not offered every year.

Staff

620,F/S GRADUATE SEMINAR IN DISTRIBUTED COMPUTATION
(1-0-1)

Content varies at discretion of instructor. Prerequisite: Computer Science 520.

Staff

680,F/S GRADUATE SEMINAR IN COMPUTABILITY THEORY (1-0-1)

Content varies at discretion of instructor. Prerequisite: Computer Science 581, 582.

Staff

690,F/S RESEARCH AND THESIS (1-15)

Staff

800,F/S DOCTORAL RESEARCH (1-15)

Staff

Electrical Engineering

The George R. Brown School of Engineering

Professor Tittel, *Acting Chair***Professors Burrus, J.W. Clark, D. H. Johnson, de Figueiredo, Jump, Leeds, Pearson, Pfeiffer, Rabson, and W.L. Wilson****Visiting Professors Chen and Massey****Adjunct Professors Erikson, Giles, Kroger, Lawton, Marowsky, Parks, and Tsuchitani****Associate Professors Antoulas, Sauerbrey, Sinclair, and Varman****Adjunct Associate Professor: F. Briggs, Harman, P.H. Murphy, and Sherwood****Assistant Professors Aazhang, Bennett, Cavallaro, Halas, Walker, and Wisoff****Adjunct Assistant Professors Garcia and Nudelman****Lecturers Bourland, Cyprus, Henson, Krishen, Philippe, Papamichalis and Smayling***Degrees Offered: B.A., B.S., M.E.E., M.S., Ph.D.*

Undergraduate Program. The four-year program in electrical engineering leads to either the B.A. or the B.S. in Electrical Engineering. The B.S. program has more technical requirements, and is the only degree accredited by the Accreditation Board for Engineering and Technology, while the B.A. program allows more flexibility with electives. It is possible in either program to satisfy major requirements of two departments. Students may take a double major combining electrical and computer engineering with computer science, physics, mathematics, economics, languages, or other disciplines.

Students contemplating a major in electrical and computer engineering should take:

Mathematics 101, 102, 211, 212 (or the corresponding honors courses)

Physics 101, 102, 132

Computer Science 210

Engineering 241

Three (two for CSE option, see below) courses plus one laboratory selected from:

Chemistry 101, 102, 107, Physics 201, 202, 231

One of the following to satisfy the B.S. requirement for an engineering science course from another engineering department: Engineering 200, 211, Materials Science 245, 301

Electrical Engineering 301, 305, 320, 326, 342 (all of these courses are required for the B.S. degree, while any four of them are required for the B.A. degree)

Although a general program of study can be arranged, the program in electrical engineering is best described in terms of three major areas of concentration. For areas of specialization other than Computer Systems Engineering, this program consists of six courses taken in the area of concentration (see below) and two related electrical engineering courses outside the major area. For the B.S. degree, one of those courses must be an engineering science course, and the other must be an engineering design course.

For the Computer Systems Engineering option, the B.S. degree program consists of nine courses as specified below. Students planning to specialize in Computer Systems Engineering need not take the second semester of chemistry or second year of physics that is required for other areas of specialization.

Circuits, Controls, and Communication Systems

This specialization is composed of four subareas: (1) circuits and electronics, (2) dynamics and control, (3) information processing and communications, and (4) bioengineering. These are closely related and generally involve the study of processing and communicating signals and information through systems of devices. The major area courses are Mathematical Sciences 330, Electrical Engineering 331, 401, 430, 436, and one of Mathematical Sciences 353 or 460.

Computer Systems and Engineering

This program permits students to develop a broad background in the general area of computer systems engineering and provides preparation for further study and the opportunity to specialize in the sub-areas of computer architecture, computer hardware engineering, computer software engineering, and computer systems performance analysis. The major area courses are: Computer Science 212, Mathematical Sciences 381, Mathematical Sciences 310 or 353, Computer Science 280, and Electrical Engineering 322, 421, 425, 424 or 426, 428.

Lasers, Microwaves, and Solid-State Electronics

This area of concentration permits undergraduate students to study and participate in several specialties, including laser technology, optical communication systems, application and development of tunable laser devices, semiconductor devices, opto-electronic devices, and integrated optics and VLSI circuits. The major area courses are Mathematical Sciences 340, Electrical Engineering 306, 459, 461, 462, 463.

In addition to the departmental requirements for the major, students seeking the B.A. degree must also satisfy the distribution requirement and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 130 semester hours. For the B.S. degree, no fewer than 43 semester hours outside departmental requirements for a total of 134 semester hours are required. See Degree Requirements and Majors, pages 63-84.

Graduate Program. Requirements of a general nature for advanced degrees are outlined on pages 136-139. In addition to the above areas, there is a graduate program in bioengineering. Students should consult departmental advisers for specific courses of study.

A candidate for the professional degree of Master of Electrical Engineering is required to complete an approved sequence of ten advanced courses. See Professional Degrees in Engineering, page 132.

A candidate for the Master of Science degree in the Department of Electrical and Computer Engineering is required to complete an approved course of study. In addition, the candidate is required to complete an approved research program and submit an acceptable thesis. A semester or more of supervised teaching is required as a valuable part of graduate education. The M.S. degree is not a terminal degree, but part of the Ph.D. program at Rice.

The granting of the Doctor of Philosophy degree presupposes academic work of high quality and demonstrated ability to do independent and creative research. To be admitted to candidacy, the student must obtain high standing in an approved course program and perform satisfactorily on qualifying examinations. Normally, the candidate completes the requirements for an M.S. degree as part of the Ph.D. program. Qualified students may, upon recommendation of the department and approval of the Graduate Council, enter a program leading directly to the Doctor of Philosophy degree after completing the bachelor's degree. The candidate must participate in a program of supervised teaching. Emphasis is placed on research leading to a satisfactory dissertation. Each candidate takes a final oral examination. The doctoral candidate should expect to spend a minimum of three academic years of graduate study in this program.

In addition to the regular graduate programs, there are four interdisciplinary graduate programs designed particularly for those who received their previous degree(s) in mathematics, physics, chemistry, or other sciences, including undergraduate engineering science programs, but who have become interested in the engineering applications appropriate to a particular field of science. These programs are systems theory, solid-state electronics and materials science, computer science, and bioengineering.

Electrical Engineering Courses

301,F/S NETWORK AND SYSTEMS THEORY (3-0-3)

Analysis of linear systems using circuits as the primary example. Time and frequency domain analysis: solution of differential equation, convolution, and the Laplace transform. State-variable analysis. Limited enrollment. Prereq- Engi 241.

Pearson, J.B.

305,F/S ELECTROMAGNETIC FIELDS & WAVES (3-0-3)

Distributed systems. Transmission lines. Smith Charts and impedance matching. Static and oscillatory fields. Maxwell's equations. Interaction of waves with media optical fibers antennae.

Smayling, M.

306,S ELECTROMAGNETIC FIELD THEORY (3-0-3)

Electrostatic fields and boundary value problems. Magnetic fields and interaction with materials. Time dependent electromagnetic fields. Plane waves, waveguides, and resonators.

Wisoff, J.

270 COURSES OF INSTRUCTION

320,F INTRODUCTION TO COMPUTER ORGANIZATION (3-3-4)

Basic computer architecture and assembly language programming. Systems software, including loaders and assemblers. Input-output devices and programming. Prereq- Comp 211 or Comp 210.

Varman, P.

322,S DESIGN/ANALYSIS OF ALGORITHMS (3-3-4)

Design and analysis of efficient computer algorithms and data structures. Prereq- Comp 212, Comp 280. Also offered as Comp 382.

Staff

326,F/S DIGITAL LOGIC DESIGN (3-3-4)

Gates, flip-flops, combinational and sequential switching circuits, registers, data transfer paths, logical and arithmetic operations. Prereq- Comp 211 or Comp 210, Engi 241.

Cyprus, J., Sinclair, J.

331,F/S APPLIED PROBABILITY (3-0-3)

Concepts, interpretations, elementary techniques, and applications of modern probability theory, including a brief introduction to statistical inference. Prereq- Math 102. Also offered as Masc 381 and Stat 381.

Pfeiffer, P.

342,F/S ELECTRONIC CIRCUITS (3-3-4)

Models of transistors, FETs, and integrated circuits. Biasing methods, two-port analysis, single and multistage amplifiers, frequency domain characteristics, feedback, stability, oscillators, power amplifiers. Prereq- Engi 241.

Massey, R., Rabson, T.

401,F SIGNALS AND LINEAR SYSTEMS (3-0-3)

Representation and analysis of signals and linear systems using Fourier transforms and convolution. Applications include modulation, gating, sampling, and filtering. Generalized functions and transforms. Bilateral Laplace and Z transforms. Prereq- Elec 301 and a knowledge of complex variable theory.

Chen, G.

421,S OPERATING SYSTEMS AND CONCURRENT PROGRAMS (3-3-4)

Introduction to the design, construction, and analysis of concurrent programs with an emphasis on operating systems, including filing systems, schedulers, and memory allocators. Specific attention is devoted to process synchronization and communication within concurrent programs. Prereq- Comp 212, Elec 320. Also offered as Comp 421.

Staff

424,S COMPUTER SYSTEM DESIGN (2-4-4)

The specification, design, and implementation of practical computer systems, taking into account such factors as cost constraints and available technology. Details of data path, control unit, and memory system design. Comparison of various bus architectures. Techniques for peripheral interfacing. Laboratory will include a major design project. Prereq- Elec 326, 425.

Bennett, J.

425,F COMPUTER SYSTEMS ARCHITECTURE (3-3-4)

Structure and organization of processor, memory and control elements. Management of memory hierarchy. Microprogramming. Interaction of instruction set and system architecture. Prereq- Elec 320, 326. or permission of instructor. Also offered as Comp 425.

Bennett, J.

426,F DIGITAL SYSTEM DESIGN (3-3-4)

Synchronous and asynchronous sequential circuits. Techniques for processing and control unit design including microprogrammed controllers and high speed arithmetic circuits. Prereq- Elec 320, 326. Not offered 1989-1990.

Jump, J.

427,F PULSE AND DIGITAL CIRCUITS (3-3-4)

Discrete and integrated solid state circuits. Interaction of linear components with diodes, bipolar transistors, and field effect transistors. Monostable, bistable, and astable multivibrators. Applications of linear one and two degree of freedom circuits to digital hardware. Analysis of circuits and their interconnection to form digital systems. Construction of digital projects from discrete and integrated circuits. Prereq- Elec 342 and Elec 326.

Cyprus, J.

428,S COMPUTER SYSTEMS PERFORMANCE (3-3-4)

Analytical models of computer systems. Queueing theory and Markov chains. Simulation and analysis of simulation results. Operational analysis. Course will include a project. Prereq- Elec 425, Elec 381 or Masc 382.

Sinclair, J.

430,S COMMUNICATION THEORY & SYSTEMS (3-0-3)

Review of applied probability theory. Introduction to stochastic processes. Complex-signal analysis. AM and FM. Digital communication, PCM, signal transmission, optimum receiver theory, information theory and coding. Prereq- Elec 401 and either Elec 331 or Masc 382.

Aazhang, B.

436,S CONTROL SYSTEMS I (3-0-3)

Representation, analysis, and design of simple control systems in the frequency domain. Prereq- Elec 301.

Henson, T.

438,S REMOTE SENSING (3-0-3)

Remote sensing using wave propagation. Statistical formulation of diffraction problems. Wave scattering from rough surfaces. Applications include monitoring from space and non-contact sensing for robotics and automation.

Krishen, K.

442,S ADVANCED ELECTRONIC CIRCUITS (3-0-3)

Electronic circuits used in communication and other systems, including principles of feedback, modulation, detection, and active filtering. Emphasis on design. Prereq- Elec 342.

Massey, R.

459,F QUANTUM MECHANICS (3-0-3)

Schrodinger's equation; harmonic oscillators; band theory of solids; hydrogen molecule; spins and angular momentum; interaction of matter with radiation; spectroscopy; scattering processes and nonlinear susceptibility; quantum statistics; transport phenomena.

Wisoff, J.

461,F ELECTRICAL PROPERTIES OF MATERIALS (3-0-3)

Properties and parameters of dielectric, conducting, and semiconducting materials important in the understanding of device characteristics. Coreq- Elec 459.

Rabson, T.

462,S SEMICONDUCTOR DEVICES (3-4-4)

Physical principles and operational characteristics of semiconductor devices. Prereq- Elec 461.

Wilson, W.

463,S QUANTUM ELECTRONIC DEVICES (3-0-3)

Lasers, optoelectronics, integrated optics, nonlinear optics, holography, and optical processing.

Sauerbrey, R.

481,F FUNDAMENTALS OF NEROSCIENCE (4-0-4)

An introduction to the field of Neuroscience that includes the anatomy and physiology of the vertebrate nervous system, as well as electrical measurement and mathematical modeling techniques that are frequently employed in the study of the nervous system. The topics covered in the area of neurophysiology include the electrophysiology of peripheral and central nervous system neurons, skeletal muscle, synaptic and neuromuscular transmission, evoked potentials from the spinal cord and brain. The electrophysiology of selected general sense receptors and the auditory, vestibular, and visual systems are also included. Electronic fundamentals associated with the design and construction of useful instrumentation systems are studied, as well as the numerical methods used to implement mathematical models that describe various biological elements of the nervous system. A term project is required. Prereq- Engi 241, 342.

Clark Jr., J.

482,S FUNDAMENTALS OF THE CARDIOVASCULAR, PULMONARY AND RENAL SYSTEMS (4-0-4)

An introduction to the anatomy and physiology of a number of organ systems in the body including the cardiovascular, pulmonary and renal systems as well as the autonomic nervous system controlling their function. Specific topics covered in the cardiovascular area include cardiac electrophysiology, ventricular mechanics, neural control of heart rate, myocardial contractility and vasomotor tone; in the pulmonary area: pulmonary mechanics, gas exchange and neural control of respiration; in the renal area: transport and exchange mechanisms in the kidney, neurohormonal control of tubular function and water balance. The class is exposed to advanced topics concerned with the design and construction of useful instrumentation systems as well as mathematical models associated with these research areas. For example, fundamental methods of sensing pressure, length, temperature, etc. are discussed as well as the design of instrumentation systems for monitoring these physical variables. A term project is required. Prereq- Elec 342, Elec 301, Elec 481.

Clark Jr., J.

490,F/S ELECTRICAL ENGINEERING PROJECTS (Variable)

Theoretical and experimental investigations under staff direction.

Staff

491,F SENIOR HONORS PROJECTS (2)

A two-semester sequence for individual projects supervised by a faculty member of the department. The portions of the first semester course (491) are devoted to group discussion of professional aspects of engineering: technical writing, engineering ethics, research protocols, patent considerations. A written proposal describing the project is required. Oral presentations throughout the year culminating in a final written report and in an oral, conference-style presentation. Senior standing in the department and permission of the course coordinator required. No credit will be given for Elec 491 without completion of Elec 492.

Johnson, D.

492,S SENIOR HONORS PROJECTS (3)

A two-semester sequence for individual projects supervised by a faculty member of the department. The portions of the first semester course (491) are devoted to group discussion of professional aspects of engineering: technical writing, engineering ethics, research protocols, patent considerations. A written proposal describing the project is required. Oral presentations throughout the year culminating in a final written report and in an oral, conference-style presentation. Senior standing in the department and permission of the course coordinator required. No credit will be given for Elec 491 without completion of Elec 492.

Johnson, D.

96,F ROBOTICS LABORATORY (1-0-1)

Computer vision experiments, programming a mobile robot and an industrial-type PUMA robot, operating a CNC mill and an industrial-size CNC lathe, projects.

Cheatham Jr., J.

98,F INTRODUCTION TO ROBOTICS (3-0-3)

A survey of topics in robotics including kinematics, dynamics and control theory applied to robotics. Lectures are given on image processing and computer vision, voice synthesis and speech recognition, artificial intelligence, and computer robot simulation. Laboratory includes programming of Microbot and PUMA robotic arms.

Cheatham Jr., J.

501,F LINEAR SYSTEM THEORY (3-0-3)

Realization theory. Matrix Fraction description of linear multivariable systems. Stabilizability and controller parametrization. Applications to regulator and decoupling problems. Prereq- Elec 301 or equivalent.

Antoulas, A.

502,S CONTROL SYSTEM SYNTHESIS (3-0-3)

Optimal synthesis of control systems using various norms. Stability robustness. Computational solutions using state space methods. Prereq- Elec 501.

Pearson, J.B.

503,F ROBOTICS II (3-0-3)

Study covering important aspects of recent research in kinematics, dynamics, and control of advanced robotic systems. To include redundant manipulators, dual and multiple armed systems, and multifingered grasping.

Walker, I.

505,F ADVANCED ELECTROMAGNETIC FIELD THEORY (3-0-3)

Boundary-value problems in electrostatics and magnetostatics. Propagation of electromagnetic waves. Time-varying fields. Wave guides and resonant cavities. Not offered 1989-90.

506,S APPLIED ELECTROMAGNETIC FIELD THEORY (3-0-3)

Waveguides and cavities, antennae, diffraction, holography, magnetohydrodynamics, and radiation from moving charges. Not offered 1989-90.

507,F DYNAMICS OF NONLINEAR SYSTEMS (3-0-3)

Analytical methods for analyzing nonlinear dynamical systems, including stability analysis via state space and describing function methods. Numerical methods for solving nonlinear ordinary differential equations are introduced, as well as methods for parameter estimation and sensitivity analysis. Techniques will be introduced for the study of the chaotic behavior of a variety of physical systems. Prereq- Elec 401,436, or equivalent.

Clark Jr., J.

519,S VLSI ALGORITHMS (3-0-3)

Models of parallel computation. Design and analysis of parallel algorithms. VLSI complexity. Area-time tradeoffs. Area efficient VLSI networks. Prereq- Elec 322. Also offered as Comp 583.

Varman, P.

520,F DISTRIBUTED SYSTEMS (3-3-4)

Distributed systems: workstations, local area networks, server machines. Multiprocess structuring and interprocess communication. File access and memory management. User interfaces: window systems and command interpreters. Case studies of selected distributed systems. Emphasis on performance aspects of system software design. Prereq- Elec 421, 425. Also offered as Comp 520.

Staff

521,F ARTIFICIAL INTELLIGENCE (3-3-4)

Techniques for simulating intelligent behavior by machine: problem solving, game playing, pattern perceiving, theorem proving, semantic information processing, and automatic programming. Prereq- Elec 322, Elec 331 or Masc 382. Also offered as Comp 440.

Staff

525,S ADVANCED COMPUTER ARCHITECTURE (3-0-3)

Design issues of pipelined, vector, and multiprocessor architectures with emphasis on achieving high performance. Cache and virtual memory design. Techniques for exploiting parallelism. Prereq- Elec 425. Also offered as Comp 525.

Cavallaro, J.

526,F COMPUTER NETWORKS DESIGN/ANALYSIS (3-0-3)

Design and comparison of computer networks; techniques for performance analysis; connectivity and reliability; capacity assignment. Network topologies. Local area networks, including rings, busses, and contention networks. Prereq- Elec 428. Also offered as Comp 526.

Sinclair, J.

529,S COMPUTER NETWORKS: ARCHITECTURE & PROTOCOL (3-0-3)

Introduction to computer networks and computer communication. Design of protocols for error recovery, reliable delivery, routing and congestion control. Store-and-forward networks, satellite networks, local area networks, and locally distributed systems. Case studies of networks, protocols and protocol families. Emphasis on software design issues in computer communication. Prereq- Masc 382, Elec 421. Also offered as Comp 529.

Staff

530,F DETECTION THEORY (3-0-3)

Review of stochastic processes; Karhunen-Loeve expansion; transmission and reception of digital signals over a variety of channels; intersymbol interference and equalization. Additional topics vary from year to year in modern communication theory. Prereq- Elec 430. Not offered 1989-90.

531,F DIGITAL SIGNAL PROCESSING (3-0-3)

Analysis of discrete-time signals and systems. Design and implementation of digital filters. Efficient algorithms for the discrete Fourier transform and for convolution. Prereq- Elec 401, a senior-level course in signals and linear systems.

Papamichalis, P.

533,F INTRODUCTION TO RANDOM PROCESSES & APPL (3-0-3)

Review of basic probability; Sequence of random variables; Random vectors and estimation. Basic concepts of random processes; Random processes in linear systems, expansion of random processes; Wiener filtering; Spectral representation of random processes; White noise integrals. Also offered as Masc 583.

Aazhang, B.

534,S ESTIMATION THEORY (3-0-3)

See Masc 584. Prereq- Elec 430. Also offered as Masc 584.

de Figueiredo, R.

535,S INFORMATION AND CODING THEORY (3-0-3)

Introduction to information theory concepts; basic theorems of channel coding and source coding with a fidelity criterion. Techniques of channel coding, parity check codes, introduction to algebraic coding theory, introduction to convolutional codes. Variable-length source coding. Prereq- Elec 331 or Masc 382. Also offered as Masc 585 and Stat 585. Not offered 1989-90.

37,F INTRODUCTION TO ARTIFICIAL INTELLIGENCE (3-0-3)

This course is intended to introduce the student with the fundamental problem solving techniques of Artificial Intelligence (AI). This will be achieved through intermixing of an introduction to Symbolic Manipulation (through LISP programming) and a presentation of selected current AI topics. Emphasis will be placed on expert systems, which are powerful engineering problem-solving tools. Enrollment limited to Seniors and Graduate students. Prereq- Intro comp and probability course. Also offered as Mech 537.

Staff

39,S DIGITAL IMAGE PROCESSING (3-0-3)

Modern techniques in 2D- and 3D-image processing. Color imaging. Scene analysis and robotic vision.

de Figueiredo, R.

60,F VLSI DESIGN (3-3-4)

Study of VLSI technology and design. MOS devices, characteristics and fabrication. Logic design and implementation. VLSI design methodology, circuit simulation and verification. Course includes group design projects. Prereq- Elec 326, Elec 305.

Cavallaro, J.

62,F MICROWAVE ENGINEERING (3-3-4)

Waveguides and resonant cavities. Scattering matrix, application to two-, three-, and four-port devices. Broadband transformers, couplers, and filters. Microwave generation. Tensor susceptibility and nonreciprocal devices. Prereq- Elec 306.

Wilson, W.

63,F INTRODUCTION TO SOLID STATE PHYSICS I (3-0-3)

Fundamental concepts of crystalline solids, including crystal structure, band theory of electrons, and lattice vibration theory. Also offered as Phys 563.

Rau, C.

64,S INTRODUCTION TO SOLID STATE PHYSICS II (3-0-3)

Continuation of Elec 563, including scattering of waves by crystals, transport theory, and magnetic phenomena. Also offered as Phys 564.

Rau, C.

69,S VLSI DESIGN LABORATORY (0-3-1)

Design and evaluation of VLSI circuits designed in Elec 560. Prereq- Elec 560.

Cavallaro, J.

80S NEURONAL MODELING (3-0-3)

This course introduces the mathematical techniques employed in modeling neurons and neuronal systems. It begins with a review of membrane ion channel kinetics and rapidly progresses to the mathematical characterization of various parts of the neuron (soma, axon and dendritic tree). Both vertebrate and invertebrate neuron models are considered; models of axonal conduction, as well as volume conduction in the medium surrounding the axon are discussed. Neuron models exhibiting pacing and bursting activity will be given particular attention. The course will include guest lectures in selected application areas. Prerequisite: LEC 481, 507 or equivalent.

Clark Jr., J.

581,S CARDIOVASCULAR DYNAMICS (3-4-4)

Analysis of the properties and function of the cardiovascular system, including a detailed study of cardiac electrophysiology, ventricular mechanics, arterial hemodynamics, coronar and cerebral circulations, heart rate control, imaging methods for determining ventricular volume and output flow. Therapeutic devices such as mechanical circulatory-assist and total replacement devices will be studied as well as computer-controlled drug delivery systems. Mathematical models of many of these systems will be considered. As part of the course requirements the student will complete an internship project with an engineer of life sciences working in the Texas Medical Center. Prereq- Elec 481, 482, 507 or equivalent. Not offered 1989-90.

590,F/S SPECIAL PROJECTS (Variable)

Theoretical and experimental investigations under staff direction.

Sta

591,F OPTICS (3-0-3)

Survey covering important aspects of classical optical theory, wave properties of light, and the Fourier analysis approach to physical optics. Holography, integrated optics, and fiber optics.

Rabson, T

592,S TOPICS IN QUANTUM OPTICS (3-0-3)

Latest developments in lasers, optical pumping, Raman and Brillouin spectroscopy, and mode locking. Not offered 1989-90.

594,S SEMINAR IN BIOMEDICAL ENGINEERING (3-0-3)

A seminar focusing on specific areas of biomedical research, and involving students and faculty from other universities in the Houston area. The course is under the sponsorship of the Houston Biomedical Engineering Society and exposes students to an intense treatment of a specific biological system from several scientific and engineering viewpoints. Graduate students in chemical, electrical, and mechanical engineering are particularly encouraged to take this course. Not offered 1989-90.

602,S OPTOELECTRONICS (3-0-3)

This is a broad survey course designed to cover the most current research directions in optoelectronics, photonics, and ultrafast measurement technology.

Halas, N

632,S SPEECH SIGNAL PROCESSING (3-0-3)

Acoustic models of speech production. Pitch and formant structure of speech. Estimation of speech spectra: short-time Fourier analysis, filter banks, homomorphic signal processing, auto-regressive models. Pitch detection. Vocoding algorithm: channel vocoders, homomorphic vocoders, linear predictive vocoders. Prereq- Elec 531.

Papamichalis, I

691,F SEMINAR-QUANTUM ELECTRONICS (1-0-1)

Sauerbrey, R., Wisoff, J.

692,S MICROWAVE ENGINEERING (Variable)

Sta

693,F ADVANCED TOPICS-COMPUTER SYSTEMS (3-0-3)

May be repeated for credit.

Bennett, J., Cavallaro, J.

694,S ADVANCED TOPICS-COMPUTER SYSTEMS (3-0-3)

May be repeated for credit.

Sinclair, J., Varman, J.

95,F ADVANCED TOPICS IN COMMUNICATIONS & STATISTICAL SIGNAL PROCESSING (3-0-3)

Advanced topics which vary from year to year. For Fall 1989 the topic is Mathematical description of random processes. Martingales and semimartingales. Optimal identification and filtering of non-Gaussian processes.

de Figueiredo, R.

96,S DIGITAL SIGNAL PROCESSING (3-0-3)

Advanced topics in digital signal process: time varying systems, multidimensional signal processing, and other topics of current interest. Individual projects are a part of this course.

Burrus, C.

97,S ADVANCED TOPICS IN COMMUNICATIONS & STATISTICAL SIGNAL PROCESSING (3-0-3)

Advanced topics which vary from year to year. For 1990 the topic is Array signal processing: physics of propagation, sampling in space and time, conventional and adaptive beamforming techniques.

Johnson, D.

98,S ADVANCED TOPICS IN ROBOTICS (3-0-3)

Not offered every year.

Cheatham Jr., J.

00,F/S RESEARCH AND THESIS (Variable)

Staff

Environmental Science and Engineering

The George R. Brown School of Engineering

Professor C.H. Ward, Chair

Professors Andrews, Bedient, Few, Tomson, and Wiesner

Adjunct Professors Keeley, Dunlap, Raymond, Schaezler, and Wilson

Adjunct Associate Professor Pier

Lecturer Blackburn

Degrees Offered: B.A., M.E.E., M.E.S., M.S., Ph.D.

Undergraduate Program. The major in environmental science (offered only as double major with other fields of science or engineering) is intended for students wishing academic training oriented toward the solution of technical environmental problems and leads to the B.A. degree.

General requirements during the first two years include: two years of mathematics, one and one-half years of chemistry, and one year of physics. Specific courses to satisfy these requirements vary somewhat and should be determined in consultation with a departmental adviser. For the B.A. degree, a minimum of 12 semester hours of environmental science and engineering courses are required during the junior and senior years. The undergraduate B.A. double major curriculum has been designed with maximum flexibility and minimum specific requirements to encourage interdepartmental study with all other fields of science and engineering. A list of suggested electives in various fields of science, engineering,

humanities, and social science is available for students desiring additional guidance or specialization.

The total number of semester hours required for the B.A. with a double major depends on departmental requirements for the other major. Generally, however, in addition to the departmental requirements for the majors, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 12 semester hours. See Degree Requirements and Majors, pages 63-84.

Undergraduates interested in environmental engineering should contact the Department of Civil Engineering for information on the B.S. degree program with an environmental option.

The introductory course, Environmental Science 201, is intended for both majors and nonmajors. Humanities majors are encouraged to consider this course for science distribution requirements.

Successful completion of the four-year curriculum leading to the Bachelor of Arts with environmental science as part of a double major qualifies the student for possible admission to a fifth year of specialized study leading to the professional degree of Master of Environmental Science (M.E.S.). Completion of a four-year curriculum leading to the Bachelor of Science in any field of engineering (civil and chemical preferred) qualifies the student for possible admission to a fifth year of specialized study leading to the professional degree of Master of Environmental Engineering (M.E.E.). These recognized professional degrees in the environmental field are differentiated on the basis of science or engineering orientation and are described on page 133. Outstanding students wishing to pursue careers in teaching and research are qualified for graduate study after the B.A., B.S., M.E.S., M.E.E. and M.S. degrees.

Graduate Program. The graduate programs in environmental science and environmental engineering are interdepartmental activities and lead to the M.E.E., M.E.S., Master of Science, and Doctor of Philosophy degrees. Applicant for admission to the environmental science program may hold the baccalaureate or master's degree in any of the sciences or mathematics. Applicants for the environmental engineering program must hold accredited baccalaureate or master's degrees in an area of engineering. Although the main research activities in the department are concerned with ground water and surface water contamination, hydrology, water and wastewater treatment, environmental microbiology and applied aquatic chemistry, the program serves as the focal point for study and research in a broad spectrum of problems related to human interactions with the natural environment. Faculty members from the Departments of Chemical Engineering, Space Physics and Astronomy, Architecture, Ecology and Evolutionary Biology, Geology, and Mathematical Sciences participate in this interdisciplinary research. Graduate students enrolled in any of these departments and interested in environmental problems for thesis topics may use facilities of the Department of Environmental Science and Engineering and are eligible for financial assistance in the form of graduate research assistantships and fellowships.

Candidates for the Master of Science or Doctor of Philosophy degrees may pursue course programs designed to both complement and supplement their backgrounds through major and minor emphasis areas. However, formal minor are not required. University requirements for the advanced degrees are presented on pages 136-139.

Graduate students in environmental science or engineering take a portion of their courses in other departments. A candidate for the Master of Science degree must complete a minimum of eight approved semester courses and present and defend, in oral examination, a research thesis. Normally, two academic years and the intervening summer are required for the degree.

Candidates for the Doctor of Philosophy must demonstrate their competence in three areas corresponding to major and minor course emphasis. In particular, a candidate for the Doctor of Philosophy must: (1) complete a rigorous list of approved courses with high standing, (2) pass a preliminary written examination to evaluate preparation for doctoral studies in the field of Environmental Science and Engineering, (3) pass a qualifying examination on course work, proposed research and related topics, (4) complete a thesis indicating the candidate's ability to do original research, and (5) pass a formal public oral examination on the thesis and related topics.

Environmental Science and Engineering

Environmental Science and Engineering Courses

01,F INTRODUCTION TO ENVIRONMENTAL SYSTEMS (3-3-4)

DISTRIBUTION COURSE: CATEGORY III.5

chemical, physical, and biological components of the environment and the effects of pollution on their maintenance and utilization. Also offered as Heal 201.

Ward, C.

01,F INTRODUCTION TO ENVIRONMENTAL CHEMISTRY (3-3-4)

fundamental principles of environmental chemistry and measurements. Additional lab.

Tomson, M.

03,F WATER & WASTEWATER TREATMENT (3-0-3)

fundamental principles of water and wastewater treatment systems and their application to the design and operation of treatment plants.

Andrews, J.

06,S INTRODUCTION TO ENVIRONMENTAL LAW (3-0-3)

legal techniques used by societies to plan and regulate the use of environmental resources.

Blackburn, J.

12,S HYDROLOGY&WATERSHED ANALYSIS (3-3-4)

fundamentals of the hydrologic cycle, hydrograph techniques, flood routing, and open channel flow; local watershed application and laboratory. Also offered as Civi 464.

Bedient, P.

43,F INTRODUCTION TO ATMOSPHERIC SCIENCE (3-0-3)

fundamentals of meteorology, climatology, and predictive meteorology and climatology. Also offered as Space 443 and Mech 477.

Few, A.

45,F NATURAL ENVIRONMENTAL FACTORS IN COMMUNITY DEVELOPMENT (3-0-3)

readings, discussion, and review of data sources on natural environmental factors affecting and affected by the development of the built environment. Also offered as Arch 345 and 645.

Blackburn, J.

490,F/S SPECIAL STUDY AND RESEARCH (Variable)

Open to environmental science or engineering majors with permission of chairman. Written thesis required.

Sta

511,F ENVI PHYSIOLOGY AND TOXICOLOGY (3-0-3)

Physical and chemical environment as it affects the physiology and population dynamics of organisms (including humans). Stability and maintenance of biogeochemical cycles. (University of Texas School of Public Health) Available to graduate students only.

Sta

512,S ENVI PHYSIOLOGY AND TOXICOLOGY (3-0-3)

See Envi 511. (University of Texas School of Public Health) Available to graduate students only.

Sta

518,F GROUND WATER HYDROLOGY (3-0-3)

Ground water hydrology, hydrogeology, well mechanics, hydraulics. Pollutant transport in aquifer systems, numerical methods, and ground water models.

Bedient, I

530,S PHYSICAL-CHEMICAL PROCESSES (3-0-3)

Mass transport and transformation processes in natural and engineered systems. Principles of colloid stability, aggregation, and transport presented in the context of mixing, flocculation, settling, filtration, softening, and adsorption operations in water treatment.

Wiesner, M

536,S BIOLOGICAL PROCESSES FOR WASTEWATER TREATMENT (3-0-3)

Theory and application of biological processes as used in wastewater treatment. An introduction to mathematical modeling, computer simulation, reactor design, and process dynamics and control as they apply to wastewater treatment.

Andrews, J

550,S APPLIED WATER CHEMISTRY (3-0-3)

Designed to provide a theoretical basis for considering the chemistry of natural and wastewater and treatment processes.

Tomson, M

564,S ATMOSPHERIC DYNAMICS (3-0-3)

Hydrodynamic equations of motion on a rotating planet solved for static, and perturbed and unstable flows for mesoscale and macroscale weather systems on earth and other planets. Also offered as Space 564.

Few, A

590,F/S M.E.E. AND M.E.S. SPECIAL STUDY AND RESEARCH (Variable)

Independent investigation of a specific topic or problem in environmental engineering under the direction of a selected faculty member. Preparation of a formal report and an oral presentation of results are required.

Sta

601,F SEMINAR (3-0-3)

Continuing seminar on environmental research.

Sta

602,S SEMINAR (3-0-3)

See Envi 601.

Sta

50,F PHYSICAL-CHEMICAL PROCESSES (3-0-3)

Continuation of 530; Ion exchange, adsorption, gas transfer, membrane process-applications. An advanced topics course.

Wiesner, M.

51,S WATER TREATMENT SYSTEMS (Variable)

Emphasizes dynamics and control of water and wastewater systems. An advanced topics course.

Andrews, J.

54,S GROUND WATER TRANSPORT (Variable)

Ground water transport theory, water quality models, analytical and numerical techniques, computer applications. Formal lecture and student projects, literature review. An advanced topics course.

Bedient, P.

55,F WATER CHEMISTRY (Variable)

Formal lecture and assigned reading in topics such as redox kinetics and thermodynamics, sorption and desorption, and the associated mathematics. An advanced topics course.

Tomson, M.

56,S WATER CHEMISTRY (Variable)

Envi 635.

Tomson, M.

51,F M.S. RESEARCH AND THESIS (Variable)

Staff

52,S M.S. RESEARCH AND THESIS (Variable)

Staff

50,F/S PH.D. RESEARCH AND THESIS (Variable)

Staff

Mathematical Sciences

The George R. Brown School of Engineering

Professor J.E. Dennis, Chair

Professors Akin, Bixby, Carroll, S.H. Davis, de Figueiredo, Miele,

Pfeiffer, D. W. Scott, Sorensen, Symes, Tapia, J. R. Thompson,

Walker, C.C. Wang, Wheeler, and Young

Adjunct Professors Dongarra, Eisner, Glowinski, Kendall,

Morshedi, Mufti, Peaceman, and Vu

Assistant Professors Boyd and Cox

Degrees Offered: B.A., M.A.Ma.Sc., M.A., Ph.D.

Undergraduate Program. The program allows each student considerable freedom to plan a course of study consistent with his or her particular interests in mathematics and its applications. Available courses provide foundations for

applications to many fields of engineering, physical sciences, life sciences, behavioral and social sciences, and computer science.

Within the flexible framework of University requirements, the program consists of three parts: (1) basic courses in mathematics and computer science, (2) introductory courses in appropriate areas of mathematical sciences, and (3) electives for which major credit is given.

1. Students normally take eight basic courses, as follows:
 Calculus — Mathematics 101, 102 (or honors equivalent);
 Differential equations — Mathematics 211;
 Multivariable calculus — Mathematics 212;
 Linear algebra — Mathematics 355 or Mathematical Sciences 310;
 Discrete mathematics — Computer Science 280 or Mathematics 356;
 Computer programming — Computer Science 210 or 212;
 Model building — Statistics 300, 301, or approved alternate.
2. Students take one course in each of three of the following areas:
 Computing — At least three hours of Computer Science in addition to the above;
 Numerical analysis — Mathematical Sciences 353, 451, 452, or 454;
 Operations research/optimization — Mathematical Sciences 460, 471, 472, 475, or 476; or Economics 472.
 Physical mathematics: Mathematical Sciences 330 or 340, or Mathematics 381 or 382;
 Applied probability: Mathematical Sciences 381, or Statistics 382.
3. Students also take elective courses for credit toward the mathematical sciences major, as follows:
 Two additional courses in one of the areas selected above;
 One further course in mathematical sciences, computer science, statistics, or mathematics;
 Approved electives to bring total major requirements to 55 semester hours.

In addition to departmental requirements for the major, students must also satisfy University distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

A student contemplating a major in Mathematical Sciences is encouraged to contact any member of the Department, particularly a member of its undergraduate committee. A faculty member will help the student explore possible programs suited to his or her individual needs and interests.

The Department of Mathematical Sciences participates in the interdisciplinary program in Managerial Studies. More information may be obtained from the description Managerial Studies program on page 369.

Graduate Program. Admission to graduate study in mathematical sciences is open to qualified students holding bachelor's or master's degrees (or their equivalent) in engineering, mathematics, or physical, biological, mathematical, or behavioral sciences. The credentials of each applicant will receive individual evaluation by the faculty of the department. A complete application folder should

include the quantitative, verbal, and advanced scores from the Graduate Record Examination, all transcripts, and evidence of proficiency in English (such as the TOEFL) where appropriate.

The graduate program is designed for students seeking the professional degree of Master in Applied Mathematical Sciences or the research degrees of Master of Arts or Doctor of Philosophy. It normally takes one or two years to obtain a master's and three or four years to obtain a doctorate. A master's degree is not a prerequisite for the doctoral degree.

The professional degree emphasizes the applied aspects of the mathematical sciences. This degree is intended for persons who plan careers as practitioners rather than primarily as researchers. Presently, this degree emphasizes the following areas, singly or in combination: (1) general applied mathematics, (2) operations research, and (3) numerical analysis. Further information about this degree may be obtained from the Department.

The granting of a research degree presupposes demonstrated ability to do advanced original research. Students are encouraged to initiate research activities at the earliest possible time in their graduate study. Presently, the research interests of the faculty are in the following four major areas: (1) numerical analysis and computation, (2) physical mathematics, (3) operations research, (4) mathematical modeling in physical, biological, or behavioral sciences. Further information about these areas may be obtained from the department.

Graduate fellowships, research assistantships, and graduate scholarships are available and are awarded on the basis of merit to qualified students. Current practice in the department is for most doctoral students in good standing to receive some financial aid. As an integral part of their scholastic programs, all graduate students are expected to attain some proficiency in teaching by engaging in instructional assignments of the Department.

Requirements for the Degree of Master in Applied Mathematical Sciences:

1. Satisfactory completion of at least 30 semester hours of coursework approved by the department.
2. At most two courses may be at the 300- (junior) level; at most two may be taken outside the department; and at most two courses may be transferred.

Requirements for the Degree of Master of Arts:

1. Satisfactory completion of at least 30 semester hours (including thesis) at the graduate level. Normally five courses must be in Mathematical Sciences.
2. An original thesis acceptable to the department. Note, however, that successful performance on the qualifying examination fulfills the master's thesis requirement for a student working toward the Ph.D. degree.
3. Satisfactory performance on a public oral examination on the thesis; the procedure for the public oral examination is given in the general rules of the University.

Requirements for the Degree of Doctor of Philosophy:

1. Satisfactory completion of courses of study approved by the department. At least two courses outside the major area are required.
2. Satisfactory performance on preliminary and qualifying examinations and reviews.

3. Satisfactory completion of two semester courses or a reading examination on an approved foreign language.
4. An original thesis acceptable to the department.
5. Satisfactory performance on a final public oral examination on the thesis the procedure is given in the general rules of the University.

Mathematical Sciences

Mathematical Sciences Courses

223,F/S INTRODUCTION TO COMPUTING (Variable)

* DISTRIBUTION COURSE: CATEGORY III.6

A self-paced, variable-credit course in the use of the programming languages MATLAB and FORTRAN 77 to solve technical problems. The course is divided into four parts: basic and advanced levels of the use of each language. Each part may be taken in separate semesters with either language taken first. No more than four hours of credit may be taken. Numerical techniques for solving systems equations and computer graphics are emphasized.

Davis, Jr., S.

310,S LINEAR ALGEBRA (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Concepts and results of linear algebra useful in a variety of fields of application.

Cox, S.

330,F/S COMPLEX VARIABLES (3-0-3)

Introduction to basic concepts of complex variable theory and applications to the solution of physical problems. Prerequisite: Mathematics 211.

Wang, C.; Ames, K.

340,F/S PARTIAL DIFFERENTIAL EQUATIONS (3-0-3)

Elementary methods for the solution of partial differential equations and boundary value problems in engineering and physical sciences. Prerequisite: Mathematics 211.

Cox, S.; Ames, K.

353,F/S COMPUTATIONAL NUMERICAL ANALYSIS (3-0-3)

An introductory course in numerical analysis with computer applications. Prerequisite: Mathematics 211.

Zhang

376,F/S QUANTITATIVE ANALYSIS (3-0-3)

Mathematical models in deterministic and stochastic situations, including linear programming, inventory theory, decision theory, waiting line theory. Prerequisite: a Statistics course.

Martinez, Boyd

381,F/S INTRODUCTION TO APPLIED PROBABILITY (3-0-3)

Concepts, interpretations, elementary techniques, and applications of modern probability theory. Prerequisite: Mathematics 102. Also offered as Electrical and Computer Engineering 331 and Statistics 381.

Pfeiffer, P.

411 GROUP THEORY FOR CHEMISTS AND PHYSICISTS I (3-0-3)

Symmetries of physical laws and structures associated transformation groups. Applications to problems in atomic, solid state, molecular physics and chemistry. Prerequisite: Linear Algebra and Elementary Quantum Mechanics. Not offered every year.

417 COMBINATORIAL ANALYSIS (3-0-3)

Solution of enumeration problems using the methods of inclusion and exclusion, generating functions, distributions, permutations, and graphical enumeration. Not offered every year.

432,F TENSOR ANALYSIS (3-0-3)

Review of Linear Algebra. Tensor Algebra. Tensor analysis on Euclidean spaces. Applications to particle mechanics, continuum mechanics, and electromagnetic theory. Prerequisite: Linear Algebra. Not offered every year.

440. MATHEMATICAL METHODS IN PHYSICS AND ENGINEERING (3-0-3)

Application of linear operator theory and transform techniques in the solution of ordinary and partial differential equations. Prerequisite: Mathematical Sciences 330 or Mathematics 382. Not offered every year.

451,F NUMERICAL LINEAR ALGEBRA (3-0-3)

A study of numerical methods in linear algebra.

Dennis, J.

452,S COMPUTATIONAL METHODS FOR DIFFERENTIAL EQUATIONS (4-0-4)

Finite difference, variational, and collocation methods for approximating numerically the solutions of ordinary and partial differential equations. Computer implementation to verify convergence to the solution.

Akin

453 NUMERICAL ANALYSIS OF ORDINARY DIFFERENTIAL EQUATIONS (3-0-3)

Runge-Kutta, linear, multistep methods; stability analysis and stiffness for initial-value problems; finite difference, finite element, collocation, and shooting methods for two-point boundary value problems. Prerequisite: Mathematics 211.

454 COMPUTATIONAL METHODS NONLINEAR SYSTEMS (3-0-3)

Analysis and computer applications of modern methods for solving nonlinear algebraic systems and nonlinear constrained optimization problems. Prerequisite: Mathematics 211, 212, Linear Algebra.

460,F OPTIMIZATION THEORY (3-0-3)

Derivation and application of necessity conditions and sufficiency conditions for constrained optimization problems. Prerequisite: 212 and Linear Algebra.

Tapia, R.

471,F LINEAR PROGRAMMING (3-0-3)

Formulation of managerial and technical problems; simplex method; revised simplex method; duality theory and applications; transportation problems; decomposition techniques. Also offered as Economics 471.

Boyd, A.

472 GAME THEORY AND DECISION ANALYSIS (3-0-3)

Matrix games; relation to linear programming; nonzero sum games; games against nature; decision trees; models for group decisions; utility theory; benefit-cost models. Not offered every year.

475,S OPERATIONS RESEARCH - DETERMINISTIC MODELS (3-0-3)

Optimization problems in a managerial and economic context. Familiarity with linear programming and microeconomic theory is strongly recommended. Also offered as Economics 475.

Boyd, A.

476,S OPERATIONS RESEARCH - STOCHASTIC MODELS (3-0-3)

Decision theory, waiting line theory, Markov chains, inventory models, replacement models simulation. Prerequisite: Mathematical Sciences 381 or Statistics 382. Also offered as Economics 476.

Pfeiffer, P.

477 MATHEMATICAL STRUCTURE OF ECONOMIC THEORY I (3-0-3)

Exposition of the theory of competitive economies from a mathematical perspective, unifying calculus, matrix algebra, and set-theoretic approaches. Prerequisite: Economics 211, Mathematics 212, Mathematical Sciences 310. Also offered as Economics 477. Not offered every year.

478 MATHEMATICAL STRUCTURE OF ECONOMIC THEORY II (3-0-3)

Continuation of Economics/Mathematical Sciences 477, which is a prerequisite. Also offered as Economics 478. Not offered every year

483. MARKOV AND MARTINGALE SEQUENCES — RENEWAL PROCESSES (3-0-3)

The Markov property and Markov sequences. Discrete parameter martingales. Poisson and other renewal processes. Prerequisite: Mathematical Sciences 381. Also offered as Statistics 483. Not offered every year.

490,F INDEPENDENT STUDY (Variable)**491,S INDEPENDENT STUDY (Variable)****533. ADVANCED TENSOR ANALYSIS (3-0-3)**

Differential and integral calculus on manifolds. Riemannian geometry. Calculus of variations. Hamilton-Jacobi theory. Applications to analytical mechanics, relativity and continuum mechanics. Prerequisite: Mathematical Sciences 432. Offered occasionally.

535. MATHEMATICAL THEORY OF NONLINEAR ELASTICITY (3-0-3)

Representation theory for the constitutive relations for elasticity; homogeneous and inhomogeneous bodies; wave propagation; second-order elasticity and approximations. Prerequisite: Mechanical Engineering 511, 512, or Mathematical Sciences 432. Offered occasionally.

540,S APPLIED FUNCTIONAL ANALYSIS (3-0-3)

Applications of basic concepts and theorems in functional analysis to mechanics, quantum mechanics, and/or optimal control problems.

Cox, S.

541,F INTRODUCTION TO LINEAR PARTIAL DIFFERENTIAL EQUATIONS (3-0-3)

Distributions, Sobolev spaces, pseudodifferential operators. Interior estimates for elliptic systems; well-posedness of hyperbolic initial value problems; propagation of singularities. Boundary regularity for second-order elliptic equations. Not offered every year.

Ames, K.

542 PARTIAL DIFFERENTIAL EQUATIONS (3-0-3)

Selected topics. Sequel to 541.

544 MATHEMATICAL METHODS OF PHYSICS (3-0-3)

Selected mathematical techniques useful in the solution of problems in physics and space physics. Prerequisite: Physics 301, 302; Mathematical Sciences 440 is recommended. Not offered every year.

551,S ADVANCED NUMERICAL LINEAR ALGEBRA (3-0-3)

The content of this course varies from year to year. It may be repeated if the change in content justifies.

Dennis, J.

552 NUMERICAL METHODS PARTIAL DIFFERENTIAL EQUATIONS I (3-0-3)

Analysis of modern numerical methods, including finite-difference methods, finite-element methods, collocation methods, and associated algebraic problems. Not offered every year.

553 NUMERICAL METHODS PARTIAL DIFFERENTIAL EQUATIONS II (3-0-3)

Continuation of Mathematical Sciences 552.

554,S NUMERICAL NONLINEAR PROGRAMMING (3-0-3)

Analysis of modern numerical methods for constrained problems, including variable metric methods, successive quadratic programming, and trust region methods. Not offered every year.

Tapia, R.

563,F ENGINEERING APPROACH TO MATHEMATICAL PROGRAM (3-0-3)

Minimization of functions of variables which are either unconstrained, or subject to equality constraints, or subject to inequality constraints, or subject to both equality and inequality constraints. Analytical methods: first-order conditions and second-order conditions. Numerical methods: first-order methods and second-order methods. Also offered as Mechanical Engineering 563.

Miele, A.

564,S ENGINEERING APPROACH TO OPTIMAL CONTROL (3-0-3)

Optimal control theory and calculus of variations. Minimization of functionals depending on variables subject to differential constraints. Numerical methods; first-order methods and second-order methods. Also offered as Mechanical Engineering 564.

Miele, A.

571,F TOPICS IN LINEAR PROGRAMMING (3-0-3)

Continuation of Mathematical Sciences 471. Advanced topics in mathematical structure of linear programming. Special emphasis on applications in management and economics. Not offered every year.

Bixby, R.

572 TOPICS IN THEORY OF GAMES (3-0-3)

Utility theory; theory of two-person general-sum games; bargaining and threats. Theory of n-person games; solution concepts and extensions. Optional topics. Not offered every year.

573 NONLINEAR PROGRAMMING (3-0-3)

Theory and computational methods for nonlinear programming, including: Kuhn-Tucker conditions, duality theory, methods for constrained optimization of convex and nonconvex problems. Also offered as Economics 573. Not offered every year.

574 INTEGER PROGRAMMING (3-0-3)

Applications, theory and computational methods in pure and mixed integer programming. Special problem structures. Not offered every year.

581,F MATHEMATICAL PROBABILITY I (3-0-3)

Measure-theoretic foundations of probability for students who need access to advanced mathematical literature in probability and random processes. Open to qualified undergraduates. Prerequisite: Mathematical Sciences 381. Also offered as Statistics 581.

Pfeiffer, P.

582,S MATHEMATICAL PROBABILITY II (3-0-3)

Continuation of Mathematical Sciences 581. Also offered as Statistics 582.

Pfeiffer, P.

583,F INTRODUCTION TO RANDOM PROCESSES & APPLICATIONS (3-0-3)

Formulation, analysis, representations, and applications of some standard random processes. Prerequisite: Mathematical Sciences 381; Recommended: Mathematical Sciences 581 or a course in real variable theory. Also offered as Electrical and Computer Engineering 533 and Statistics 583.

Aazhang, B.

584,S ESTIMATION THEORY (3-0-3)

Maximum likelihood and Bayesian vector parameter estimation. Minimum mean square error estimation. Time series analysis. Algorithms based on state variable and ARMA models for signal estimation, model identification, and spectral estimation. Prerequisite: Mathematical Sciences 381 (583 Recommended). Also offered as Electrical and Computer Engineering 534 and Statistics 584. Not offered every year.

Staff

585,S INFORMATION AND CODING THEORY (3-0-3)

See Electrical and Computer Engineering 535. Prerequisite: Mathematical Sciences 381. Also offered as Electrical and Computer Engineering 535.

587 ADVANCED STOCHASTIC PROCESSES (3-0-3)

Measure-theoretic probability. Separability and measurability. Analytic properties of sample functions. Standard properties of second-order processes. Continuous-parameter Markov processes and martingales. Prerequisite: Mathematical 581 or 583. Also offered as Electrical and Computer Engineering 587. Not offered every year.

590,F/591,S TOPICS IN OPERATIONS RESEARCH (3-0-3 each semester)

592,F/593,S TOPICS IN APPLIED MATHEMATICS (3-0-3 each semester)

594,F/595,S TOPICS IN APPLIED PROBABILITY (3-0-3 each semester)

596,F/597,S SPECIAL TOPICS IN MATHEMATICAL SCIENCES (3-0-3 each semester)

Independent Study.

617 CONTINUUM MECHANICS I (3-0-3)

Advanced topics in continuum mechanics. Theory of constitutive equations. Theories of fading memory. Thermodynamics of materials with memory. Prerequisite: Mechanical Engineering 511, 512. Also offered as Mechanical Engineering 617. Not offered every year.

618 CONTINUUM MECHANICS II (3-0-3)

Recent developments in continuum mechanics. Typical topics: irreversible thermodynamics; electromagnetic interaction with general materials; theories of mixtures, continuum dislocation theories. Prerequisite: Mathematical Sciences 617. Also offered as Mechanical Engineering 618. Offered occasionally.

652. TOPICS IN NUMERICAL DIFFERENTIAL EQUATIONS (3-0-3)

The content of this course varies from year to year. It may be repeated if the change of content justifies.

654 TOPICS IN OPTIMIZATION (3-0-3)

Content varies from year to year.

800a,b,c THESIS (Variable)

Mechanical Engineering and Materials Science

The George R. Brown School of Engineering

Professor J.E. Akin, *Chair*

Professors Bayazitoglu, Carroll, Chapman, Cheatham

McLellan, Miele, Spanos, and Wang

Associate Professors Angel and Pharr

Assistant Professors Cohen, Meade, and Ramaswamy

Adjunct Assistant Professor Reuben

Lecturer Cunningham

Degrees Offered: B.A., B.S.M.E., B.S.M.S., M.M.E., M.M.S., M.S., Ph.D.

Undergraduate Program. Undergraduate programs offered by this Department lead to the degrees of Bachelor of Arts (with a major in mechanical engineering or materials science and engineering), Bachelor of Science in Mechanical Engineering, and Bachelor of Science in Materials Science.

The programs in mechanical engineering may, by proper choice of electives, lead to specialization in one of several options: thermal sciences and energy conversion, gas dynamics, hydrodynamics, stress analysis and mechanical behavior of materials, aerospace engineering, and materials engineering. The programs in materials science and engineering provide the student with knowledge of the fabrication, structure, and properties of materials used by engineers. The B.A. programs are highly flexible, involve less technical content, and allow the student to pursue more deeply areas of interest outside of engineering. The B.S. programs, both accredited by the Accreditation Board for Engineering and Technology, have higher content of technical courses and prepare the student for the professional practice of engineering.

The senior year of the B.S. program in mechanical engineering provides a capstone design experience for mechanical engineering majors. Senior mechanical engineering students are required to complete a major design project in addition to course work in computer-aided design and design applications.

The basic university requirements for the B.A. and B.S. programs are summarized under Degree Requirements and Majors (pp. 63-84) and Engineering and

Applied Science (page 246). The detailed requirements are summarized below. Lists of representative courses and their normal sequence during the students' undergraduate years are available from the department for either the B.A. or B.S. programs in both mechanical engineering or materials science and engineering.

Students seeking the B.A. degree with a major in mechanical engineering must satisfy the university distribution requirements while completing not less than 75 semester hours in courses specified by the department and not less than 60 additional semester hours. Those seeking the B.A. degree with a major in materials science must satisfy the university distribution requirements while completing not less than 53 semester hours in courses specified by the department and not less than 67 additional semester hours.

Students seeking the accredited B.S. in Mechanical Engineering must satisfy the university distribution requirements while completing not less than 42 semester hours in courses unspecified by the Department and not less than the 92 semester hours comprised by the following courses.

Mathematics 101, 102, 211, 212

Mathematical Sciences 223, 340

Physics 101, 102, and 132

Chemistry 101, 102, 105

Engineering 200, 211, 241

Materials Science 301, 304

Mechanical Engineering 331, 332, 340, 371, 372, 401, 403, 404, 411, 412, 431, 471, 481

Civil Engineering 300, 500

Approved major design elective of three semester hours.

Students seeking the accredited B.S. in Materials Science and Engineering must satisfy the university distribution requirements while completing not less than 46 semester hours in courses unspecified by the Department (43 in the electronic materials option) and not less than the 88 semester hours (91 in the electronic materials option) comprised by the following courses:

Mathematics 101, 102, 211, 212

Physics 101, 102, and 132

Chemistry 101, 102, and 105

Engineering 211, 241

Materials Science 301, 303, 401, 402, 404, 406, 411, 421, 500, 501, 535, and 537

One of the following: Mathematical Sciences 223 (minimum of 3 hours),
Computer Science 210

Mathematical Sciences 340

Civil Engineering 300

One of the following: Materials Science 561 or 562

One approved science elective (200 level or higher)

Additional course requirements for the Engineering Materials Option:

One approved engineering science elective (not MSCI)

Two of Materials Science 415, 541, 550, 569, 594

One of the following: Physics 201, Chemistry 211, Chemistry 311

Additional courses required for the Electronic Materials Option:

Electrical Engineering 342, 462, 459

Physics 201

Mathematical Sciences 223, if selected, should be taken for a minimum of 4 hours.

A suggested sequence in which courses should be taken is available from the Department.

Professional and Graduate Programs. Advanced level programs offered by this department lead to the professional degrees of Master of Mechanical Engineering and Master of Materials Science and to the research degrees of Master of Science and Doctor of Philosophy in either mechanical engineering or materials science.

The professional degrees involve a fifth year of specialized study, integrated with the four prior years leading to either the B.A. or B.S. degrees in the same areas of interest described in the foregoing discussion of the undergraduate programs. The professional programs are open to students who have shown academic excellence in their undergraduate studies. Detailed university requirements for professional degrees are described under Professional Degrees (pp. 130-139) and involve the successful completion of 30 semester hours of course work. Suggested lists of courses are available from the department; however, specific programs are developed for each student according to interest.

The programs leading to the research degrees of M.S. and Ph.D. are open to students who have demonstrated outstanding performance in their undergraduate studies. The general university requirements for these degrees are outlined under Requirements for Research Degrees (pp. 129-130). Specific course requirements are variable, depending on preparation and performance in courses and on qualifying examinations, etc. The granting of a graduate degree presupposes superior quality academic work and a demonstrated ability to do original research. For both the M.S. and Ph.D. degrees, a thesis must be presented that comprises an original contribution to knowledge, and it must be defended in a public oral examination.

The research interests of the faculty and the laboratory equipment available provide the following areas of specialization: (1) engineering mechanics; (2) materials science; (3) fluid dynamics, gas dynamics, heat transfer, physical oceanography; (4) astronautics; (5) computer-aided design; and (6) computational mechanics.

Mechanical Engineering Courses

311,F MECHANICS OF DEFORMABLE SOLIDS (3-0-3)

Analysis of stress and deformation of solids with applications to beams, circular shafts, and columns. Prereq- Engi 211. Not offered every year.

Staff

314,S INTRODUCTION TO MECHANICAL DESIGN (3-0-3)

An introductory design course covering the design process, materials selection, and design methods. Prereq- Mech 311, or Civi 300. Not offered every year.

Staff

331,F/S JUNIOR LABORATORY I (0-3-1)

Static and impact testing of engineering materials. Beam deflection and shear center experiments are included. Strain gauges are applied and tested.

Angel, Y.

292 COURSES OF INSTRUCTION

332,F/S JUNIOR LABORATORY II (0-3-1)

Instruction in fluid mechanics and thermodynamics.

Chapman, A.

340,F/S INDUSTRIAL PROCESS LAB (0-3-1)

Practical experience in and observation of selected industrial processes. Sign-up in Mech.Engr. Office. Prereq- Mech major

Gesenhues, J.

371,F FLUID MECHANICS I (3-0-3)

Introduction to fluid statics and dynamics; the development of the fundamental equations of fluid mechanics and their application to problems of engineering interest. Prereq- Engi 200, 211, Math 212.

Bayazitoglu, Y.

372,S FLUID MECHANICS II (3-0-3)

Continuation of Mech 371 devoted to airfoil theory, lubrication, boundary layers, and turbulence. Prereq- Mech 371.

Cohen, R.

401,F MECHANICAL DESIGN APPLICATIONS (3-0-3)

Prereq- Mech 314.

Cheatham Jr., J.

403,F COMPUTER AIDED DESIGN (3-0-3)

Integration of the computer into the area of design. Optimization, simulation, finite elements, expert systems, etc. Prereq- Masc 223.

Akin, J.

404,S SENIOR DESIGN PROJECT (0-12-4)

Staff

406,F MEASUREMENT AND CONTROL (3-3-4)

Instrumentation methods, analogs, analysis of experimental results, applications in controls. Also offered as Civi 406.

Bourland, H.

407,F MECHANICAL DESIGN PROJECT I (3-0-3)

Cheatham, Jr., J.

408,S MECHANICAL DESIGN PROJECT II (3-0-3)

Cheatham, Jr., J.

411,F ANALYTICAL DYNAMICS (3-0-3)

Application of energy methods in the study of particle and rigid-body dynamics, electric circuits, electromechanical systems, and continuous dynamic systems. Prereq- Engi 211.

Spanos, P.

412,S VIBRATIONS (3-0-3)

Analysis of discrete and continuous linear, mechanical, vibrating systems with particular emphasis upon multi-degree-of-freedom systems. Approximate methods are included. Prereq- Mech 411.

Spanos, P.

431,F/S SENIOR LABORATORY I (0-3-1)

Instruction in gasdynamics, heat transfer, applied thermodynamics, and engine cycles.

Staff

471,F APPLICATIONS OF THERMODYNAMICS (3-0-3)

Applications of thermodynamics to various systems of interest in mechanical engineering with particular attention to energy conversion, refrigeration, and psychrometrics. Prereq-Engi 200.

Chapman, A.

472,F THERMAL SYSTEMS DESIGN (3-0-3)

Design and synthesis of systems based on applications of thermodynamics, fluid mechanics, heat transfer, economics, and optimization theories. Prereq-Engi 200, Mech 371, Mech 372, Mech 471, Mech 481.

Meade, A.

476,F/S FLUID MACHINERY (3-0-3)

Continuous-flow machinery analysis and design problems. Prereq- Mech 371.

Staff

481,S HEAT TRANSFER (4-0-4)

General study of the principles of heat transfer by conduction, convection, and radiation and their application to problems of engineering practice.

Chapman, A.

496,F ROBOTICS LABORATORY (1-0-1)

Computer vision experiments, programming a mobile robot and an industrial-type PUMA robot, operating a CNC mill and an industrial-size CNC lathe, projects.

Cheatham Jr., J.

498,F INTRODUCTION TO ROBOTICS (3-0-3)

A survey of topics in robotics including kinematics, dynamics and control theory applied to robotics. Lectures are given on image processing and computer vision, voice synthesis and speech recognition, artificial intelligence, and computer robot simulation. Laboratory includes programming of Microbot and PUMA robotic arms.

Cheatham Jr., J.

501,F ANALYTICAL DYNAMICS (3-0-3)

Graduate level version of Mech 411. Offered concurrently with Mech 411.

Spanos, P.

502,S VIBRATIONS (3-0-3)

Graduate level version of Mech 412. Offered concurrently with Mech 412.

Spanos, P.

509,S DYNAMIC ANALYSIS OF OFFSHORE STRUCTURES (3-0-3)

Loads on offshore structures are described on deterministic and probabilistic basis. Methods are examined for calculating the structural response. Specific examples involving drill strings, marine risers, fixed and compliant structures are given. Also listed as Civi 509.

Spanos, P.

510,S ELASTO-DYNAMICS (3-0-3)

Propagation of waves in linearly-elastic strings, fluids, and solids. Surface waves, wave reflection and refraction at interfaces. Wave propagation in waveguides. Steady-state and transient half-space problems. Scattering of waves by cracks.

Angel, Y.

510,F ELASTODYNAMICS (3-0-3)

Propagation of waves in linearly-elastic strings, fluids, and solids. Surface waves, wave reflection and refraction at interfaces. Wave propagation in waveguides. Steady-state and transient half-space problems. Scattering of waves by cracks.

Staff

511,S CONTINUUM MECHANICS I (3-0-3)

Concepts and general principles common to all branches of solid and fluid mechanics. Applications include non-Newtonian fluid mechanics and nonlinear elasticity.

Angel, Y.

515,S STRUCTURAL PLASTICITY (3-0-3)

Problems in limit analysis and design; plastic behavior of structures; flexure and torsion of prismatic members. Also offered as Civi 515.

Merwin, J.

517,S FINITE ELEMENT METHODS (3-0-3)

Introduction to the finite element analysis with applications to problems in fluid and solid mechanics.

Akin, J.

521,S FLIGHT MECHANICS I (3-0-3)

Introduction to the performance, stability, and control of flight vehicles. Not offered every year.

Staff

523,S PROBABILISTIC STRUCTURAL DYNAMICS (3-0-3)

Also offered as Civi 523.

Spanos, P.

530,S HEAT EXCHANGER DESIGN (3-0-3)

Introduction to the fundamentals of the thermal design of heat exchangers; the design of a heat exchanger for a specified application.

Bayazitoglu, Y.

537,F INTRODUCTION TO ARTIFICIAL INTELLIGENCE (3-0-3)

See Elec 437. Also offered as Elec 437.

Staff

538,S EXPERT SYSTEMS APPLIED TO ROBOTICS (3-0-3)

Engineering applications of artificial intelligence and expert systems to robotics and automation.

Staff

563,F ENGINEERING APPROACH TO MATHEMATICAL PROGRAMMING (3-0-3)

Minimization of functions of variables which are (1) unconstrained, or (2) subject to equality constraints, or (3) subject to inequality constraints, or (4) subject to both equality and inequality constraints. Analytical and numerical methods. Also offered as Masc 563.

Miele, A.

564,S OPTIMAL CONTROL (3-0-3)

Optimal control theory and calculus of variations. Minimization of functionals depending on variables subject to differential constraints, non-differential constraints, initial constraints, and final constraints. Analytical and numerical methods. Also offered as Masc 564.

Miele, A.

591,F/S GAS DYNAMICS (3-0-3)

Fundamentals of compressible, one-dimensional gas flows with area change, normal shocks, friction, and heat addition; oblique shocks and Prandtl-Meyer flows. Prereq- Mech 371.

Meade, A.

593,F/S MECHANICAL ENGINEERING PROBLEMS (Variable)

With approval, mechanical engineering students may elect an investigation or design project under the direction of a member of the staff.

Akin, J.

594,S ADVANCED AERODYNAMICS (3-0-3)

Development of theories for the prediction of aerodynamic forces and moments acting on airfoils, wings, and bodies and their design applications.

Staff

601,F/S SPECIAL TOPICS (Variable)

Miele, A.

602,F/S SPECIAL TOPICS (Variable)

Bayazitoglu, Y.

603,F/S SPECIAL TOPICS (Variable)

Chapman, A.

604,F/S SPECIAL TOPICS (Variable)

Cheatham, Jr., J.

605,F/S SPECIAL TOPICS (Variable)

Staff

606,F/S GRADUATE SEMINAR (0)

Akin, J.

673,F ADVANCED FLUID MECHANICS I (3-0-3)

Conservation equations for viscous compressible fluids. Applications to viscous and inviscid flows. Simple flows of non-Newtonian fluids.

Cohen, R.

674,S ADVANCED FLUID MECHANICS II (3-0-3)

Conservation equations for viscous compressible fluids. Applications to viscous and inviscid flows. Simple flows of non-Newtonian fluids. Not offered every year.

Cohen, R.

676,F/S COMPUTATIONAL FLUID MECHANICS (3-0-3)

Numerical methods for the solutions of the equations of fluid mechanics. Finite element and difference schemes, accuracy, stability considerations. Prereq- Mech 673.

Ramaswamy, B.

682,S CONVECTIVE HEAT TRANSFER (3-0-3)

Rigorous study of the transfer of heat by free and forced convection.

Bayazitoglu, Y.

683,F RADIATIVE HEAT TRANSFER I (3-0-3)

Rigorous study of the transfer of heat by radiant exchange in the absence of absorbing media. Not offered every year.

Chapman, A.

684,S RADIATIVE HEAT TRANSFER II (3-0-3)

Radiative transfer in the presence of absorbing, emitting, and scattering media; combined radiation, conduction, and convection. Heat transfer in furnaces, fire propagation, and air pollution problems. Not offered every year.

Bayazitoglu, Y.

698,S ADVANCED TOPICS IN ROBOTICS (3-0-3)

Kinematics and dynamics, trajectory planning, control, vision and sensing.

Cheatham Jr., J.

699,S ADVANCED ROBOTICS LABORATORY (3-0-3)

Staff

800,F/S RESEARCH AND THESIS (Variable)

Akin, J.

Materials Science Courses

301,F/S MATERIALS SCIENCE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

Introduction to the science of solid materials covering metals ,ceramics, plastics, and semiconductors. The properties of solid materials from atomic and macroscopic points of view. Prereq- Math 101.

Pharr, G.

303,S MATERIALS SCIENCE JUNIOR LAB (0-3-1)

Introductory laboratory course. Open to junior materials science majors.

Cunningham, R.

304,F APPLIED MATERIALS ENGINEERING (0-3-1)

Practical application of the basic principles of materials science, covering case studies of failures under a variety of conditions and topics in the fabrication and heat treatment of metallic materials. Prereq or coreq- Msci 301.

Cunningham, R.

401,F THERMODYNAMICS IN ALLOYS (3-0-3)

Thermodynamics applied to systems of solid solutions and intermetallic compounds. Phase law and phase equilibrium. Determining free energies in binary systems. Simple models for transformations.

McLellan, R.

402,F MECH PROPERTIES OF MATERIALS (3-0-3)

Basic, fundamental properties of dislocations in crystals. Applications to mechanical behavior: creep, work hardening, internal friction, fracture, and other structure sensitive phenomena of materials. Prereq- Math 211.

Cunningham, R.

404,S MATERIALS ENGINEERING & DESIGN (2-3-3)

Technological aspects of materials selection, design, failure, and analysis. Laboratory time is spent in an industrial setting. Prereq- Msci 301.

Cunningham, R.

406,S PHYSICAL PROPERTIES OF SOLIDS (3-0-3)

Survey of electrical, magnetic, and optical properties of metals, semiconductors, and dielectrics based upon elementary band theory concepts. Prereq- Math 211.

Staff

411,S METALLOGRAPHY&PHASE RELATIONS (3-0-3)

Microstructures which may be observed in metals and alloys; optical metallography in addition to more sophisticated techniques. Prereq- Msci 301.

McLellan, R.

415,S CERAMICS AND GLASSES (3-0-3)

Fundamentals of ceramic and glassy materials, including phase relations, theoretical properties, structure, and bonding. Not offered every year. Prereq- Msci 301.

Staff

421,F TRANSPORT PHENOMENA, ENERGY AND MASS BALANCE (3-0-3)

Transport phenomena in the processing of metals, ceramics, glasses and polymers with attendant energy and mass balance examples. Energy and mass balance relations frequently encountered in extractive and chemical metallurgy are treated.

McLellan, R.

500,F/S MATERIALS SCIENCE SEMINAR (0)

A series of biweekly seminars on selected topics in Materials Science.

Pharr, G.

501,F/S MATERIALS SCIENCE SEMINAR (1-0-1)

A series of biweekly seminars on selected topics in Materials Science.

Staff

535,F INTRODUCTION TO X-RAY DIFFRACTION & ELECTRON MICROSCOPY (3-0-3)

Study of crystals by x-ray and electron diffraction and electron microscopy. Basic diffraction theory and methods for characterization of structure and constitution of materials. Prereq- Msci 301.

Staff

537,F X-RAY DIFFRACTION & ELECTRON MICROSCOPY (0-3-1)

Selected laboratory experiments to complement the lecture material of Msci 535.

Staff

541,S PHYSICAL METALLURGY (3-0-3)

Fundamentals of solidification, alloying, and heat treatment. The mechanical and nonmechanical properties of metallic systems from atomic and electronic theory. Prereq- Msci 301. Not offered every year.

Staff

550,S TIME DEPENDENT PLASTICITY (3-0-3)

Fundamental concepts in creep and creep rupture in solids. A phenomenological overview and mechanistic theories are presented. Prerequisite: Materials Science 402 or permission of instructor. Not offered every year

561,F ADVANCED METALLURGICAL LAB I (0-4-1)

Students whose interest lies primarily in the field of materials and metallurgy are given the opportunity for research and design in these fields. Prereq- permission of instructor.

Staff

562,S ADVANCED METALLURGICAL LAB II (0-4-1)

Students whose interest lies primarily in the field of materials and metallurgy are given the opportunity for research and design in these fields. Prereq- permission of instructor.

Staff

569,F CORROSION SCIENCE & ENGINEERING (3-0-3)

Survey of surface activity and corrosion processes on metals, semiconductors, and insulating materials. Prereq - Msci 301. Not offered every year.

Cunningham, R.

570,F SENIOR THESIS (0-4-1)

A research project in the materials science field will be undertaken by the student in close collaboration with at least one materials science faculty member.

Staff

571,S SENIOR THESIS (0-4-1)

A research project in the materials science field will be undertaken by the student in close collaboration with at least one materials science faculty member.

Staff

593,F POLYMERS (3-0-3)

Basic concepts in macromolecular chemistry and their application in the synthesis and chemical modification of polymers. Prerequisite: Chemistry 211, 212.

Armeniades, C.

594,S PROPERTIES OF POLYMERS (3-0-3)

Basic concepts in macromolecular chemistry and physics and their application in the production, processing, and use of synthetic polymers. Also offered as Ceng 594.

Armeniades, C.

609,S FRACTURE MECHANICS (3-0-3)

Theory of elasticity and theory of plasticity pertinent to fracture mechanics. Not offered every year.

Staff

610,F CRYSTAL THERMODYNAMICS (3-0-3)

Potentials and third-order elastic constants will be discussed. The lattice dynamics of harmonic phonons and anharmonic perturbation expansion are included, as well as the contribution of electrons to the thermodynamic quantities. Not offered every year.

Staff

614,F/S SPECIAL TOPICS (Variable)

Staff

615,F/S SPECIAL TOPICS (Variable)

Staff

634,F THERMODYNAMICS OF ALLOYS (3-0-3)

Relations between classical thermodynamics and statistical mechanics applied to understanding solid and liquid alloys. Solid-solid, liquid-solid, and gas-solid equilibria in metallurgy. Not offered every year.

McLellan, R.

635,S TRANSFORMATION IN ALLOYS (3-0-3)

Diffusion in metals and alloys. Mechanism and phenomenology of diffusion-controlled transformations. Precipitation from saturated alloys and liquid solutions. Transformations in heat treated alloys. Not offered every year.

McLellan, R.

English

Professor Isle, *Chair*

Professors Apple, Chance, Doody, Doughtie, Grob, Huston,
Meixner, Morris, Patten, Piper, Skura, Snow, and J.A. Ward

Associate Professors Driskill, Wood

Assistant Professor Lamos

Instructor Lurie

Lecturers Daichman, Logan, Recknagel, Tobin, and Wallingford

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. A major in English requires 36 semester hours in English; at least 24 semester hours must be courses at or above the 300 level. A double major requires 30 semester hours in English, with at least 18 hours at the advanced level. All English majors must take Masters of English Literature (English 251, 252) as a preparatory survey. Humanities 101 and 102 may be counted as credit toward the major.

An English major must also take advanced courses in the following categories: (1) six semester hours in English literature before 1800, of which one course must be Chaucer, Shakespeare, or Milton; (2) three semester hours in English literature after 1800; (3) three semester hours in American literature.

It is recommended that all English majors take some formal instruction in English and American history and, if they plan to do graduate work, at least six semester hours at the advanced level in a foreign language.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

The Graduate Program. The graduate program in English is designed for thorough training of a limited number of carefully selected students. Both the M.A. and Ph.D. degrees are offered to students interested in all fields of British and American literature and in literary theory.

As a part of their training, all graduate students are expected to serve as research assistants, to participate in the teaching activities of the department, or to assist the editor of *Studies in English Literature*, published by Rice University.

Within the limits of available funds, graduate scholarships and fellowships are awarded to qualified students. Scholarships provide a waiver of tuition; fellowships include a stipend and a waiver of tuition.

Requirements for the Degree of Master of Arts. Students admitted to the graduate program may take the master's degree by meeting four requirements:

1. If they have not done so before entering the program, they must satisfactorily complete at least 3 semester hours at the junior or senior level in the literature of a foreign language, not in translation, either at Rice or another accredited institution.
2. They must satisfactorily complete at least 24 semester hours of graduate work in English, exclusive of the thesis.

3. They must fulfill distribution requirements by taking at least one course in each of five of the following fields: 1) Medieval Literature, 2) Renaissance Literature to 1600 (including Shakespeare), 3) Seventeenth and Eighteenth-Century British Literature, 4) Nineteenth-Century British Literature, 5) Twentieth-Century British Literature, 6) American Literature to 1900, 7) Twentieth-Century American Literature, 8) Literary Theory.
4. They must complete a thesis of approximately 50 pages and must defend it in an oral examination. For students admitted to candidacy for the Ph.D. degree, the requirement of a thesis will be waived.

Requirements for the Degree of Doctor of Philosophy. Candidates for the doctoral degree must complete five requirements:

1. If they have not done so before entering the program, they must satisfactorily complete at least six semester hours at the junior or senior level in the literature of a foreign language, not in translation. Although this work may be done at Rice or another accredited institution, it should directly relate to the student's research interests, and it must be approved by the Graduate Studies Committee.
2. They must satisfactorily complete at least 42 semester hours of course work in English, exclusive of the thesis.
3. They must fulfill distribution requirements by taking at least one course in each of the following fields: 1) Medieval Literature, 2) Renaissance Literature to 1600 (including Shakespeare), 3) Seventeenth- and Eighteenth-Century British Literature, 4) Nineteenth-Century British Literature, 5) Twentieth-Century British Literature, 6) American Literature to 1900, 7) Twentieth-Century American Literature, 8) Literary Theory.
4. They must satisfactorily complete a preliminary examination, which consists of a 6-hour written examination covering two chronologically contiguous fields of specialization chosen by the student from the following: (1) Old English; (2) Middle English; (3) Sixteenth Century including Shakespeare, (4) Seventeenth Century including Shakespeare and Milton; (5) Restoration including Milton, Dryden, and Swift; (6) Eighteenth Century including Swift and Blake; (7) Romantic including Blake; (8) Victorian; (9) Modern British including T.S. Eliot; (10) American literature from colonial to Henry James, inclusive; (11) Modern American including Henry James and T. S. Eliot; (12) Literary Theory: Plato to 1800; (13) Literary Theory: 1800 to present. This examination will usually be taken at the end of the second semester following completion of the course requirements. The examining committee may request a 1-hour oral examination focusing on the written examination.
5. They must complete a dissertation which demonstrates a capacity for independent work of high quality in either traditional scholarship, critical interpretation, or critical theory; and they must pass an oral examination on the thesis and related fields.

In order to qualify for continuing financial aid, students must be approved for candidacy for the Ph.D. by the beginning of the seventh semester at Rice. To secure approval, they must satisfy the foreign language requirement, fulfill the distribution requirements, pass the preliminary examinations, and have a dissertation prospectus approved by the department's graduate studies committee.

*English Courses***101,F CRITICAL READING AND WRITING (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Analysis and discussion of literary texts: poetry, drama, prose, fiction. Students submit essays frequently. All students must submit section preference sheets to the English Dept.

*Staff***102,S CRITICAL READING AND WRITING (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Continuation of Engl 101, with sections giving special emphasis to individual genres: fiction, drama, and poetry.

*Staff***103,F BASIC COMPOSITION (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Intended primarily for students whose English Competency Examination is below standard.

Prereq- permission of instructor.

*Ms. Driskill***104,S BASIC COMPOSITION (3-0-3)**

See Engl 103. Permission of instructor is required.

*Ms. Tobin***211,F/S INTRO. TO CREATIVE WRITING (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Discussion and analysis of student fiction and poetry. Permission of the instructor required.

*Ms. Wood***251,F MAJOR BRITISH WRITERS CHAUCER TO 1800 (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Readings in British major authors of the Middle Ages, the Renaissance, and the eighteenth century. Required of English majors. Enrollment in each section limited. Turn in preference sheet to English Office.

*Mr. Piper, Mr. Huston, Mr. Snow***252,S MAJOR BRITISH WRITERS 1800 - PRESENT (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Readings in major British authors of the nineteenth and twentieth centuries. Required of English majors. Enrollment in each section limited. Turn in preference sheet to English Office.

*Ms. Lamos, Mr. Patten, Ms. Wallingford***271,F ASPECTS OF MODERN LITERATURE (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Modern literature in short story, drama, poetry, novel, and nonfiction, drawn from American, British, and European sources of the nineteenth and twentieth centuries.

*Mr. Ward***272,S ASPECTS OF MODERN LITERATURE (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

See Engl 271.

*Mr. Meixner***302,F/S BALLAD AND FOLKSONG (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

About two-thirds of this course is devoted to British and American folk ballads; the rest surveys American folk lyrics, spirituals, work songs, and blues.

Mr. Doughtie

302 COURSES OF INSTRUCTION

304,F/S 20TH-CENTURY WOMEN WRITERS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Readings in modern women novelists or modern women poets.

Ms. Lurie

311,F FICTION WRITING (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Discussion and analysis of student fiction. Prereq- permission of instructor.

Mr. Apple

312,S FICTION WRITING (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

See Engl 311. Prereq- permission of instructor.

Mr. Apple

313,S DRAMATIC WRITING (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

The emphasis, depending on individual students, will be on the writing of drama in one of several of the chief modes of the performing arts: plays, films, musicals, opera, even dance. Prereq- permission of instructor required. May be repeated for credit.

Mr. Meixner

314,F/S POETRY WRITING (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Extensive reading in modern poetry as well as regular practice in the writing of various forms will be required. Prereq- permission of instructor. May be repeated for credit.

Ms. Wood

315,S EXPOSITORY WRITING (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

A course in the composition of personal essays. Prereq- permission of instructor.

Mr. Piper

317,S TECHNICAL WRITING (3-0-3)

Ms. Driskill

320,S INTRODUCTION TO MEDIEVAL CULTURE (3-0-3)

Interdisciplinary course providing insights into the literature, art, philosophy, history, music, science, and cuisine of the Middle Ages, with guest lectures by specialists in various fields, slide lectures, and field trips. Also offered as Humanities 320.

Ms. Chance

321,F OLD ENGLISH: GENDER AND POWER (3-0-3)

An examination of the charms, "Wulfand Eadwacer," "The Wife's Lament," "Judith and Beowulf" and related texts in the original and in translation.

Ms. Chance

323,F/S CHAUCER (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Readings in the *Canterbury Tales* and other writings of Chaucer.

Ms. Chance

328,S MIDDLE ENGLISH LITERATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Mythology in medieval literature: misogyny, literacy, and myth.

Ms. Chance

329,S 16TH CENTURY BRITISH LITERATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

A survey focusing on the nondramatic works of Shakespeare, Sidney, Spenser, More, Wyatt, and their contemporaries.

Mr. Doughtie

334,F ELIZABETHAN AND JACOBAN DRAMA (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Close critical reading of Elizabethan and Jacobean plays with particular emphasis on the works of Marlowe and Jonson.

Ms. Skura

339,F SHAKESPEARE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Each semester representative plays including tragedies, comedies, histories, and romances will be read.

Mr. Grob

340,S SHAKESPEARE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

See Engl 339. Limited to juniors and seniors only.

Mr. Huston

343,S 17TH CENTURY BRITISH LITERATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Poetry and prose of the seventeenth century, excluding Milton.

Mr. Snow

344,F/S MILTON (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Major poems and prose of John Milton.

Mr. Snow

346,F 18TH CENTURY BRITISH LITERATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Major writers of the eighteenth century, with particular attention given to Swift, Pope, and Johnson.

Mr. Piper

351,F/S BRITISH LITERATURE-ROMANTIC PERIOD (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

The major writings of Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats.

Mr. Grob

357,S VICTORIAN LITERATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

The poetry of Tennyson, Browning, Arnold, Meredith, the Pre-Raphaelites and Hopkins; the prose of Carlyle, Ruskin, Pater, Arnold, Mill.

Mr. Patten

361,F 18TH CENTURY BRITISH FICTION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

A course dealing chiefly in the novels of Fielding, Sterne, Smollett, and Austen.

Mr. Piper

362,F 19TH CENTURY BRITISH FICTION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

The novel from Austen to Hardy.

Mr. Doody, Mr. Patten

363,F/S 20TH CENTURY BRITISH FICTION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Forster, Woolf, Lawrence, Joyce, and their contemporaries. Particular attention will be given to *Ulysses*.

Mr. Ward

364,F 20TH CENTURY BRITISH POETRY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Survey from 1890 to the present: emphasis on Hopkins, Yeats, Lawrence, Graves, Auden, Larkin, and Hughes.

Ms. Wallingford

367,F MODERN DRAMA: IBSEN TO 1940 (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Plays by Ibsen, Chekhov, Strindberg, Wilde, Shaw, Synge, O'Casey, Pirandello, and T.S. Eliot.

Mr. Meixner

368,S MODERN DRAMA: 1940-PRESENT (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

O'Neill, Miller, and Williams; French moderns; absurdism and recent trends.

Ms. Skura

369,F THE NOVEL: CERVANTES TO 1900 (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Major European fiction from Cervantes to Tolstoy in translation.

Mr. Patten

378,F AMERICAN LITERATURE TO 1860 (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Poe, Emerson, Thoreau, Melville, Hawthorne, Whitman, and other American writers.

Mr. Ward

379,S AMERICAN LITERATURE:1860-1910 (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

A study of Mark Twain, Emily Dickinson, Stephen Crane, Henry James, and others.

Mr. Ward

383,F/S AMERICAN FICTION: 1910-1940 (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Hemingway, Fitzgerald, Faulkner, and their contemporaries.

Mr. Doody

384,S AMERICAN FICTION 1940 - PRESENT (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Survey with emphasis on the work of Bellow, Mailer, Barth, and Pynchon.

Mr. Isle

387,S 20TH CENTURY AMERICAN POETRY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Frost, Pound, Eliot, and Stevens with some attention to the other poets of the twentieth century.

Ms. Lamos

388,F CONTEMPORARY AMERICAN POETRY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

American poetry since Lowell.

Ms. Wallingford

394,F/S STRUCTURE OF ENGLISH LANGUAGE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Also offered as Ling 394.

Mr. Davis

395,S HISTORY OF ENGLISH LANGUAGE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Also offered as Ling 395.

Mr. Mitchell

396,S LANGUAGE AND PHILOSOPHY IN LITERATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Readings and discussions of issues in the philosophy of language.

Mr. Morris

399,F LITERARY CRITICISM: HISTORY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

A survey of the history of literary criticism from Plato to the twentieth century.

Mr. Morris

400,F/S LITERARY CRITICISM: THEORY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Recent developments in critical theory.

Mr. Morris

401, 402 TOPICS IN LITERATURE (3-0-3 each semester)

* DISTRIBUTION COURSE: CATEGORY I.1

The topics vary from year to year. May be repeated for credit. Topic for fall 1989 is Literature and The City (401). Topic for spring 1990 is Literature and The Visual Arts (402)

Mr. Doody, Mr. Snow

403, 404 STUDIES IN A MAJOR BRITISH AUTHOR (3-0-3 each semester)

* DISTRIBUTION COURSE: CATEGORY I.1

The topics vary from year to year. May be repeated for credit. Topic for fall 1989 is Shakespeare's *Antony and Cleopatra* (403).

Mr. Snow

405, 406 STUDIES IN A MAJOR AMERICAN AUTHOR (3-0-3 each semester)

* DISTRIBUTION COURSE: CATEGORY I.1

The topics vary from year to year. May be repeated for credit.

Staff

407, 408 STUDIES IN LITERARY TYPES (3-0-3 each semester)

* DISTRIBUTION COURSE: CATEGORY I.1

The topics vary from year to year. May be repeated for credit.

Staff

411, 412 STUDIES IN MODERN LITERATURE (3-0-3 each semester)

* DISTRIBUTION COURSE: CATEGORY I.1

The topics vary from year to year. May be repeated for credit.

Staff

413, 414 STUDIES IN A LITERARY CRITICISM (3-0-3 each semester)

* DISTRIBUTION COURSE: CATEGORY I.1

The topics vary from year to year. May be repeated for credit. Topic for fall 1989 is Feminist Literary Theory (413).

Ms. Lurie

306 COURSES OF INSTRUCTION

416,F/S ADVANCED CREATIVE WRITING (3-0-3 each semester)

*** DISTRIBUTION COURSE: CATEGORY I.1**

Advanced fiction writing. May be repeated for credit. Prereq: permission of instructor required.

Mr. Apple

421,F DIRECTED READING (3-0-3)

Mr. Isle

422,S DIRECTED READING (3-0-3)

Mr. Isle

423,F SENIOR THESIS (3-0-3)

Mr. Isle

424,S SENIOR THESIS (3-0-3)

Mr. Isle

501,F BRITISH AND AMERICAN LITERATURE (3-0-3)

Directed reading in a topic in British or American literature or literary theory. Graduate students may enroll for up to two semesters of directed reading for graduate credit.

Mr. Isle

502,S BRITISH AND AMERICAN LITERATURE (3-0-3)

See Engl 501.

Mr. Isle

504,F 20TH-CENTURY WOMEN WRITERS (3-0-3)

An enriched version for graduate students of English 304. Additional readings, papers, or meetings to be assigned by the instructor.

Ms. Lurie

510,F SEMINAR: FEMINIST LITERARY THEORY (3-0-3)

Ms. Gallop

510,S SEMINAR: 18TH CENTURY FICTION (3-0-3)

Mr. Piper

511,F SEMINAR: VICTORIAN LONG POEM (3-0-3)

Mr. Patten

511,S SEMINAR: HENRY JAMES (3-0-3)

Mr. Ward

512,S SEMINAR: JAMES JOYCE (3-0-3)

Mr. Doody

513,F SEMINAR: TEACHING OF COMPOSITION (3-0-3)

Ms. Driskill

521,F OLD ENGLISH (3-0-3)

An enriched version of Engl 321 for graduate students. Additional readings, papers, or meetings to be assigned by instructor.

Ms. Chance

523,F/S CHAUCER (3-0-3)

An enriched version of Engl 323 for graduate students. Additional readings, papers, or meetings to be assigned by the instructor.

Ms. Chance

528,S MIDDLE ENGLISH LITERATURE (3-0-3)

An enriched version of English 328 for graduate students. Additional readings, papers, or meetings to be assigned by the instructor.

Ms. Chance

529,S 16TH CENTURY BRITISH LITERATURE (3-0-3)

An enriched version for graduate students of Engl 329. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Doughtie

534,F ELIZABETHAN AND JACOBEAN DRAMA (3-0-3)

An enriched version for graduate students of Engl 329. Additional readings, papers, or meetings to be assigned by the instructor.

Ms. Skura

539,F SHAKESPEARE (3-0-3)

An enriched version for graduate students of Engl 339, 340. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Grob

540,S SHAKESPEARE (3-0-3)

See Engl 539.

Mr. Huston

543,S 17TH CENTURY BRITISH LITERATURE (3-0-3)

An enriched version for graduate students of Engl 343. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Snow

544,F/S MILTON (3-0-3)

An enriched version for graduate students of Engl 329. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Snow

546,F 18TH CENTURY BRITISH LITERATURE (3-0-3)

An enriched version of Engl 346. Additional readings, papers, or 54 meetings to be assigned by the instructor.

Mr. Piper

551,F/S BRITISH LITERATURE, ROMANTIC PERIOD (3-0-3)

An enriched version for graduate students of Engl 351. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Grob

557,S VICTORIAN LITERATURE (3-0-3)

An enriched version for graduate students of Engl 357. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Patten

561,F 18TH-CENTURY BRITISH FICTION (3-0-3)

An enriched version for graduate students of English 361. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Piper

308 COURSES OF INSTRUCTION

562,F 19TH CENTURY BRITISH FICTION (3-0-3)

An enriched version for graduate students of Engl 329. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Doody

563,F/S 20TH CENTURY BRITISH FICTION (3-0-3)

An enriched version for graduate students of Engl 363. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Ward

564,F 20TH CENTURY BRITISH POETRY (3-0-3)

An enriched version for graduate students of English 329. Additional readings, papers, or meetings to be assigned by the instructor.

Ms. Wallingford

567,F MODERN DRAMA: ISBEN TO 1940 (3-0-3)

An enriched version for graduate students of Engl 367. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Meixner

568,S MODERN DRAMA: 1940 TO PRESENT (3-0-3)

Ms. Skura

578,F AMERICAN LITERATURE TO 1860 (3-0-3)

An enriched version for graduate students of Engl 378. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Ward

579,S AMERICAN LITERATURE 1860-1910 (3-0-3)

An enriched version for graduate students of Engl 379. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Ward

583,S AMERICAN FICTION 1910-1940 (3-0-3)

An enriched version for graduate students of Engl 383. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Doody

584,S AMERICAN FICTION 1940 - PRES (3-0-3)

An enriched version for graduate students of Engl 384. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Isle

587,S 20TH CENTURY AMERICAN POETRY (3-0-3)

An enriched version for graduate students of Engl 387. Additional readings, papers, or meetings to be assigned by the instructor.

Ms. Lamos

588,F COMTEMPORARY AMERICAN POETRY (3-0-3)

An enriched version for graduate students of Engl 388.

Ms. Wallingford

599,F LITERARY CRITICISM: HISTORY (3-0-3)

An enriched version for graduate students of Engl 399. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Morris

600,S LITERARY CRITICISM: THEORY (3-0-3)

An enriched version for graduate students of English 400. Additional readings, papers, or meetings to be assigned by the instructor.

Mr. Morris

621,F DIRECTED READING (3-0-3)

Mr. Isle

622,S DIRECTED READING (3-0-3)

Mr. Isle

701,F BRITISH AND AMERICAN LITERATURE (Variable)

Topics in British and American Literature or Literary Theory.

Mr. Isle

702,S BRITISH AND AMERICAN LITERATURE (Variable)

Mr. Isle

703,F RESEARCH LEADING TO CANDIDACY (Variable)

Topics in British and American Literary theory. To be taken after a student has completed departmental course requirements for the Master's or Doctorate, and before being admitted to candidacy.

Mr. Isle

704,S RESEARCH LEADING TO CANDIDACY (Variable)

Mr. Isle

800,F/S PH.D. RESEARCH AND THESIS (Variable)

To be taken after a student has been admitted to candidacy.

Mr. Isle

French and Italian

Associate Professor D. Nelson, *Chairman*

Professors Alcover, and Carrington

Associate Professors Aresu, and Logan

Lecturers Cafilisch and Datta

Degrees Offered: B.A., M.A., Ph.D.

French

Undergraduates may major in French, and there is a graduate program in French leading to the degrees of Master of Arts and Doctor of Philosophy. A fully equipped language laboratory is in operation, and laboratory work is an important part of the elementary courses in French.

Undergraduate Program. A minimum of 30 semester hours (ten courses) in advanced French courses is required for the major in French. However, only 24 semester hours (eight courses) of advanced study are required for double majors or area majors. The following courses are required unless the student is exempted by

his or her major adviser: French 301, 302, 311, and 312. Students who have taken French 300- and 400-level courses cannot enroll simultaneously or afterwards in French 200-level courses for credit. Students with a diploma from French-speaking institutions must consult with the department before enrolling in courses.

Students are urged to take some work in European history, English, another European literature, or other courses closely related to French literature and culture. All majors and prospective majors must have their programs approved by the undergraduate adviser.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

In addition to courses at the 100 and 200 levels, the department particularly recommends French 306 to meet the university distribution requirements. This course, designed to interest a wide range of students, is taught in English and does not require previous knowledge of French. It may be accepted for an area major when approved by the departments involved.

An honors program in French is available to qualified students. For detailed information, they should consult their French instructor or the departmental adviser. The Clyde Ferguson Bull Traveling Fellowship is awarded each year to a graduating senior with a major or double major in French. The fellowship permits the recipient to spend an entire year in France. A \$2,000 summer travel scholarship is presented each year by the Alliance Francaise for university students in the Houston area. Members of the department are available for discussion of the numerous programs of study and travel in France sponsored by both American and French institutions. There is an active chapter of the French honorary society of Pi Delta Phi and an active French club, Le Club Chouette.

Graduate Programs. Admission to graduate study in French will be granted to a limited number of qualified students. A distinguished undergraduate record in the study of French literature and a capacity for independent work are essential. The award of advanced degrees is not based solely on accumulation of credits or compliance with formal requirements. Candidates are expected to attain a wide general knowledge of the appropriate history and literature and to demonstrate their command of the French language. In most cases, two years will be required for the completion of work for the degree of Master of Arts. All courses are given in French.

Requirements for the Degree of Master of Arts:

1. Completion with satisfactory standing of 24 hours (beyond B.A.) in advanced courses plus thesis work (6 semester hours).
2. Satisfactory performance on a reading examination in one language other than French (language to be approved by the department).
3. Satisfactory performance on preliminary written and oral examinations in French on the French authors indicated in a reading list provided.
4. Completion of an acceptable thesis.
5. Satisfactory performance on a final oral examination.

Requirements for the Degree of Doctor of Philosophy:

1. Completion with high standing of a program approved by the department. Normally, this will include 54 semester hours of course work plus

36 hours for the thesis. For those already holding the degree of Master of Arts, the requirement would be 30 semester hours of course work plus 36 hours for the thesis.

2. Satisfactory performance on a reading examination in two languages other than French approved by the department.
3. Satisfactory performance on a preliminary written and oral examination on the authors indicated in a reading list provided and on the literature, culture, and civilization of France. The oral examination may be taken only after the successful completion of the written examination. Students have a choice between passing a preliminary examination in a second field of literature or taking at least one course in a closely related field approved by the graduate faculty. Maximum credit toward the Ph.D. degree for work in a "minor" field is limited to three hours.

Note: Requirements 2 and 3 must be fulfilled one year before the submission of a dissertation.

4. Completion of a dissertation approved by the department; the dissertation is expected to represent an original contribution.
5. Satisfactory performance on a final oral examination on the dissertation and related fields.

Note: Regardless of the type of appointment held by the graduate student, he or she may be required to undertake research or teaching assignments, depending upon the background of the graduate student and the needs of the department.

French Courses

101,F/S ELEMENTARY FRENCH I (3-1-4)

*** DISTRIBUTION COURSE: CATEGORY I.1**

NOTE: 102 must be completed to receive dist. credit for 101. Introductory French. Concentration on all four language skills. Supplemented by work in the language laboratory.

Datta, E.

102,F/S ELEMENTARY FRENCH II (3-1-4)

*** DISTRIBUTION COURSE: CATEGORY I.1**

See Fren 101.

Staff

103,F ACCELERATED ELEMENTARY FRENCH (6-2-8)

*** DISTRIBUTION COURSE: CATEGORY I.1**

Accelerated review of French for those wishing to enter French 201 in the spring semester. Equivalent to Fren 101, 102.

Staff

201,F/S INTERMEDIATE FRENCH I (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.1**

Intense oral and written grammar review; literary and cultural readings serve as basis for class discussions and compositions. Prereq- Fren 102 for 201 and 201 for 202, or placement exam.

Staff

202,F/S INTERMEDIATE FRENCH II (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.1**

See Fren 201.

Staff

312 COURSES OF INSTRUCTION

301,F/S ADVANCED FRENCH GRAMMAR (3-0-3)

Intensive study of French grammar and syntax at the advanced level, with concentration on idiomatic structures for the language and written practice of contemporary French. Required for French majors. Prereq- Fren 202 or placement exam.

Aresu, B.

302,F/S FRENCH PHONETICS (3-0-3)

Contrastive analysis of the French sound system, including such key areas as diction and articulation of French speech, with emphasis on class as well as laboratory practice. Required for French majors. Prereq- Fren 202 or placement exam.

Alcover, M.

303,S ADVANCED CONVERSATION AND COMPOSITION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Active practice of composition, oral analysis, and discussion based upon the reading of texts on selected issues and problems in contemporary French society. Prereq- Fren 301 and 302 or placement exam.

Staff

305,S COMMERCIAL FRENCH (3-0-3)

An introduction to French for careers and to commercial French, this course will deal with the essential vocabulary and syntax specific to the language of French-speaking business. Prereq- 301 and 302 or placement exam.

Datta, E.

306 FRENCH LITERATURE IN ENGLISH TRANSLATION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Not offered every year. Topic changes periodically.

Staff

311,F INTRODUCTION TO FRENCH LITERATURE I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Main currents in French literature from its beginning to the nineteenth century. Required for French majors. Lectures and discussions in French. Prereq- Fren 202 or placement exam.

Datta, E.

312,S INTRODUCTION TO FRENCH LITERATURE II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Main currents in French literature from the nineteenth century to the present. Required for French majors. Open to first-year students. Lectures and discussions in French. Prereq- Fren 202 or placement exam.

Aresu, B.

401 SYNTAX AND TRANSLATION (3-0-3)

Close grammatical and stylistic analysis of passages for translation from English to French and to a lesser extent from French to English. This course is less theoretical than practical, with continual exercise in the art of translation and of writing good French. Prereq- Fren 301 and 302 or placement exam. Not offered every year.

Staff

403,F/S SPECIAL TOPICS (3-0-3)

Staff

410,F/S LITERATURE OF THE MIDDLE AGES (3-0-3)

Study of the major genres of medieval French literature including such works as *La Vie de Saint Alexis*, *La Chanson de Roland*, the *lais* of Marie de France, *Le Chevalier de la Charrete*, and lyric poetry. Modern French translations will be used. Prerequisite: normally 301 and 311 or placement exam. Not offered every year.

Nelson, D.

430 SEVENTEENTH CENTURY THEATRE (3-0-3)

Close readings of the plays of Corneille, Moliere, Racine and Regnard. Prereq- normally Fren 301 and 311 or placement exam. Not offered every year.

Staff

440 EIGHTEENTH-CENTURY LITERATURE (3-0-3)

This course will include such authors as Montesquieu, Voltaire, Marivaux, Diderot, Rousseau, and Beaumarchais. Prereq- normally 301 and 311 or placement exam. Not offered every year.

Staff

451 NINETEENTH CENTURY POETRY (3-0-3)

Studies in Romantic, Parnassian, and Symbolist poetry, dealing with such authors as Lamartine, Musset, Vigny, Hugo, Nerval, Leconte de Lisle, and Baudelaire. Prerequisite: normally 301 and 312 or placement exam. Not offered every year.

Staff

455 NINETEENTH-CENTURY NOVEL (3-0-3)

From Romanticism through Realism to Naturalism in such authors as Constant, Stendhal, Hugo, Balzac, Flaubert, and Zola studied through modern critical perspectives. Prereq- Fren 301 or 312 or placement exam. Not offered every year.

Staff

463 INTRODUCTION TO LITERARY CRITICISM AND THEORY.

Prereq: 301, 302, 311 or 312.

Staff

465 TWENTIETH CENTURY FICTION (3-0-3)

Survey of major novels in the twentieth century. Prereq- normally 301 and 312 or placement exam. Not offered every year.

Staff

466,F FRENCH LITERATURE: 1950'S TO PRESENT (3-0-3)

Studies in major literary works of the post-existentialist era in France and French-speaking cultures of Africa, Canada, and the Caribbean, with geographical emphasis varying from semester to semester. Prereq- Fren 301 and 312 or placement exam.

Aresu, B.

501,F/S GRADUATE RESEARCH (0-0-3)

Graduate research and thesis in partial fulfillment of the requirements for the degree of Master of Arts.

Staff

503,F/S SPECIAL TOPICS IN FRENCH LITERATURE (3-0-3)**504 HISTORY AND STYLISTICS OF FRENCH LANGUAGE (3-0-3)**

Phonology & syntax of Old French

Selected readings from the *lais* of Marie de France. Not offered every year.

Nelson, D.

510 SEMINAR ON MEDIEVAL LITERATURE (3-0-3)

Topic changes periodically. Not offered every year.

Nelson, D.

525 SEMINAR ON RENAISSANCE PROSE (3-0-3)

Topic changes periodically. Not offered every year.

Staff

314 COURSES OF INSTRUCTION

530,F SEMINAR ON 17TH CENTURY LITERATURE (3-0-3)

17th century French thought from Montaigne to Fontenelle.

Alcover, M.

543,S SEMINAR ON 18TH CENTURY FRENCH LITERATURE (3-0-3)

The Philosophes: From Bayle to Sade.

Alcover, M.

545,S SEMINAR ON 18TH CENTURY NOVEL (3-0-3)

Readings will include works by authors such as Montesquieu, Marvau, Prevost, Voltaire, and Rousseau. Not offered every year.

Staff

555 SEMINAR IN ROMANTICISM (3-0-3)

From Romanticism through Realism to Naturalism in such authors as Constant, Stendhal, Hugo, Balzac, Flaubert, and Zola. Not offered every year.

Staff

561,F STUDIES IN FRENCH POETRY (3-0-3)

Desire and anguish in the poetry of Paul Valéry.

Bourjea, S.

562 SEMINAR ON MODERN DRAMA (3-0-3)

Topic changes periodically. Not offered every year.

Staff

563 SEMINAR ON THE HISTORY AND THEORY OF CRITICISM (3-0-3)

Topic changes periodically. Not offered every year.

565 SEMINAR ON MODERN LITERATURE (3-0-3)

Topic changes periodically. Not offered every year.

Staff

566,S SEMINAR ON MODERN FICTION (3-0-3)

Post-1950 French and Third World Fiction.

Aresu, B.

567 POETICS OF THE MODERN LYRIC (3-0-3)

Poetics of figuration and cultural decentering in modern French and francophone poetry. Not offered every year.

Aresu, B.

800,F/S THESIS RESEARCH (0-0-9)

Staff

Italian

Italian Courses

101,F ELEMENTARY ITALIAN I (4-0-4)

* DISTRIBUTION COURSE: CATEGORY I.1

NOTE: 102 must be completed to receive dist. credit for 101. Concentration on all four language skills, supplemented by work in the language laboratory. Basic elements of Italian culture and civilization: an overview of current events and ideas. This course also includes a "BBC" video.

Caflisch, A.

102,S ELEMENTARY ITALIAN II (4-0-4)

* DISTRIBUTION COURSE: CATEGORY I.1

Continuation of Ital 101.

Caflisch, A.

201,F INTERMEDIATE ITALIAN I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

A review and consolidation of the structure of contemporary Italian. Literary and cultural readings serve as a basis for class discussion, conversation, oral reports. Oral reports and compositions will help to increase fluency and naturalness. This course also includes a "BBC" video program and a movie by an Italian director.

Caflisch, A.

202,S INTERMEDIATE ITALIAN II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Continuation of Ital 201.

Caflisch, A.

Geology and Geophysics

Professor Stormer, Chair

Professors Anderson, Avé Lallemant, D.R. Baker (*Emeritus*), Bally,

De Bremaecker, Heymann, Leeman (*on leave 1989*), Oldow,

Talwani, and Vail

Adjunct Professors Buffler, Burke, Cramez, D.M. Curtis, O.G. Johnson, Savit,

Seriff, Taner, Wornardt, and J. L. Wilson

Associate Professors H.C. Clark (*Emeritus*), R.B. Dunbar, Levander,

Sawyer and J.E. Wright

Adjunct Associate Professors Dravis and Riese

Assistant Professor Droxler

Adjunct Assistant Professor Sullivan

Lecturers R.W. Dunbar and Sisson

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program in Geology. The following courses are required for completion of the degree of Bachelor of Arts with a major in geology:

Geology 101, 102, 311, 312, 331, 332, 334, 361, 390, and 402.

At least six semester hours of geology in additional courses at the 300-level or higher.

The following supporting courses are also required:

Mathematics 101, 102, and 211;

Chemistry 101, 102, and 107;

Physics 101, 102, 132;

Mathematical Sciences 223 (Min. 2 hours Fortran) or Computer Science 211.

Double majors including geology must comply with the above requirements except that the six hours of geology electives may be deleted.

Students in the geology major must satisfy the distribution requirements and complete no fewer than 60 semester hours in addition to the Departmental requirements for the Geology major for a total of 135 semester hours.

The Department of Geology and Geophysics offers an approved curriculum leading to certification in earth science as a second teaching field. The curriculum consists of 25 semester hours of introductory courses which would most benefit a secondary school teacher, i.e., physical and historical geology, study of minerals, rocks, and fossils; some work in astronomy, meteorology, and oceanography.

Undergraduate Program in Geophysics. The following courses are required for completion of the degree of Bachelor of Arts with a major in geophysics:

Geology 101, 102, 311, 331, 334, 361, 390, 441, 442, and 461;

Mathematics 101, 102, 211, and 212;

Chemistry 101, 102, and 107;

Physics 101, 102, 132, 201, and 231;

Mathematical Sciences 233 (Min. 2 hours Fortran) or Computer Science 211.

Additional courses recommended but not required are Physics 301, Mathematical Sciences 310 or Mathematics 355, and Mathematical Sciences 340.

Students in the geophysics major must satisfy the distribution requirements and complete no fewer than 60 semester hours in addition to the Departmental requirements for the Geophysics major for a total of 135 semester hours.

Graduate Program. The department offers graduate programs leading to M.A. and Ph.D degrees. At present the department is prepared to offer advanced work in marine geology-oceanography, stratigraphy, sedimentation, carbonate petrology, igneous petrology, meteoritics, geochemistry, rock mechanics, structural geology, regional tectonics, seismology, and geodynamics. Programs of study and research that bridge a variety of these specialties are encouraged.

We expect all incoming students to have a strong background in physics, chemistry, and mathematics and to have, or to acquire, a broad grounding in fundamental earth sciences. We encourage applications from well qualified students with degrees in the other sciences and mathematics. Candidates for advanced degrees must pass a comprehensive written qualifying exam given at the beginning of the second semester. Candidates who do not have a previous bachelor's or master's degree in Geology or Geophysics may choose to take the written comprehensive exam in their second year.

Fellowships and/or tuition scholarships, which do not obligate a student to specific research projects are available for the first year of study. During the first year students select an advisor and a research project, and in the second and subsequent years they normally receive a stipend and tuition from external funds for specific research. Our degree programs require full time study and close interaction with faculty and fellow students for the optimum educational experience. Therefore, we do not encourage part-time students who will be concurrently

employed in full (or nearly full) time positions outside the university. As part of their training all graduate students are expected to satisfactorily perform a limited amount of teaching as assistants in Geology and Geophysics courses. These teaching requirements are unrelated to stipends or scholarships.

The general requirements for the M.A. and Ph.D. are similar. However, the Ph.D. demands the attainment of a significantly higher level of knowledge, research skills, and scholarly independence. Details of the requirements are contained in the departmental "Guidelines for Advanced Degrees in the Department of Geology and Geophysics" distributed to all incoming students, and are only summarized here. All university requirements apply. Most students can expect to spend at least two years beyond the bachelor's degree to complete requirements for the master's degree, and at least two years beyond the master's degree for the Ph.D. Students of exceptional ability with a bachelor's degree may be allowed to work directly toward the Ph.D. In this case, the course of study will be equivalent to that required for both degrees, and performance on the examinations and the thesis will be at the level required for the Ph.D.

Course requirements are flexible to meet the needs of individual students' programs. Each candidate must complete a course of study determined by his major professor and advisory committee and approved by the departmental Graduate Committee. Geology 403 is the only required course, but the course program for each degree must include 20 credit hours of course work at the 400 level and above, other than research courses. The department requires that a student maintain a grade point average of 3.0 (B) or better.

During the second semester of residence, all students must register for the preparation of a thesis proposal. The student must pass an oral qualifying exam based on the research proposal, before beginning the research program. The research program will culminate in a thesis representing an original contribution to science, which must be completed for publication. Finally, the research and the conclusions of the thesis must be successfully defended in an oral examination.

Geology Courses

101.F THE EARTH (3-3-4)

*** DISTRIBUTION COURSE: CATEGORY III.5**

Nature of the earth and the processes that change it. Laboratory includes the study of rocks, minerals, geological maps, air photos, and a one weekend field trip. Also offered as Geog 101.
Heymann, D., Dunbar, R.W.

102.S STRATIGRAPHY & HISTORICAL GEOLOGY (3-3-4)

*** DISTRIBUTION COURSE: CATEGORY III.5**

Global geography through time based on plate tectonic reconstructions; fundamentals of paleontological stratigraphy; sedimentation as it relates to stratigraphy; outcrop, well log, and seismic stratigraphy, and a summary of historical geology. Laboratory exercises include a one weekend field trip. Also offered as Geog 102.

Vail, P.

202.S GEOPHYSICS IN THE STUDY OF THE EARTH (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY III.5**

The historical development of geophysics. Application of geophysical methods to learn about the Earth's interior and to explore for oil and other minerals. (For coherent minors and non-majors.) Prereq- Geol 101 is recommended but not required.

Talwani, M.

214,S THE PLANETS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY III.5**

The physical, chemical, and geological development of the solar system from 4.6 billion years ago until today. All planets, their major satellites, comets, and asteroids will be discussed individually. (For coherent minors and non-majors.) Prereq- Geol 101.

Heymann, D.

311,F MINERALOGY (3-6-5)

*** DISTRIBUTION COURSE: CATEGORY III.5**

Introduction to crystallography, crystal chemistry, systematics and classification, physical and chemical properties, distribution, occurrence and genesis of minerals, and optical mineralogy.

Stormer, J., Sisson, V.

312,S PETROLOGY (3-3-4)

Description and interpretation of igneous and metamorphic rocks. Laboratory work emphasizes study of rock thin sections with petrographic microscope, and includes a one weekend field trip.

Wright, J.

331,F STRUCTURAL GEOLOGY (3-3-4)

Introduction to deformation mechanics, structural analysis of faults and folds, and elementary tectonics. Laboratory emphasizes practical use of structural analysis, and includes a one weekend field trip.

Oldow, J., Avé Lallemant, H.

332,S SEDIMENTOLOGY (3-3-4)

Processes in sedimentation and sedimentary rocks including both clastic and carbonate rocks. Laboratory exercises include a one weekend field trip.

Anderson, J., Droxler, A., Dunbar, R.B.

333,F STRUCTURAL GEOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY III.5**

Same course as Geol 331 without the laboratory. For non-majors only.

Oldow, J., Avé Lallemant, H.

334,S FIELD MAPPING TECHNIQUES (0-6-2)

Beginning field techniques taught in seven labs and seven field days plus class meetings. Geologic map and report to be submitted.

Oldow, J., Avé Lallemant, H.

341,F THE OCEANS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY III.5**

Introduction to oceanography; survey of the geological, physical, and biological aspects. For nonscience majors.

Anderson, J., Droxler, A., Dunbar, R.B.

352,S ENGINEERING GEOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY III.5**

Analysis, in terms of engineering and environmental applications, of earthquakes, faults, landslides, shorelines, ground water, subsidence, and other geologic phenomena. Techniques of engineering geology investigation.

Clark, H.

361,F GEOPHYSICS (3-3-4)

Description and analysis of gravity, magnetic, thermal, and seismic properties of the earth and their bearing on plate tectonics. Prereq- Masc 223 or Comp 211.

De Bremaecker, J.

390, Summer. FIELD GEOLOGY (0-18-6)

A six-week course in geology.

402,S PALEONTOLOGY (2-6-4)

Introduction to the taxonomy, systematics, morphology, ecology, paleoecology and correlation of fossils. Aspects of advanced historical geology will also be covered. Offered alternate years.

Anderson, J.

403,F ADVANCED PHYSICAL GEOLOGY (1-0-0)

Introduction to current research in geology. Each faculty member in department participates by describing his/her research and some of the techniques involved.

Staff

404,F MICROPALEONTOLOGY (2-6-4)

Study of microfossils: emphasis on identification, ecology, paleoecology, and biostratigraphy of radiolaria and foraminifera. Prerequisites: Geology 402 or permission of department. Not offered every year.

411,F METAMORPHIC PETROLOGY (3-3-4)

Evaluation of sub-solidus mineral equilibria through consideration of natural assemblages, thermodynamic calculations, and experiments. Labs will stress thin section petrography. Not offered every year.

Sisson, V.

412,S IGNEOUS PETROLOGY (3-3-4)

Evaluation of the evolution of igneous rocks in the earth's crust and mantle. Topics will include phase equilibria, experimental studies and geochemistry. Labs will stress thin section petrography. Not offered every year.

Stormer, J., Wright, J.

415,F ECONOMIC GEOLOGY—PETROLEUM (3-0-3)

A study of the geology of petroleum: origin, migration, and accumulation will be studied. Government regulation and industry economics will be examined. Not offered every year.

416,S ECONOMIC GEOLOGY—MINERAL DEPOSITS (3-0-3)

An overview of metallic and non-metallic mineral deposits, theories of their origin, and classification. The impact of government regulation, economics, production practices, and exploration will be considered. Not offered every year.

418,S GEOLOGICAL OCEANOGRAPHY (3-3-4)

Study of geological aspects of oceanography, including geomorphology, nearshore processes, seafloor spreading, plate tectonics, marine geophysics, marine sediments, and paleoceanography. Not offered every year.

Anderson, J., Dunbar, R.B., Droxler, A.

421,F DEEP SEA SEDIMENTS/PALEOCEANOGRAPHY (3-0-3)

Study of the Mesozoic and Cenozoic evolution of the ocean system based on the analyses of biogenic and terrigenous deep sea sediments. Prereq- Geol 332.

Droxler, A.

422,S EXPLORATION GEOPHYSICS (3-0-3)

Principles and procedures involved in geophysical exploration. Emphasis is on reflection seismology involving acquisition, processing, and interpretation of data. For non-geophysics majors only. Prereq- Math 212.

Seriff, A., Levander, A., Clark, H.

423,S ANTARCTIC MARINE GEOLOGY (3-0-3)

The study of marine geologic principles and processes using examples from the Southern Oceans. Not offered every year.

Anderson, J.

427,F SEQUENCE STRATIGRAPHY (3-0-3)

Principles of sequence stratigraphy (a new tool used to subdivide, correlate, and map sedimentary rocks within chronostratigraphically constrained genetic intervals) and its application to outcrop, well log, and seismic data.

Vail, P.

428,S GEOLOGIC INTERPRETATION OF REFLECTION SEISMIC PROFILES (3-3-4)

Discussion and application of seismic stratigraphic and structural interpretation procedures, including the integration of surface and subsurface data with seismic reflection profiles. Not offered every year.

Vail, P., Bally, A.

432,F MICROPALAEONTOLOGY AND WELL LOG SEQUENCE STRATIGRAPHY (3-0-3)

The basic concepts and procedures for interpreting stratigraphy on individual well logs and correlating between well logs. The fundamentals of micropaleontology and how micropaleontology is used to determine geologic age and environments of deposition. Well log sequence stratigraphic analysis is used to aid in the interpretation of depositional environments and lithofacies, tie in with seismic data, and correlate between wells. Not offered every year.

Vail, P., Wornardt, W.

438,S SEDIMENTARY GEOCHEMISTRY AND MINERALOGY (3-0-3)

Study of the chemistry of environments of formation of the major sedimentary minerals and rocks and secular variations through geologic history. Not offered every year.

Dunbar, R.B.

441,F GEOPHYSICAL DATA ANALYSIS (2-3-3)

Review complex variables, Fourier, Laplace, and Z-transforms; convolution, correlation, filtering, deconvolution, probability, sampling and aliasing, spectral estimation and discrete inverse theory. Computer based exercises. Prereq- Math 211.

Sawyer, D.

442,S EXPLORATION GEOPHYSICS (3-6-5)

Principles and procedures involved in geophysical exploration. Emphasis is on reflection seismology, involving acquisition, processing, and interpretation of data. Includes computer exercises. Prereq- Geol. 361.

Seriff, A., Levander, A., Clark, H., Sawyer, D.

452,F ADVANCED ENGINEERING GEOLOGY (3-0-3)

Consideration of methods and research in engineering geology. Application of geophysical techniques to specific problems will be emphasized. Students will work as teams on several field projects. Not offered every year.

Clark, H.

453,F CHEMISTRY OF THE EARTH (3-0-3)

An intermediate level, comprehensive geochemistry course with many problem solving exercises. Topics will include both high-pressure, high-temperature as well as low-temperature aqueous geochemistry.

Heymann, D.

459,F MODELS IN GEOLOGY (3-0-3)

Discussion of models in general; numerical solutions of heat transfer, folding, and convection problems. Prereq- Math 211, 212, Masc 223, 340. Not offered every year.

De Bremaecker, J.

461,F GEOPHYSICS: REFLECTION SEISMOLOGY (3-3-4)

Principles of elastic wave initiation, propagation, and reflection in ideal media and real rocks, with applications to exploration for hydrocarbons. Prereq- Math 211, Phys 101, 102. Math 212 recommended, may be taken concurrently. Not offered every year.

Levander, A., Seriff, A.

462,S GEODYNAMICS (3-0-3)

The forces which govern the motions and deformations in the earth, and how they are constrained by geophysical and geological measurements. Prereq- Math 211, 212; Geol 361. Not offered every year.

De Bremaecker, J., Sawyer, D.

463,F ADVANCED TECTONICS (3-3-4)

Mechanics of rock deformation in theory, in experiments, and in nature.

Avé Lallemant, H., Oldow, J.

464,S FUNDAMENTALS OF PLATE TECTONICS (2-3-3)

Introduction to plate tectonics theory concerning geometric constraints to plate motions, driving mechanism, behavior at plate boundaries, and intraplate tectonism. Not offered every year.

Oldow, J., Bally, A.

465,F/S COMPARATIVE PHANEROZOIC TECTONICS (3-3-4)

A synthesis of the Phanerozoic tectonic evolution of the earth. Global investigation of fold and thrust belts, their relationship to convergent plate boundaries, associated structural and stratigraphic relations, and the mechanics of deformation. Prereq- Geol. 464. Not offered every year.

Bally, A., Oldow, J., Avé Lallemant, H., Wright, J.

471,F GEOCHRONOLOGY (3-0-3)

An introduction to the principles and techniques of geochronology and isotope geology, including the Rb-Sr, Sm-Nd, U-Pb, K-Ar, and $^{40}\text{Ar}/^{39}\text{Ar}$ systems.

Wright, J., Heymann, D.

481,F SENIOR RESEARCH IN GEOLOGY (Variable)

Advanced work adapted to the needs of the individual student.

Staff

482,S SENIOR RESEARCH IN GEOLOGY (Variable)

See Geol 481.

Staff

491,F SPECIAL STUDIES (Variable)

Study in specific fields under the guidance of a staff member.

Staff

492,S SPECIAL STUDIES (Variable)

See Geol 491.

Staff

501,F SPECIAL STUDIES (Variable)

Advanced work in certain phases of geology adapted to the needs of individual graduate students. Prereq- permission of department.

Staff

502,S SPECIAL STUDIES (Variable)

See Geol 501.

Staff

503,Summer SPECIAL STUDIES (Variable)

See Geol 501.

Staff

504,F CLASTIC SEDIMENTARY ENVIRONMENTS, PROCESSES, AND FACIES (3-0-3)

Study of modern and ancient sedimentary environments with emphasis on field work. Depositional models examined in relation to climatic, oceanographic, and tectonic influences.

Anderson, J.

505,F APPLIED SEDIMENTOLOGY (1-6-3)

Field investigation of sedimentary deposits of northwestern New Mexico to provide graduate students in sedimentology with training in field methods, interpretation of sedimentary deposits, and facies mapping. Prereq- Geol 504. Not offered every year.

Anderson, J.

506,S CARBONATE SEDIMENTOLOGY (3-0-3)

Characterization of modern and ancient, shallow and deep sedimentary environments and facies. Examination of different depositional models in relation to climate, as well as hydrographic and geographic settings. Three field trips. Prereq- Geol 332.

Droxler, A.

511F-530S SEMINARS IN GEOLOGY (Variable)

Individual seminars cover different topics in different years and may be taken more than once.

Staff

535,F STABLE ISOTOPE GEOCHEMISTRY (3-0-3)

Review of basic principles of isotope fractionation mechanisms and distribution of isotopes with focus on significance to major geological problems. Not offered every year.

Dunbar, R.B.

537,F ADVANCED SEDIMENTARY GEOLOGY (3-3-4)

Lecture, lab, and field problems focusing on sedimentology and sedimentary petrography. Not offered every year.

Staff

539,F ADVANCED PETROLOGY (3-3-4)

Advanced topics in igneous and metamorphic petrology with emphasis on interests of the staff. Modern developments are rigorously examined in physico-chemical terms. Not offered every year. May be taken more than once. Prereq- Geol 412 or equivalent.

Stormer, J., Leeman, W., Wright, J.

540,S ADVANCED PETROLOGY (3-3-4)

See Geol 539.

Stormer, J., Leeman, W., Wright, J.

542,S ADVANCED REFLECTION SEISMOLOGY (3-0-3)

Review of elastodynamics. Calculation of synthetic seismograms for acoustic and elastic media using reflectivity, asymptotic and finite difference methods. Migration of reflection data by finite difference, FK and boundary integral methods. Prereq- Geol 441, 442, 461.

Levander, A.

550,S ADVANCED MINERALOGY AND CRYSTAL CHEMISTRY (3-0-3)

Advanced topics in crystal structure, chemistry, thermodynamics and solution models. Detailed examination of important mineral groups such as feldspars, oxides, carbonates, phyllosilicates, etc. Not offered every year.

Stormer, J.

561,F ADVANCED TOPICS IN GEOPHYSICS (3-0-3)

Content varies from year to year: Convection, advanced wave propagation, tectonophysics, inverse problems, etc. May be taken more than once. Not offered every year.

De Bremaecker, J., Levander, A.

562,S ADVANCED TOPICS IN GEOPHYSICS (3-0-3)

See Geol 561.

De Bremaecker, J., Levander, A.

566,S EXPERIMENTAL STRUCTURAL GEOLOGY (3-3-4)

Selected topics, such as elasticity and plasticity of minerals and rocks. Laboratory work includes experimental rock deformation. Not offered every year.

Avé Lallemant, H.

568,S STRUCTURAL ANALYSIS OF DEFORMED ROCKS (3-3-4)

Studies of structures, textures, and petrofabrics of deformed rocks, stress and strain analysis. Not offered every year.

Avé Lallemant, H.

572,S INTRODUCTION OF INDUCTIVELY COUPLED PLASMA SPECTROSCOPY (2-2-2)

An applied workshop on the theory and application of ICP spectroscopy with emphasis on practical experience in quantitative analysis. Prerequisites: approval of instructor. Not offered every year.

Leeman, W.

574,S ELECTRON MICROPROBE/SCANNING ELECTRON MICROSCOPE: THEORY (2-2-2)

Principles, techniques, and applications of the Electron Microprobe/SEM. Emphasis on quantitative analysis and geological problems. Practical laboratory instruction and experience in analytical techniques.

Stormer, J.

579,F PREPARATION OF M.A. THESIS PROPOSAL (0-9-3)

Students may not receive credit for both Geol 579 and 580.

Staff

580,S PREPARATION OF M.A. THESIS PROPOSAL (0-9-3)

See Geol 579.

Staff

589,F PREPARATION OF PH.D. THESIS PROPOSAL (0-9-3)

Students may not receive credit for both Geol 589 and 590.

Staff

590.S PREPARATION OF PH.D. THESIS PROPOSAL (0-9-3)

See Geol 589.

Sta

800,F/S/Summer THESIS RESEARCH (Variable)

Sta

Geography Courses

101,F THE EARTH (3-3-4)

* DISTRIBUTION COURSE: CATEGORY III.5

Nature of the earth and the processes that change it. Laboratory includes the study of rocks, minerals, geological maps, air photos, and a one weekend field trip. Also offered as Geol 101.

Heymann, D., Dunbar, R.W.

102.S STRATIGRAPHY & HISTORICAL GEOLOGY (3-3-4)

* DISTRIBUTION COURSE: CATEGORY III.5

Global geography through time based on plate tectonic reconstructions; fundamentals of paleontological stratigraphy; sedimentation as it relates to stratigraphy, outcrop, well log and seismic stratigraphy, and a summary of historical geology. Laboratory exercises include a one weekend field trip. Also offered as Geol 102.

Vail, P.

German and Slavic Studies

Professor E. M. Thompson, Chair
Professors S. L. Clark, Copeland, Eifler,
Weissenberger, J. B. Wilson, and Winkler
Visiting Professor A. Semczuk
Associate Professor R. G. Jones
Visiting Assistant Professor Joel Golb
Lecturers Barry and A. N. Hill

German

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. Students majoring in German may pursue either of two options: German literature or German studies.

For an option in **German literature** the requirements are:

1. Completion of a program approved by the Department.
2. The equivalent of at least 24 semester hours (eight courses) numbered 300 or higher.

The Department recommends related courses in linguistics, history, philosophy, and other literatures.

For an option in **German studies** the requirements are:

1. Completion of a program which has been defined in close cooperation with the German departmental undergraduate adviser.

2. The equivalent of at least 18 semester hours (six courses) in courses numbered 300 or higher.
3. At least 12 semester hours (four courses) in courses relating to the field of German in other departments. Courses in translation offered by the Department pertaining to German culture and civilization count toward the fulfillment of the area requirement.

This option in German studies, which permits maximum flexibility within a frame of clearly defined objectives, allows an interdisciplinary approach to German affairs. The student can incorporate into the study of German language and literature subject-related courses in political science, history, musicology, art history, philosophy, and economics. The option in German studies is designed for students who are preparing for a career in international law, business, banking, or diplomacy and for graduate study in a variety of fields such as history, political science, library science, art history, etc.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Honors Program. The department offers a special program for outstanding students consisting of independent readings and research which must lead to a substantial honors essay under the supervision of a departmental faculty member. Admission is decided in the second semester of a student's sophomore year.

German Literature in Translation. Courses in German literature in translation (Germanics") are open to undergraduate students from all disciplines. Readings and discussions are in English. These courses may be repeated for credit.

Requirements for the Degree of Master of Arts:

1. Completion with high standing of a program approved by the Department. Normally, this includes 24 semester hours at the graduate level.
2. Satisfactory performance on a reading examination in one foreign language other than German approved by the Department.
3. Completion of an acceptable thesis.
4. Satisfactory performance on a final oral examination on the thesis and related topics.

Requirements for the Degree of Doctor of Philosophy:

1. Completion with high standing of a program approved by the Department. Normally, this includes 45 semester hours at the graduate level, including those required for the degree of Master of Arts.
2. Satisfactory performance on a reading examination in two foreign languages other than German approved by the Department.
3. Satisfactory performance on a preliminary written and oral examination on the general field of German studies; this examination is based in part on a reading list provided by the Department.
4. Completion of a dissertation approved by the Department; the dissertation is expected to represent an original contribution to knowledge.
5. Satisfactory performance on a final oral examination on the dissertation and related fields.

Note: Requirements 1 and 2 must be met at least a year before the submission of a dissertation.

As part of their training, graduate students, regardless of the type of appointment, will be required to perform some duties, such as assisting in classes, the language laboratory, research, and other activities suggested by the department.

Scholarships: Available for German language studies from the Dr. and Mrs. Earl Douglas Mitchell Fellowship Fund and the Max Freund Prize.

German Courses

101,F/S ELEMENTARY GERMAN (3-1-4)

* DISTRIBUTION COURSE: CATEGORY I.1

NOTE: 102 must be completed to receive dist. credit for 101. Introductory German with emphasis on speaking and reading. The course is supplemented by language laboratory work.
Clark, S., St

102,F/S ELEMENTARY GERMAN (3-1-4)

* DISTRIBUTION COURSE: CATEGORY I.1

See Germ 101.

Clark, S., St

201,F/S INTERMEDIATE GERMAN (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Grammar, conversation, and extensive reading supplemented by films and language laboratory work.

Eifler, M., St

202,F/S INTERMEDIATE GERMAN (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Intermediate language skills with readings and discussion of literary texts and related materials. Prereq- Germ 201, or equivalent.

Eifler, M., St

209,F/S INDEPENDENT WORK (Credit variable)

Lamb-Faffelberge, M., St

302,F ADVANCED SCIENTIFIC GERMAN I (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Readings in German computer language. Open to all students with second-year competence.
Wilson

305,F COMPOSITION & CONVERSATION I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

A variety of reading materials serves as the basis for discussions and compositions. Prereq- second-year competence.

Weissenberger,

306,S COMPOSITION & CONVERSATION II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

A variety of reading materials serves as the basis for discussions and compositions. Prereq- second-year competence. Sources rest on journals, film, and audio-taped materials.

Eifler,

11,F SURVEY OF GERMAN LITERATURE (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

German 311 is an introduction to the historical development of German literature; the description, interpretation, and analysis of literature and literary trends through the nineteenth century. Not offered this year.

Winkler, M.

12,S SURVEY GERMAN LITERATURE II (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Not offered this year.

Winkler, M.

71,F GERMAN LITERATURE 1900-1945 (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Concentrates on the Literature of German Expressionism and the Weimar Republic.

Winkler, M.

72,S GERMAN LITERATURE SINCE 1945 (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Authors who began their careers after 1945; for example, Böll, Grass, Dürrenmatt, Weiss.

Winkler, M.

78,F NEW GERMAN CINEMA (3-0-3)

DISTRIBUTION COURSE CATEGORY I.1

Critical assessment of contemporary German filmmakers, such as Fassbinder, Herzog, Luge, Wenders, Export, Ottinger, Sander, Trotta.

Eifler, M.

91,F SPECIAL TOPICS: (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1.

Topic in 1989/90: Reading German script. Transliteration and translation of 19th century manuscripts.

Wilson, J.

92,S SPECIAL TOPICS: (3-0-3)

DISTRIBUTION COURSE CATEGORY I.1.

Topic in 1989/90 is: The German Short Story. Topic changes from year to year. May be repeated for credit.

Weissenberger, K.

01,F/S INDEPENDENT WORK IN GERMAN LITERATURE (credit variable)

Qualified students work on projects of their choice under the supervision of individual instructors with approval of the Undergraduate Advisor.

Staff

11,S INTRODUCTION TO MIDDLE HIGH GERMAN (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Middle High German Language and representative works from literature of the courtly period (twelfth and thirteenth centuries). Open to graduate students for credit. Not offered this year.

Clark, S., Staff

21,S GERMAN LITERATURE OF THE RENAISSANCE AND REFORMATION (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Major aspects of German literature from 1400 to 1600. Open to graduate students for credit.

Clark, S.

328 COURSES OF INSTRUCTION

422,S GERMAN LITERATURE OF THE BAROQUE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

German literature of the seventeenth century. Open to graduate students for credit. Not offered this year.

Clark, S

433,S LINGUISTIC STRUCTURE OF GERMAN (3-0-3)

Also offered as Ling 433.

Copeland, J

434,F HISTORY OF THE GERMAN LANGUAGE (3-0-3)

Aspects of the history of German phonology, syntax, and semantics (with related systems from its Proto-Indo-European origins to the present. Not offered this year. Also offered as Ling 434.

Copeland, J

435,S TOPIC IN GERMANIC LINGUISTICS: (3-0-3)

Topic changes from year to year. Not offered this year. Also offered as Ling 435.

Copeland, J

437,S THE INTERACTION OF GERMAN AND WENDISH (SORBIAN) IN TEXAS (3-0-3)

Transliteration and Translation of 19th century manuscripts. Acquaintance with a Slavic language required. Also offered as Slavic 437.

Wilson, J

500,F/S GRADUATE RESEARCH (Credit variable)

Graduate research and thesis in partial fulfillment for the degree of Master of Arts.

Sta

511,F/S GRADUATE WORK-GERMAN LITERATURE (Credit variable)

With approval of the Graduate Advisor.

Sta

512,F/S GRADUATE INDEPENDENT WORK (Credit variable)

With approval of the Graduate Advisor.

Sta

522,S OLD HIGH GERMAN (3-0-3)

Language and literature of the Old High German period (eighth to eleventh centuries); text from the pagan and the monastic traditions.

Wilson, J

524,S OLD ICELANDIC (3-0-3)

The earliest Scandinavian language and literature: runic inscriptions, the prose sagas of the Viking era, the Eddic poetry of Germanic gods and heroes. Not offered this year.

Wilson, J

531,F LINGUISTIC STRUCTURE—GERMAN (3-0-3)

Synchronic study of Modern German syntax, phonology, and semantics, including discourse structure. Also offered as Ling 433.

Sta

561,F LYRIC POETRY: HISTORY & THEORY (3-0-3)

Introduction to the major modes of criticism.

Winkler, M

562,S GERMAN LITERATURE 1933-45 (3-0-3)

Third Reich, "Inner Emigration", Exile.

Winkler, M.

563,F SEMINAR IN LITERARY GENRES (3-0-3)

Topic 1989-90: Non-Fictional Prose.

Weissenberger, K.

565,F SPECIAL TOPICS (3-0-3)

Not offered this year.

Staff

566,S SPECIAL TOPICS (3-0-3)

Not offered this year.

Staff

571,F/S SEMINAR IN 18TH & 19TH CENTURIES (3-0-3)

Specific aspects, problems, and authors of the period. Not offered this year.

Staff

572,S SEMINAR IN 19TH & 20TH CENTURIES (3-0-3)

Specific aspects, problems, and authors of the period. Topic 1989/90: Modern German novel.

Eifler, M.

591,F 592,S SELECTED PROBLEMS IN MODERN LITERATURE (3-0-3)

Not offered this year.

Staff

590,F/S GRADUATE RESEARCH (Credit variable)

Graduate research and dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Staff

590 GRADUATE SUMMER RESEARCH (Credit variable)

Staff

590,F/S GRADUATE RESEARCH (Credit variable)

Staff

Germanics Courses

101,F BEGINNING GERMANIC LANGUAGE (3-1-4)

DISTRIBUTION COURSE: CATEGORY I.1

NOTE: 102 must be completed to receive dist. credit for 101.

Introductory study of a Germanic language (Danish, Dutch, Norwegian, Swedish) with emphasis on speaking and reading. Topic in 1989/90: Beginning Swedish.

Wilson, J.

102,S BEGINNING GERMANIC LANGUAGE (3-1-4)

DISTRIBUTION COURSE: CATEGORY I.1

See Gman 101.

Wilson, J.

313,F/314,S STUDIES IN GERMAN CULTURE IN TRANSLATION (3-0-3)

Not offered this year.

Staff

330 COURSES OF INSTRUCTION

321,F/S VIKING LITERATURE IN TRANSLATION (3-0-3)

Not offered this year.

Wilson, S.

351,F GREAT GERMAN AUTHORS OF THE TWENTIETH CENTURY IN TRANSLATION (3-0-3)

Topic changes from year to year. May be repeated for credit. Not offered this year.

Staff

352,S GREAT GERMAN AUTHORS OF THE TWENTIETH CENTURY IN TRANSLATION (3-0-3)

See Gman 351. Not offered this year.

Staff

361,F SPECIAL TOPICS IN MODERN GERMAN LITERATURE IN TRANSLATION (3-0-3)

Topic changes from year to year. May be repeated for credit. Not offered this year.

Staff

362,S SPECIAL TOPICS IN MODERN GERMAN LITERATURE IN TRANSLATION (3-0-3 each semester)

See Gman 361. Not offered this year.

Staff

376,F/S GERMANY TODAY: EAST AND WEST (3-0-3)

Comparative study of the two German states. Reading materials include documentary and literary texts. Not offered this year.

Eifler, M.

391,F SPECIAL TOPICS IN GERMAN LITERATURE IN TRANSLATION (3-0-3)

Topic changes from year to year. May be repeated for credit. Not offered this year.

Staff

392,S SPECIAL TOPICS IN GERMAN LITERATURE IN TRANSLATION (3-0-3)

See Gman 391. Not offered this year.

Staff

406,F/S MAJOR TRENDS IN GERMAN LITERATURE FROM THE MIDDLE AGES THROUGH ENLIGHTENMENT IN TRANSLATION (3-0-3)

Topic changes from year to year. May be repeated for credit. Not offered this year.

Clark, S.

407,F GERMAN LITERATURE OF THE MIDDLE AGES IN TRANSLATION (3-0-3)

DISTRIBUTION COURSE: CATEGORY I.1

Topic changes from year to year. Topic 1989/90: Epic and Romance.

Clark, S.

Slavic Studies

Degrees offered: B.A.

Undergraduate Program. At least 24 semester hours (eight courses) offered in fulfillment of major requirements must be numbered 300 or higher. Double majors may be allowed to take 18 semester hours (six courses numbered 300 or higher) with the approval of the Department and should consult with the Slavic Studies staff to arrange a program compatible with the other major. Four of the courses may be language courses with the remainder literature or culture; these may be chosen by the student with the adviser's consent. All departmental majors must have their programs approved by the representative of the Department.

No Russian is required for nonmajors who wish to take courses in Slavic or Russian Literature. Lectures and readings are in English. Majors are required to read some of the works and to write assigned papers in Russian.

Scholarships: Available for Slavic language studies from the Dr. and Mrs. Earl Douglas Mitchell Fellowship Fund.

Slavic Courses

101,F BEGINNING SLAVIC LANGUAGE (3-1-4)

DISTRIBUTION COURSE: CATEGORY I.1

NOTE: 102 must be completed to receive dist. credit for 101.

Introductory study of a Slavic language other than Russian (Polish, Czech, Ukrainian) with emphasis on speaking and reading. Not offered every year. Topic in 1989-90: Beginning Polish.

Semczuk, A.

102,S BEGINNING SLAVIC LANGUAGE (3-1-4)

DISTRIBUTION COURSE: CATEGORY I.1

See Slav. 101.

Staff

242,S SPECIAL TOPICS IN SLAVIC STUDIES (3-0-3)

May be repeated for credit. Permission of instructor required. Topic in 1989-90: Drama Practicum.

Hill, A.

320,S SLAVIC CIVILIZATION (3-0-3).

Development of Slavic cultures, with emphasis on the modern period.

Thompson, E.

437,S THE INTERACTION OF GERMAN AND WENDISH (SORBIAN) IN TEXAS (3-0-3)

Transliteration and translation of 19th century manuscripts. Acquaintance with a Slavic language required. Also offered as Germ 437.

Wilson, J.

450,F/S INDEPENDENT STUDY (3-0-3).

Qualified students may conduct research and write a paper on a topic of particular interest.

Staff

Russian Courses

332 COURSES OF INSTRUCTION

101,F ELEMENTARY RUSSIAN I (3-2-4)

* DISTRIBUTION COURSE: CATEGORY I.1

NOTE: 102 must be completed to receive dist. credit for 101. Fundamentals of Russian grammar. Pronunciation, reading, oral practice, and translation.

Staff

102,S ELEMENTARY RUSSIAN II (3-2-4)

* DISTRIBUTION COURSE: CATEGORY I.1

See Russ 101.

Jones, R.

201,F INTERMEDIATE RUSSIAN I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Grammar review, reading of selected texts, conversation, and composition.

Hill, A.

202,S INTERMEDIATE RUSSIAN II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

See Russ 201.

Hill, A.

301,F CONVERSATION & COMPOSITION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Emphasis on composition and conversation with reading of relevant texts.

Hill, A.

302,S CONVERSATION & COMPOSITION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

See Russ 301.

Hill, A.

312,F/S SURVEY OF RUSSIAN LITERATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Comprehensive survey of Russian literature from the 18th century to the Soviet period. No knowledge of Russian required. Not offered this year.

Thompson, E.

351,F TOLSTOY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Study of the major works of Tolstoy. No knowledge of Russian required. Not offered this year.

Thompson, E.

352,F DOSTOEVSKY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Study of the major works of Dostoevsky. No knowledge of Russian required. Not offered this year.

Thompson, E.

401,F RUSSIAN STYLISTICS I (3-0-3)

Designed to improve the spoken and written language with emphasis on syntactic and idiomatic structures. Weekly papers required.

Semczuk, A.

402,S RUSSIAN STYLISTICS II (3-0-3)

See Russ 401.

Thompson, E.

411,F RUSSIAN LITERATURE OF THE SOVIET PERIOD (3-0-3)*Semczuk, A.***412,F/S SOLZHENITSYN AND THE DISSIDENTS (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Study of the life and works of Solzhenitsyn and of the dissident movement in post-Stalin Russia. No knowledge of Russian required. Not offered this year.

*Staff***420,F/S WOMEN IN RUSSIAN LITERATURE (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

The portrayal of women in major works of Russian literature. No knowledge of Russian required. Not offered this year.

Staff

History

Professor Van Helden, Chair

Professors Boles, Drew, Gruber, Haskell, Hyman, Loewenheim,

Matusow, Odhiambo, R.J. Smith, Stokes, and Wiener

Associate Professors Cox, Seed and Wolin

Assistant Professors Fishman, Maas, Quillen, and Sanders

Mellon Assistant Professor Kahan

Lecturers Avé Lallemand, Zammito, and Zdatny

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. A student majoring in history must take a minimum of 30 semester hours (ten courses) in history, of which 18 semester hours (six courses) must be on the advanced level (300 or 400). Two of the student's advanced courses must be chosen from a departmental list of seminars/colloquia devoted mainly to writing and discussion. In addition, students are expected to distribute their ten courses over four fields:

I. Ancient-Medieval: one course minimum

II. Modern Europe: two courses minimum

III. United States: two courses minimum

IV. Asia, Latin America, Africa: one course minimum

History majors also are advised to acquaint themselves with humanistic disciplines other than history (for example, literature, fine arts, and philosophy) and also with social sciences such as political science, sociology, economics, and anthropology, whose contributions to historical studies are vital. Some foreign language proficiency is desirable for a history major, and the department highly recommends that students contemplating graduate work in history study at least one foreign language in some depth (most graduate schools require a reading knowledge of French and German for the Ph.D. degree).

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Graduate Program. Graduate students in history are accepted for study leading to either the M.A. or Ph.D. Holders of the B.A. degree (or its equivalent) from an acceptable institution are eligible to apply. The graduate program is designed to train a limited number of carefully selected students. Both the M.A. and the Ph.D. degrees are offered in limited areas of American, European and other history. Further information about the fields may be obtained on request from the department.

Graduate fellowships as well as graduate scholarships within the limits of available funds are awarded to qualified students with demonstrated ability. Fellowships include a stipend and a waiver of tuition; scholarships provide a waiver of tuition only. As a part of their training, all graduate students are expected to render limited services to the department as tutorial instructors, as research assistants, or as assistants to the editors of the *Journal of Southern History* or *The Papers of Jefferson Davis*, both of which are sponsored by Rice University.

Requirements for the Degree of Master of Arts. Candidates for the M.A. degree are expected to complete a certain amount of formal class or seminar work, usually 24 semester hours; take one graduate colloquium and one graduate seminar; and write a thesis under the direction of an advisory committee of the department headed by a professor having special competence in the subject area of the thesis. An oral defense of the thesis is also required. Completion of these requirements usually takes two years. Not more than three years may elapse between the time the student is admitted to graduate study and the completion of the degree, unless an extension is approved by the departmental graduate committee. An alternate M.A. degree is available to doctoral students who fulfill the special requirements set by the department.

Requirements for the Degree of Doctor of Philosophy. Candidates for the Ph.D. degree are expected to prepare themselves for a qualifying examination in three fields, at least two of which must be in the major area of concentration (European, American, or other history). The two fields in the major area of concentration should include one broadly defined field and one more narrow concentration within that broad area (e.g., U.S. history and slavery; modern European history and the Hitler era; Latin American history and capitalism in the modern world). If the major area is European history, the third field must be in American history; if the major area is in American history, the third field must be in European history. If the major area is outside American or European history, the third field must be in either American or European history. Preparation for this qualifying examination (the passing of which qualifies the student to apply for formal admission to candidacy for the Ph.D. degree) normally includes course work, directed reading, and a substantial amount of independent reading. This work must also include at least two graduate colloquia and two graduate seminars. The department has no specific requirements for the number of hours that must be completed, but Ph.D. students are expected to remain full-time students from their entry into the program until they pass their qualifying examination. The qualifying examination usually is oral, though it may be written or both written and oral at the discretion of the department. It is given only after the student has completed all necessary course and seminar work and passed reading examinations in the principle language of research (unless it is English) and one other language (not English). Students should take the qualifying examination before the beginning of their sixth semester and must take it before the beginning of the seventh semester. In addition to the foreign language examinations and the qualifying examination, the Ph.D.

candidate must present a dissertation embodying the results of original research and defend it in a public oral examination. This dissertation must be completed within three calendar years after passing the qualifying examination, unless an extension is granted by the departmental graduate committee.

History

History Courses

101,F EUROPE'S FIVE HUNDRED YEARS, 1450-1815 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

How was the world so thoroughly reshaped by the European experience? A comprehensive attempt to answer that question. Recommended for Freshman and Sophomores. Offered with additional work as Hist 301.

Mr. Stokes

102,S EUROPE'S FIVE HUNDRED YEARS, 1815-1980 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

Continuation of Hist 101. Both courses can be taken separately. Recommended for Freshmen and Sophomores. Offered with additional work as Hist 302.

Mr. Stokes

105,F VARIETIES OF THE AMERICAN EXPERIENCE I (3-0-3)

Interpretive approaches to American history. Not offered 1989-90.

Staff

106,S VARIETIES OF THE AMERICAN EXPERIENCE II (3-0-3)

Interpretive approaches to American history. Not offered 1989-90.

Staff

152,S FRESHMAN SEMINAR IN ANCIENT HISTORY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

The Hero and his Companion from Gilgamesh to Sam Spade. How does presentation of heroic action illustrate the basic values of a society? Through consideration as historical sources of several ancient texts, modern mystery stories, and two "western" movies, we will see the development of a style of community service that links heroism with alienation. The extent to which women participate will be traced. Interested students must see Professor Maas by the end of the Fall semester. Limited enrollment.

Mr. Maas

154,S LIFE OF MUHAMMAD (Freshman seminar) (3-0-3)

*** DISTRIBUTION COURSE ***

An examination of the life of the Prophet Muhammad in the context of Islamic history and the growth of Islamic tradition, as well as the Western view of Muhammad and Islam. We will be reading classical and modern Arabic biographies of Muhammad in translation as well as some Western polemical treatises on Muhammad and the responses to them from the Islamic world. (Limited to 15 students)

Ms. Sanders

201,F INTRODUCTION TO ANCIENT HISTORY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

Why are the ancient civilizations of the Near East, Greece, and Rome important, and how do we go about studying them? This course surveys major contributions of the ancient world to western civilization and examines the premises of modern interpretations.

Mr. Maas

336 COURSES OF INSTRUCTION

202,S MEDIEVAL HISTORY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

A history of the late Roman Empire and the Middle Ages covering the period approximately from the fourth century to the end of fifteenth.

Ms. Drew

206,S INTRODUCTION TO ASIAN CIVILIZATIONS (3-0-3)

*** DISTRIBUTION COURSE ***

Introduction to the great cultural traditions of Asia, past and present, with emphasis on evolving religious and philosophical traditions, artistic and literary achievements, and patterns of political, social, and economic change. (Also Hu. 211)

Mr. Smith, Mr. Wilson, Mr. Klein

211,F AMERICAN THOUGHT AND SOCIETY I (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

A topical introductory survey of seventeenth- and eighteenth-century American history, primarily concerned with intellectual and social developments underlying the surface of events. Offered with additional work as History 311. Not offered 1989-90.

Mr. Haskell

212,S AMERICAN THOUGHT AND SOCIETY II (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

A topical introductory survey of nineteenth and twentieth century American history, primarily concerned with intellectual and social developments underlying the surface of events. Offered with additional work as Hist 312. Not offered 1989-90.

Mr. Haskell

213,S SLAVERY IN NORTH AMERICA (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

An interdisciplinary examination of all aspects of United States slavery, from the African background through emancipation. Offered with additional work as Hist 413. Not offered 1989-90.

Mr. Boles

214,S HISTORY OF RELIGION IN AMERICA (3-0-3)

A survey from Pilgrim beginnings to modern revivalism. Not offered 1989-90.

Mr. Boles

215,F BLACKS IN THE AMERICAS (3-0-3)

*** DISTRIBUTION COURSE ***

A survey of the history of Blacks in the New World from 1619 to the present. Offered with additional work as Hist 315.

Mr. Cox

223,F HISTORY OF SCIENCE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

A broad survey of the development of scientific ideas and methods from the ancient Greeks to the end of the seventeenth century. No expertise in science required. Not offered 1989-90.

Mr. Van Helden

224,S HISTORY OF MODERN SCIENCE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

A broad survey of the development of scientific ideas and methods since about 1700. No expertise in science required.

Mr. Van Helden

231,F AFRICA TO 1884 (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

This survey course covers: the changing historiography of Africa; the emergence of the Bantu; early Christianity and Islam; trans-Saharan trade; the medieval Sudanic Empires; Statelessness and State formation; Portugal in Africa; the slave trade; South Africa to 1867; the Mfecane; the Sudanic jihads; long distance trade; African-European relations in the 19th century.

Mr. Odhiambo

232,S THE MAKING OF MODERN AFRICA (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

This course surveys the transformation of Africa from the late 19th century to the present. The topics covered include: Europe and Africa in the 19th century; the scramble for and partition of Africa; the evolution of the colonial state; economic change in the 20th century: plantation and peasant agriculture, mining and industrialization, wage and migrant labor, African capitalism, rural differentiation, the roots of hunger and poverty; social change in the 20th century: the invention of ethnic identity, the emergence of elites, cultural policies—language, leisure, the changing roles of women, religion and cultural resistances, the rival conceptions of law and order, changes in medicine and healing, urbanization; political developments: ethnic unions, political parties, and decolonization; Africa since independence: the economic and political crises.

Mr. Odhiambo

242,S SOUTHERN AUTOBIOGRAPHY (3-0-3)

The autobiography as a genre of historical documentation for U.S. southern history. The autobiographies discussed will cover the nineteenth and twentieth centuries and represent most segments of the population. Not offered 1989-90.

Mr. Boles

244,S INTRODUCTION TO WOMEN'S HISTORY (3-0-3)*** DISTRIBUTION COURSE ***

What does it mean to study women's history? Is women's history the same thing as the history of women? This course examines both the range of approaches and the types of evidence used by scholars in the field. We will also discuss the relationship of women's history to several related fields, including feminist theory, gender studies, and the history of sexuality. Offered with additional work as Hist 344.

Ms. Quillen

250,S CHINESE CULTURE (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

An introduction to the language, philosophy, religion, art, literature, and social customs of China. Offered with additional work as Hist 450.

Mr. Smith

257,F TECHNOLOGY AND WORLD HISTORY (3-0-3)

An examination of the technological dimension of human culture from the Paleolithic era to the eve of the Industrial Revolution, ca. 1750; a comparative approach. Offered with additional work as History 357. Not offered 1989-90.

Mr. Van Helden

258,S TECHNOLOGY AND THE CONTEMPORARY WORLD (3-0-3)

An examination of how the Western world has been changed by technology and science since 1750, and how other societies have incorporated Western technology, or parts of it, into their cultures. Offered with additional work as History 358. Not offered 1989-90.

Mr. Van Helden

261,F HISTORY OF ENGLAND: FROM THE REFORMATION TO 1815 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

The personalities and forces that changed England from a backwater of Europe into the leading nation in the world. Lectures, discussions, and frequent short papers. Offered with additional work as Hist 361. Not offered 1989-90.

Mr. Wiener

262,S HISTORY OF ENGLAND: FROM 1815 TO THE PRESENT (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

England's "take-off" into the Industrial Revolution and how it has adapted to it. The twentieth century decline. Novels, biographies, and other materials are used to examine the transformation of British 73 society in the past two centuries. Lectures, discussions, and frequent short papers. Offered with additional work as Hist 362.

Mr. Wiener

265,S CONTEMPORARY HISTORY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

Our own years in historical perspective. The world since Nixon and Kissinger. Reading includes latest memoirs and biographies, leading newspapers and periodicals, also television and radio news.

Mr. Loewenheim

269,S U.S. LATIN AMERICAN RELATIONS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

This course is a basic history of U.S.-Latin American Relations from 1775 to the present. Particular attention is given to twentieth century policies and problems focusing on intervention since 1945. Offered with additional work as Hist 469.

Ms. Seed

271,F HISTORY OF FRANCE TO 1815 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

The first part of a two-semester survey of French history focusing on the structures of French society and the crash of the Old Regime. Offered with additional work as Hist 371. Not offered 1989-90.

Mr. Zdatny

272,S HISTORY OF FRANCE SINCE 1815 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

Revolutions, industrialization, civil wars, culture, cuisine, the fall from Great Power status—and why the French are still sensitive about it. Offered with additional work as Hist 372. Not offered 1989-90.

Mr. Zdatny

273,F HISTORY OF THE JEWISH PEOPLE I: 70 to 1492 (3-0-3)

*** DISTRIBUTION COURSE ***

Examination of the social, political, economic and theological contexts which shaped Jewish life under the rule of Romans, Christians and Muslims, and of developments in Jewish culture during this period in the areas of rabbinics, liturgy, poetry, philosophy and mysticism. Lecture and discussion of primary sources in translation. Offered with additional work as Hist 373.

Ms. Fishman

274.S HISTORY OF THE JEWISH PEOPLE II: 1492 TO 1882 (3-0-3)*** DISTRIBUTION COURSE ***

Evolution and revolution in Jewish life under the impact of the Reformation, Sabbatean messianic movement, Hasidism, Enlightenment, Emancipation and nationalism. Reform, positive-historical (i.e., Conservative), Neo-Orthodox and Zionist re-definitions of Jewish identity. Lecture and discussion of primary source readings in translation. Offered with additional work as Hist. 374.

Ms. Fishman

275.F SOCIAL HISTORY OF MODERN EUROPE (3-0-3)*** DISTRIBUTION COURSE ***

Once upon a time life was simpler, work more satisfying, families more cohesive, God more loved and feared. No. Once life was precarious and cheap, epidemics and starvation rampant; old women burned at the stake, and surgeons prescribed leeches. Then came industry, science, urbanization, mass literacy, and Geraldo. From the 17th through the 20th century we will pursue the changes in the structures and mentalities of the lives of ordinary people. Offered with additional work as Hist 375.

Mr. Zdatny

281.F HISTORY OF THE ISLAMIC NEAR EAST, 600 - 1258 (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

A survey of the basic political, institutional, and social history of the Near East from the rise of Islam to the Seljuks. We will pay particular attention to the elaboration of political and religious institutions (especially the caliphate), the origins and rise of Shii Islam, the growth and subsequent fragmentation of the caliphal empires, and the advent of the Turkic peoples. (lecture/discussion) Offered with additional work as Hist 381.

Ms. Sanders

282.S HISTORY OF THE ISLAMIC NEAR EAST, 1258 - 1805 (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Continues the first semester survey from the advent of the Seljuk Turks to the Ottoman conquest of Egypt. It includes discussion of the fate of the caliphate after the political fragmentation of the Abbasid empire, the rise of the mamluk military system, Mongols, Crusades, and the early history of the Ottoman and Safavid empires. Lecture/discussion. Hist 281 is recommended, but not required. Offered with additional work as Hist 382.

Ms. Sanders

293.F THE ART OF WAR FROM ALEXANDER TO NAPOLEON (3-0-3)

A study of the theory and practice of warfare from the classical age to the early nineteenth century. Reading includes selections from Thucydides, Caesar, Machiavelli, Saxe, and Napoleon. Also offered with additional work as History 393. Not offered 1989-90.

Mr. Gruber

294.S WAR IN THE MODERN WORLD (3-0-3)

The theory, practice, and experience of war in the nineteenth and twentieth centuries. Reading includes selections from Clausewitz and Liddell Hart. Offered with additional work as History 394. Not offered 1989-90.

Mr. Gruber

297.F CONSTITUTIONAL AND LEGAL HISTORY OF THE U.S. I (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Major questions in the historical development of American law and governing institutions. Offered with additional work as Hist 397.

Mr. Hyman

298.S CONSTITUTIONAL AND LEGAL HISTORY OF THE U.S. II (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Major questions in the historical development of American law and governing institutions. Offered with additional work as Hist 398.

Mr. Hyman

340 COURSES OF INSTRUCTION

299,S CIVIL WAR AND RECONSTRUCTION (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

An examination of the causes, events and results of America's most severe conflict. Special attention goes to connections between federalism, racial democracy and military-political events. Offered with additional work as Hist 399. Not offered 1989-90.

Mr. Hyman

301,F EUROPE'S FIVE HUNDRED YEARS, 1450-1815 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 101. Students may not receive credit for both Hist 101 and 301. Recommended for Junior and Seniors.

Mr. Stokes

302,S EUROPE'S FIVE HUNDRED YEARS, 1814-1980 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 102. Students may not receive credit for both Hist 102 and 302. Recommended for Juniors and Seniors.

Mr. Stokes

303,F/S UNDERGRADATE INDEPENDENT READING (3-0-3)

Independent reading under the supervision of a faculty member. Open to a limited number of advanced students with special permission.

Staff

304,F/S UNDERGRADATE INDEPENDENT READING (3-0-3)

Independent reading under the supervision of a faculty member. Open to a limited number of advanced students with special permission.

Staff

305,S RUSSIAN HISTORY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

A survey of Russian history from earliest times to the present. Not offered 1989-90.

Mr. Stokes

306,S POLITICS AND SOCIETY IN ANCIENT GREECE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

Discussion of the main developments in social, political, and intellectual life in the Greek world from the end of the Mycenaean Age to the advent of Alexander the Great. Not offered 1989-90.

Mr. Maas

307,F IMPERIAL ROME FROM CAESAR TO DIOCLETIAN (3-0-3)

How did Rome acquire, maintain, and understand her empire? This course considers the development of a political, social, and ideological system fitted to an empire reaching from Scotland to Mesopotamia during the three centuries of Rome's greatest power. Not offered 1989-90.

Mr. Maas

308,S THE WORLD OF LATE ANTIQUITY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

A social, religious, and political history of the Roman world from Diocletian to the rise of Islam. Focus will be on the breaking of the unity of the Mediterranean world and the formation of Byzantine society in the Greek east.

Mr. Maas

309,F DECLINE AND FALL OF THE ROMAN EMPIRE (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

What was the "fall" of the Roman Empire? This course examines the circumstances of the end of Roman political authority in western Europe. Ancient and modern theories will be considered, with special emphasis on the importance of the Germanic invasions. Not offered 1989-90.

Mr. Maas

311,F AMERICAN THOUGHT & SOCIETY I (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Enriched version of Hist 211. Students may not receive credit for both Hist 211 and 311. Not offered 1989-90.

Mr. Haskell

312,S AMERICAN THOUGHT & SOCIETY II (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 212. Students may not receive credit for both Hist 212 and 312. Not offered 1989-90.

Mr. Haskell

315,F BLACKS IN THE AMERICAS (3-0-3)*** DISTRIBUTION COURSE ***

An enriched version of Hist 215. Students may not receive credit for both Hist 215 and 315. Not offered 1989-90.

Mr. Cox

327,F COLONIAL LATIN AMERICAN HISTORY I (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

The first part of a two semester survey course of colonial Latin America focusing on construction of the self and "other" narrative strategies and rhetoric. The colonial part examines narratives of conquest, travel, and piracy in Latin America and the Caribbean in the sixteenth and seventeenth centuries.

Ms. Seed

328,S MODERN LATIN AMERICAN HISTORY II (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

This is the second part of a two semester course on Latin America focusing on construction of the self and "other" narrative strategies, and rhetoric in contemporary Latin America. The modern half examines nineteenth- and twentieth-century essays and novels dealing with modern Latin American identity. Readings include Sarmiento, Paz, and Naipaul.

Ms. Seed

335,F CARIBBEAN HISTORY TO 1838 (3-0-3)*** DISTRIBUTION COURSE ***

History of the Caribbean from the arrival of Europeans to the abolition of slavery in the British West Indies in 1838. Focus will be on the social and economic history of the region during this period. Why did slavery and the plantation system emerge? Why did they fall?

Mr. Cox

336,S CARIBBEAN HISTORY: 1838 TO THE PRESENT (3-0-3)*** DISTRIBUTION COURSE ***

Social, economic, and political history of the people from the abolition of slavery to the emergence of independent nations in the modern era.

Mr. Cox

337,F HISTORY OF ANCIENT AND MEDIEVAL LAW (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

A history of ancient law focusing on imperial Roman law and the various forms of medieval law: vulgar Roman law, barbaric Germanic law, and English common law. Not offered 1989-90.

Ms. Drew

342 COURSES OF INSTRUCTION

339,F/S MORALITY AND HISTORY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

Does it subvert the very idea of morality to say that it has a history, that it is susceptible to change? Students in this discussion and writing course will grapple with this problem through selected readings drawn mainly from Anglo-American history and philosophy that range over a period of several centuries. Not offered 1989-90.

Mr. Haskell

340,F VICTORIAN INTELLECTUALS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

The upheaval in late nineteenth century social thought and culture associated with Darwin's theory of evolution. Readings (mainly American, but including English and continental writers for comparison) may include Spencer, Veblen, Henry Adams, William James, Dewey, Matthew Arnold and Nietzsche. Not offered 1989-90.

Mr. Haskell

341,F HISTORY OF CHINA I (3-0-3)

Survey of Chinese history from antiquity to about 1800, highlighting salient aspects of China's heritage. Not offered 1989-90.

Mr. Smith

342,S HISTORY OF CHINA II (3-0-3)

China's revolutionary transformation in the nineteenth and twentieth centuries — from Ch'ing dynasty to People's Republic. Not offered 1989-90.

Mr. Smith

343,F CONTEMPORARY CHINA (3-0-3)

An examination of the interplay between "tradition" and "modernity" in contemporary China. Not offered 1989-90.

Mr. Smith

344,S INTRODUCTION TO WOMEN'S HISTORY (3-0-3)

*** DISTRIBUTION COURSE ***

An enriched version of Hist 244. Students may not receive credit for both Hist 244 and 344.

Ms. Quillen

345,F RENAISSANCE EUROPE (3-0-3)

*** DISTRIBUTION COURSE ***

This course, the first of a two semester survey in the history of Early Modern Europe, traces the major cultural, social, and political developments of the Renaissance period. Specific topics include the impact of urbanization on family and social structure, the development of commerce, the rise of the humanist movement and its relation both to medieval thought and to the new civic culture, and European attitudes toward the rest of the world.

Ms. Quillen

346,S REFORMATION AND COUNTER-REFORMATION THOUGHT AND PRAXIS (3-0-3)

*** DISTRIBUTION COURSE ***

Taking as its starting point the religious doctrines outlined by Luther and Calvin and the Catholic response to them, this course examines the radically different ways in which Protestant and Catholic theologies were first interpreted and then translated into action in Early Modern Europe and its American colonies.

Ms. Quillen

349,F AGE OF BISMARCK (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

The history of Europe from the French Revolution and Napoleon to Bismarck, Gladstone, and the Spanish American War. Not offered 1989-90.

Mr. Loewenheim

350,F AMERICA IN THE 20TH CENTURY (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Survey of major economic, social, and political developments in the United States from 1900 to 1940. Lectures, readings, discussions and one research paper. By permission of the instructor; limited to forty students.

*Mr. Matusow***357,F TECHNOLOGY AND WORLD HISTORY (3-0-3)**

An enriched version of History 257. Students may not receive credit for both 257 and 357. Not offered 1989-90.

*Mr. Van Helden***358,S TECHNOLOGY AND THE CONTEMPORARY WORLD (3-0-3)**

An enriched version of History 258. Students may not receive credit for both 258 and 358. Not offered 1989-90.

*Mr. Van Helden***359,F ROMAN BRITAIN & MEDIEVAL ENGLAND (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

Survey of historical developments in Roman Britain and Medieval England with special attention to social, economic, and religious factors.

*Ms. Drew***361,F HISTORY OF ENGLAND: FROM THE REFORMATION TO 1815 (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 261. Students may not receive credit for both Hist 261 and 361. Not offered 1989-90.

*Mr. Wiener***362,S HISTORY OF ENGLAND: FROM 1815 TO PRESENT (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 262. Students may not receive credit for both Hist 262 and 362. Not offered 1989-90.

*Mr. Wiener***367,F HISTORY OF SOUTH AFRICA (3-0-3)***** DISTRIBUTION COURSE ***

This course will survey the history of South Africa from the mid-17th Century. The topics to be covered include: South Africa before the Europeans; white settlers and Cape colonial society to 1814; the capitalist revolution; the struggle for South Africa in the 19th century; the transformation of South African society; the rise and development of the apartheid state; resistances and struggles. ****NEW COURSES****

*Mr. Odhiambo***371,F HISTORY OF FRANCE TO 1815 (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 271. Students may not receive credit for both Hist 271 and 371. Not offered 1989-90.

*Mr. Zdatny***372,S HISTORY OF FRANCE SINCE 1815 (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 272. Students may not receive credit for both Hist 272 and 372. Not offered 1989-90.

Mr. Zdatny

373,F HISTORY OF THE JEWISH PEOPLE I: 70 TO 1492 (3-0-3)

*** DISTRIBUTION COURSE ***

An enriched version of Hist 273. Students may not receive credit for both Hist. 273 and 373.
Ms. Fishman

374,S HISTORY OF THE JEWISH PEOPLE II: 1492 TO 1882 (3-0-3)

*** DISTRIBUTION COURSE ***

An enriched version of Hist 274. Students may not receive credit for both Hist 274 and 374.
Ms. Fishman

375,F SOCIAL HISTORY OF MODERN EUROPE (3-0-3)

*** DISTRIBUTION COURSE ***

An enriched version of Hist 275. Students may not receive credit for both Hist 275 and 375.
Mr. Zdatny

376,S EXISTENTIALISM (3-0-3)

An examination of the genesis and development of existentialism as an intellectual force in nineteenth- and twentieth-century Europe. Will begin with a brief treatment of Kierkegaard and Nietzsche, before proceeding to a study of twentieth-century figures such as Heidegger, Sartre, and Camus. Not offered 1989-90.

Mr. Wolin

378,S CULTURAL CRITICISM AND AMERICAN SOCIETY (3-0-3)

*** DISTRIBUTION COURSE ***

This course will focus on the tension between ideals and reality in American life as expressed by a growing number of post-war social critics and theorists such as Marcuse, Lasch, Bellah, and Daniel Bell.

Mr. Wolin

379,F INTRODUCTION TO POSTMODERNISM (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

We will begin with a survey of the most important intellectual precursors of postmodernism — Nietzsche, Heidegger, and Bataille — before moving on to consider the movement's leading representatives in contemporary France: Lyotard, Derrida, and Foucault. We will then conclude by examining some of the more important criticisms of the postmodern world view (e.g., the critique of Jurgen Habermas.)

Mr. Wolin

381,F HISTORY OF THE ISLAMIC NEAR EAST, 600 - 1258 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 281. Students may not receive credit for both Hist 281 and 381.
Ms. Sanders

382,S HISTORY OF THE ISLAMIC NEAR EAST, 1258 - 1805 (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 282. Students may not receive credit for both Hist 282 and 382.
Ms. Sanders

383,F THE ENLIGHTENMENT (3-0-3)

A study of the transformation of the European intellect during the eighteenth century, with special emphasis on the Enlightenment as the intellectual harbinger of the French Revolution. Among the authors: Locke, Hume, Voltaire, Diderot, Rousseau, Kant. Not offered 1989-90.

Mr. Wolin

391,F CAPITALISM AND CULTURE (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

What are the cultural consequences (ethical, aesthetic, and religious) of capitalism as a social formation? This question will be addressed through an examination of the work of several major social theorists, classical and contemporary. Among the authors treated will be Marx, Weber, Parsons, Habermas, and Bell. Not offered 1989-90.

Mr. Wolin

392,S LIBERALISM, DEMOCRACY, AND COMMUNITY (3-0-3)*** DISTRIBUTION COURSE ***

Contemporary American political thinkers such as Rawls, Sandel, and Walzer have attempted in provocative and contrasting ways to re-define the basic terms of modern political discourse. We will begin with a brief survey of the "classics" of modern political thought (Locke and Mill, Rousseau and Marx) before proceeding to concentrate on the work of the above-named American theorists.

Mr. Wolin

393,F THE ART OF WAR FROM ALEXANDER TO NAPOLEON (3-0-3)

An enriched version of History 293. Students may not receive credit for both 293 and 393. Not offered 1989-90.

Mr. Gruber

394,S WAR IN THE MODERN WORLD (3-0-3)

An enriched version of History 294. Students may not receive credit for both 294 and 394. Not offered 1989-90.

Mr. Gruber

395,F THE OLD SOUTH (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

A survey of the economic, cultural, political, religious, and social history of the South from 1607 to 1860 with particular attention to race.

Mr. Boles

396,S THE NEW SOUTH (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Continuation of Hist 395 to the present.

Mr. Boles

397,F CONSTITUTIONAL AND LEGAL HISTORY OF U.S. I (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 297. Students may not receive credit for both Hist 297 and 397. 76

Mr. Hyman

398,S CONSTITUTIONAL AND LEGAL HISTORY OF U.S. II (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 298. Students may not receive credit for both Hist 298 and 398.

Mr. Hyman

399,S AMERICAN CIVIL WAR AND RECONSTRUCTION (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

An enriched version of Hist 299. Students may not receive credit for both Hist 299 and 399. Not offered 1989-90.

Mr. Hyman

403,F SENIOR THESIS (3-0-3)

Open to well-qualified students with special permission. Students must take both Hist 403 and 404 to gain credit.

Staff

346 COURSES OF INSTRUCTION

404,S SENIOR THESIS (3-0-3)

See Hist 403.

Staff

405,F FASCISM (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

A look at the most murderous political philosophy of our time, at the leaders (Mussolini, Hitler), the followers, and the victims. Not offered 1989-90.

Mr. Zdatny

406,S THE FRENCH REVOLUTION (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

An in-depth examination of "the first modern revolution": regicide, terror, counterrevolution—"the rule of the people," the marriage of ideals and the guillotine. Not offered 1989-90.

Mr. Zdatny

407,F HOLOCAUST (3-0-3)

It isn't easy to murder millions of people. It takes dedication and, above all, organization. This course will examine the idea and the execution of Hitler's plans to wipe Jews from the face of the earth. Course limited to 17 students.

Mr. Zdatny

408,S FROM CROMWELL TO LENIN: REVOLUTIONS IN MODERN EUROPE (3-0-3)

July 1989 is the 200th anniversary of the Bastille, and the bicentennial of the French Revolution. It presents an apt occasion to wonder about revolutions and revolutionaries in European History. How does the political status quo erupt into revolution? What kind of people lead these political super-novas? Do they lead inevitably to anarchy and violence or do they serve freedom and the progress of mankind? Not offered 1989-90.

Mr. Zdatny

409,F HISTORY OF EAST AFRICA (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

A survey of East African cultures, societies, economies and politics from the earliest times to the present: the peopling and languages of East Africa; migrations and settlement, state formation; long-distance trade and expansions in scale; imperialisms and colonial conquest; colonial transformations of African societies; Nationalism, and Independence. Not offered 1989-90.

Mr. Odhiambo

410,S AFRICA: IMPERIALISM/NATIONALISM (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Not offered 1989-90.

Mr. Odhiambo

413,S SLAVERY IN NORTH AMERICA (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

An enriched version of Hist 213. Students may not receive credit for both Hist 213 and 413. Not offered 1989-90.

Mr. Boles

421,F TOPICS IN CHINESE HISTORY DIVINATION IN CHINESE HISTORY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

This seminar will explore the role of divination in the political and social life of China from neolithic times to modern era, focusing on fortune-telling as a reflection of traditional Chinese attitudes, values, world view, and cosmology. Prereq- any course in Chinese history or the consent of the instructor; limited to 15 students. Not offered 1989-90.

Mr. Smith

423,F WOMEN IN EARLY MODERN EUROPE (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

The course develops a critical feminist perspective on the historical issues of the early modern era. Topics covered include: the coming of capitalism, the Reformation, the expansion of literacy, the demographic transition, and the development of seventeenth-century science. Not offered 1989-90.

Ms. Seed

425,F COLONIAL/POST COLONIAL DISCOURSE (3-0-3)*** DISTRIBUTION COURSE ***

The course will cover one of the most important emerging theoretical issues in the study of the Third World peoples, namely how Europeans and Americans have created definitions of who these people are, and how they behave, by virtue of not *their* systems of knowledge but *ours*. The constitution of colonized peoples as subjects of knowledge by their colonizers is known as colonial discourse; the reactions of the colonized, post-colonial discourse. The first half of the course will analyze the theories of colonial and post-colonial discourse, the second half will deal with examples from Latin America, Africa, and South Asia. Prerequisite: EITHER one Third World history course (any area) OR a course in literary or anthropological theory.

Ms. Seed

426,S COMPARATIVE SLAVERY AND RACE RELATIONS IN THE AMERICAS (3-0-3)*** DISTRIBUTION COURSE ***

A comparative analysis of slavery and race relations in the U.S., the Caribbean, and Latin America, chiefly to the late nineteenth century. It addresses issues like the relative harshness or mildness of the institution of slavery in various systems, opportunities for advancement for the former slaves, and the resultant nature of race relations.

Mr. Cox

430,S SOCIAL PROBLEMS AND POLICY IN NINETEENTH CENTURY BRITAIN (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

This course will focus on sexual relations and the family as sites of social problems. The discovery and construction of problems such as prostitution, illegitimacy, child abuse, abortion and divorce will be explored. Discussion and a research paper.

Mr. Wiener

431,F VICTORIAN MORALITY (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

The rise and decline of a set of attitudes and values about human nature and behavior that flourished widely in the nineteenth century. Social sources and functions of this morality will be stressed, in particular its role in structuring class, gender and generational relations in an age of rapid change. Britain will be the geographical focus, with glances at the United States and Western Europe. Material examined will include literature and art. Lectures, discussions and a research paper. Not offered 1989-90.

Mr. Wiener

437,F LIFE ON THE NILE: EGYPTIAN POLITICS, CULTURE AND SOCIETY FROM MEDIEVAL TO MODERN TIMES (3-0-3)

An examination of Egyptian history from the Arab conquest in 641 until the 20th century, focusing on major themes in Egypt's political, social, and cultural life, on historical continuities and discontinuities, and on problems of historical interpretation. Lecture/discussion. Not offered 1989-90.

Ms. Sanders

438,S GENDER AND SOCIETY IN ISLAM (3-0-3)

This course will examine some features of the legal position and social realities of men and women in the Islamic world. We will discuss the family and sexual ethics, the harem, polygyny, divorce, and eunuchs (who played an important role in both the military and in certain religious institutions) in order to understand how the boundaries of gender have traditionally been drawn. Not offered 1989-90.

Ms. Sanders

440,S SOCIAL AND ECONOMIC HISTORY OF EUROPE IN THE MIDDLE AGES (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Seminar covering selected problems in the social and economic history of medieval Europe.

Ms. Drew

442,S HISTORY OF ASTRONOMY AND COSMOLOGY (3-0-3)

A lecture and discussion course dealing with topics in the history of astronomy and cosmology from antiquity to the twentieth century. Not offered 1989-90.

Mr. Van Helden

447,F HISTORY OF THE JEWISH PIETISM (3-0-3)

* DISTRIBUTION COURSE *

In their quest for a life of greater spiritual intensity, Jews throughout the ages have sought means of enhancing and supplementing ritual observance. Course explores pietistic attitudes and practices, meditational techniques, theosophical speculation and strategies for effecting redemption, both personal and collective. Readings in translation include selections from ethical wills, manuals for self-improvement, philosophical and mystical treatises composed from the rabbinic period through modern times. Instructor's permission required.

Ms. Fishman

448,S JUDAICA IN THE HUMANITIES (3-0-3)

* DISTRIBUTION COURSE *

Exploration of social and cultural developments in West European life and thought resulting from the dominant society's interaction with Jews and Judaism. Readings include selections from the Pauline Epistles, Eusebius, Pico della Mirandola, Reuchlin, Luther, Spinoza, Rabelais, Grimmshausen, Voltaire, Hegel, Herder, Marx and Freud. Frequent short papers and student presentations. Instructor's permission required.

Ms. Fishman

450,S CHINESE CULTURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

An enriched version of Hist 250. Students may not receive credit for both Hist 250 and 450.

Mr. Smith

454,S REPORTING FROM THE UNFREE WORLD (3-0-3)

How Western journalists have viewed authoritarian and totalitarian regimes in the twentieth century, from the Russian Revolutions of 1917 to the present, the background and impact of their accounts on public opinion and official policy. Not offered 1989-90.

Mr. Loewenheim

455,F FROM BISMARCK TO THE FIRST WORLD WAR (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

The revolutions of 1848, the unification of Italy and Germany, Bismarck and Gladstone, the new nationalism and imperialism, the political and cultural upheavals of the turn of the century, and the road to war. Not offered 1989-90.

Mr. Loewenheim

456,F DECLINE OF WESTERN WORLD, 1914-39 (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Europe from 1914 to 1939: the First World War and its consequences, with special attention to the historic role of the United States in world affairs. Not offered 1989-90.

*Mr. Loewenheim***457,S FROM DANZIG TO SUEZ: THE END OF THE EUROPEAN WORLD, 1939 - 1956 (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

Europe from 1939 to 1956: the Second World War and its consequences, with special attention to the role of the United States in world affairs.

*Mr. Loewenheim***458,S EUROPE AND WORLD POLITICS FROM SUEZ TO THE PRESENT (3-0-3)**

The world in 1956, the Cold War, the era of Vietnam, and after, with special attention to role of the United States in world affairs. Not offered 1989-90.

*Mr. Loewenheim***459,F THE MUNICH CRISIS (3-0-3)**

The historical origins, inner history, and significance of a world historical crisis, with special emphasis on contemporary records and the role of the United States. (In observance of the 50th anniversary of the Munich Conference, September 29-30, 1938.)

*Mr. Loewenheim***460,S ADVANCED SEMINAR IN ANCIENT HISTORY (3-0-3)**

Limited enrollment. Prerequisites: History 307, 308, or 309, or consent of the instructor. Topic for spring 1989: "Constantine and the Conversion of the Roman Empire to Christianity." Not offered 1989-90.

*Mr. Maas***462,S THE LIFE AND TIMES OF ADOLPH HITLER (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

How and why Hitler and National Socialism took over Germany, conquered most of Europe, and finally met defeat and destruction. (In observance of the centennial of Hitler's birth, April 20, 1889.) Not offered 1989-90.

*Mr. Loewenheim***465,F COLONIAL AMERICA TO 1754 (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

The growth of society, thought, and politics in the English colonies of North America. Lectures, discussions, and papers. Not offered 1989-90.

*Mr. Gruber***466,S AMERICAN REVOLUTION, 1754-1789 (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

The origins and implications of the American Revolution, emphasizing constitutional, social, and political developments. Not offered 1989-90.

*Mr. Gruber***469,S U.S.-LATIN AMERICAN RELATIONS (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3**

Enriched version of Hist 269. Students may not receive credit for both Hist 269 and Hist 469.

Ms. Seed

350 COURSES OF INSTRUCTION

492,F MICHEL FOUCAULT (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

A seminar devoted to a critical reading of Foucault's work from "Madness and Civilization" to "The History of Sexuality."

Mr. Wolin

494,S PROBLEMS IN NINETEENTH- AND TWENTIETH-CENTURY

EUROPEAN HISTORY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

A discussion and pro-seminar on various problems of nineteenth and twentieth century European history. Different topics are covered in different years. Enrollment limited to 15 students. Not offered 1989-90.

Mr. Stokes

501,F MASTER'S HISTORICAL RESEARCH (Variable)

Master's thesis. Students must take both Hist 501 and 502 in order to gain credit.

Staff

502,S MASTER'S HISTORICAL RESEARCH (Variable)

See Hist 501.

Staff

503,F GRADUATE TOPICS (Variable)

Staff

504,S GRADUATE TOPICS (Variable)

Staff

511,F DIRECTED READINGS IN AMERICAN HISTORY (4-0-4)

For graduate students only.

Staff

512,S DIRECTED READINGS IN AMERICAN HISTORY (4-0-4)

For graduate students only.

Staff

513,F DIRECTED READINGS IN AMERICAN HISTORY I (4-0-4)

For graduate students only.

Staff

514,S DIRECTED READINGS IN AMERICAN HISTORY II (4-0-4)

For graduate students only.

Staff

517,F DIRECTED READINGS IN SCIENCE AND TECHNOLOGY (4-0-4)

For graduate students only.

Mr. Van Helden

518,S DIRECTED READINGS IN SCIENCE AND TECHNOLOGY (4-0-4)

For graduate students only.

Mr. Van Helden

521,F DIRECTED READINGS IN MEDIEVAL HISTORY (4-0-4)

For graduate students only.

Ms. Drew

522,S DIRECTED READINGS IN MEDIEVAL HISTORY (4-0-4)

For graduate students only.

*Ms. Drew***527,F DIRECTED READINGS IN NON-WESTERN HISTORY (4-0-4)**

For graduate students only.

*Staff***528,S DIRECTED READINGS IN NON-WESTERN HISTORY (4-0-4)**

For graduate students only.

*Staff***529,F DIRECTED READINGS IN MODERN EUROPEAN HISTORY I**

(4-0-4)

For graduate students only.

*Staff***530,S DIRECTED READINGS IN MODERN EUROPEAN HISTORY I**

(4-0-4)

For graduate students only.

*Staff***531,F DIRECTED READINGS IN MODERN EUROPEAN HISTORY II**

(4-0-4)

For graduate students only.

*Staff***532,S DIRECTED READINGS IN MODERN EUROPEAN HISTORY II**

(4-0-4)

For graduate students only.

*Staff***533,F GRADUATE COLLOQUIUM IN EUROPEAN HISTORY (4-0-4)**

For graduate students only.

*Mr. Stokes***535,F GRADUATE COLLOQUIUM IN AMERICAN HISTORY (4-0-4)**

For graduate students only. Not offered 1989-90.

*Mr. Gruber, Mr. Matusow***540,S REVISIONISM IN AFRICAN HISTORY (4-0-4)**

The course is concerned with the impact of theoretical constructs and debates on African historiography. It takes note of the intellectual debates that have been organized around modernization, underdevelopment, dependency, world-systems and the Marxist/Neo-Marxist theories. These postulations, originally derived from historical studies in Europe, Asia, and Latin America, have simultaneously opened up African history to a wider comparative discourse while at the same time imposing hegemony on the nature of that discourse. This course is concerned in part with the histories of these theories. In the second part it will discuss the histories of certain specific concepts, including feudalism, Oriental despotism, modes of production, capitalism, social classes, nationalism, race, ethnicity, peasantries, class consciousness, the state—in their home contexts—and the ways they have been applied to the study of African history. Thirdly, the course will discuss in what ways these theories and concepts have influenced the evolution of specific historiographies in Africa: "Afri-canist," "nationalist" and "radical."

Mr. Odhiambo

352 COURSES OF INSTRUCTION

581,S GRADUATE SEMINAR IN MEDIEVAL HISTORY (4-0-4)

Offered when demand justifies.

Ms. Drew

582,S GRADUATE SEMINAR IN MODERN BRITISH HISTORY (4-0-4)

Not offered 1989-90.

Mr. Wiener

583,F GRADUATE SEMINAR IN SOUTHERN HISTORY (4-0-4)

Religion and slavery in the Old South. Not offered in 1989-90.

Mr. Boles

585,F U.S. CONSTITUTIONAL AND LEGAL HISTORY (4-0-4)

Significant constitutional and legal questions stressing civil liberties, criminal law, civil-military relations, race relations, and urban problems.

Mr. Hyman

586,S U.S. CONSTITUTIONAL AND LEGAL HISTORY (4-0-4)

Significant constitutional and legal questions stressing civil liberties, criminal law, civil-military relations, race relations, and urban problems. 79

Mr. Hyman

591,F/S GRADUATE READING (1-0-1)

Graduate reading in conjunction with another course.

Mr. Van Helden

592,F/S GRADUATE READING (1-0-1)

See Hist 591.

Mr. Van Helden

593,F/S GRADUATE READING (1-0-1)

See Hist 591.

Mr. Van Helden

800,F PH.D. RESEARCH (Variable)

Doctoral dissertation.

Mr. Van Helden

800,S PH.D RESEARCH (Variable)

Doctoral dissertation.

Mr. Van Helden

Human Performance and Health Sciences

Professor Poindexter, *Chair*

Professors Bearden, Lee, and Spence

Adjunct Professors Bryan, Butler, Fred, Risser, Skaggs, and Weinberg

Associate Professors Bland, Disch, Etnyre, and Iammarino

Assistant Professors Long and Shetty

Instructors Lidvall, Lindley, Phenix

Lecturers Bordelon, Eggert, Peters, and Pyung-Soo

Degrees Offered: B.A. with major in Human Performance; health education as teaching field only.

A minimum of 120 semester hours is required for the Bachelor of Arts with a major in Human Performance. The University distribution requirements described on pages 63-84 must be satisfied. Students majoring in Human Performance must complete 38 semester hours of physical education courses and laboratories in accordance with one of the specified Human Performance tracks. Human Performance 105, 120, and 250, and six activity laboratories are required in all tracks. For additional information about the tracks, consult with a departmental faculty adviser.

Both physical education and health education are offered as fields for teacher certification. Students wishing to qualify for teacher certification by the Texas Education Agency must complete 12 semester hours of English, 6 semester hours of American history, 6 semester hours of federal and state government, 18 semester hours of education, 24 semester hours in another teaching field, and 24 semester hours of health education courses or physical education courses, according to which is selected for the teaching field. Requirements are subject to change based on Texas Education Agency regulations.

Health education courses cannot be used to fulfill the requirements for a major in physical education but may be taken as electives by all students.

Human Performance Courses

101,F/S BASIC PHYSICAL EDUCATION (0-2-0)

Skill development, knowledge of rules and strategy, concepts of conditioning, and participation in two physical activities. Required for baccalaureate degree. Normally, it is expected that the requirement for Phed 101-102 be completed during the freshman year.

Bland, R.

102,F/S BASIC PHYSICAL EDUCATION (0-2-0)

Skill development, knowledge of rules and strategy, concepts of conditioning, and participation in two physical activities. Required for baccalaureate degree.

Bland, R.

105,F CONTEMPORARY SPORT (3-0-3)

Interactions of history, philosophy, economics, politics, education, and contemporary social issues in the evolution of sport. For first- and second-year students.

Poindexter, H.

354 COURSES OF INSTRUCTION

120,S SCIENTIFIC FOUNDATIONS (3-0-3)

An introduction to the scientific areas of human movement: anatomy and physiology, physiology of exercise, motor learning, and kinesiology.

Long, K.

122,F BASIC AQUATICS (0-3-1)

Instruction in basic aquatic activities, including mechanics of the various strokes and basic lifesaving.

Bearden, F.

124,S CONDITIONING (0-3-1)

Concepts and experience in health-related fitness and conditioning for improved performance. Prereq- concurrent or previous enrollment in Phed 120 or previous enrollment in Phed 101 and 102.

Long, K.

125,F/S ADVANCED LIFESAVING (0-3-1)

Aquatic instruction leading to Advanced Lifesaving Certificate.

Bearden, F.

126,S WATER SAFETY (0-3-1)

Focus on skills, theory, teaching progressions, and practice teaching of swimming, lifesaving, and beginning swimming. Completion of requirements leads to certification as Water Safety Instructor. Prereq- currently valid Advanced Lifesaving Certificate.

Staff

128,F/S RACQUET SPORTS (0-3-1)

Skill development, knowledge of rules and strategy, concepts of conditioning, and participation in badminton, racquetball, and squash. Prereq- concurrent or previous enrollment in Phed 105 or 120 or previous enrollment in Phed 101 and 102.

Bland, R.

135,F BASIC GYMNASTICS (0-3-1)

An introduction to gymnastics. Activities include tumbling, vaulting, and activities on parallel bars, side horse, rings, high bar, and balance beam. Prereq- concurrent or previous enrollment in Phed 105 or previous enrollment in Phed 101 and 102.

Staff

204,S PSYCHOLOGICAL FOUNDATIONS (3-0-3)

Investigation of the theoretical and empirical psychological foundations of sport and physical activity.

Staff

205,F SPORT AND SOCIETY (3-0-3)

A study of the development of contemporary sport and its interrelationships with existing social institutions.

Lee, E.

223,S INDIVIDUAL SPORTS (0-3-1)

Skill development, knowledge of rules strategy, concepts of conditioning, and participation in fencing, golf, and archery. Prereq- concurrent or previous enrollment in Phed 105 or previous enrollment in Phed 101 and 102. Prereq- permission of instructor.

Bearden, F.

228,F TENNIS (0-3-1)

Skill development, knowledge of rules and strategy, concepts of conditioning, and participation in tennis. Prereq- Concurrent or previous enrollment in Phed 105 or previous enrollment in Phed 101 and 102.

Etnyre, B.

250,S ANATOMY AND PHYSIOLOGY (3-0-3)

Introduction to human anatomy and physiology, with emphasis on gross structure and basic concepts of function.

Spence, D.

260,S SPORTS MANAGEMENT PUB SECTOR (3-0-3)

Management theory and practice related to public sector sports programs.

Bearden, F.

300,F/S SPORTS MANAGEMENT INTERNSHIP (Credit variable)

Internship experience for senior students in sports management track. Prereq- permission of instructor.

Staff

302,S KINESIOLOGY (3-0-3)

Anatomical and mechanical bases of human movement with emphasis on the analysis of sport and exercise skills. Prereq- Phed 120, 250, or permission of instructor.

Shetty, A.

304,S FIRST AID/EMERGENCY CARE/CPR (2-1-2)

The American Red Cross certification program for emergency care procedures for illness, traumatic injuries, and cardiopulmonary resuscitation. Limited enrollment: 25. Also offered as Heal 308.

Staff

305,F EXCEPTIONAL CHILDREN (3-0-3)

Areas of exceptionality displayed by children within the school or institution relative to the physical educator's role.

Bearden, F.

308,S PROGRAM DEVELOPMENT IN PHYSICAL EDUCATION (3-0-3)

Teaching methodology, program development, and implementation of teaching techniques and class management. For junior and senior students.

Lee, E.

311,F MOTOR LEARNING (3-0-3)

Physiological, neurological, and psychological factors affecting voluntary skill acquisition and development.

Poindexter, H., Etnyre, B.

314,F/S METHODS PRACTICUM (0-3-1)

Practicum in the application of teaching methods in physical education activities. Prereq- concurrent or previous enrollment in Phed 308.

Lee, E.

319,F TESTS & MEASUREMENTS (3-0-3)

Introduction to basic statistics, test construction and evaluation, and elementary measurement theory in physical education.

Disch, J.

321,F PHYSIOLOGY OF EXERCISE (3-0-3)

Physiologic response of the circulatory, respiratory, and muscular systems to exercise stress. Prereq- Phed 120 or permission of instructor.

Spence, D.

356 COURSES OF INSTRUCTION

323,F PHYSIOLOGY OF EXERCISE (0-3-1)

Measuring physiologic response to exercise stress. Prereq- concurrent enrollment in Phed 321.

Spence, D.

326,F TRAINING ROOM PROCEDURES (0-3-1)

Field application in prevention, management, and rehabilitation of athletic injuries. Limited enrollment: 24.

Eggert, A.

334,S TEAM SPORTS (0-3-1)

Selected team sports including volleyball and soccer. Prereq- Phed 124 and two of: Phed 122,126,128,135,223,228, and 337.

Disch, J.

337,F BASIC MOVEMENT — DANCE (0-3-1)

An introduction to modern dance techniques and improvisation.

Phenix, L.

338,S DANCE TECHNIQUE & IMPROVISATION (0-3-1)

Modern dance techniques and improvisation.

Phenix, L.

341,F SPORTS MEDICINE AND TRAINING (3-0-3)

The following areas are integrated: anatomy and physiology of sports, emphasizing orthopedic anatomy and circulorespiratory physiology; clinical medicine; prevention and management of athletic injuries.

Spence, D.

350,F/S COACHING INTERNSHIP (Credit variable)

Internship experience for senior students in coaching track. Prereq- permission of instructor.

Disch, J.

361,F SPORT MANAGEMENT—PRIVATE SECTOR (3-0-3)

Management theory and practice related to private sector sports programs. Prereq- Phed 260 or permission of instructor.

Staff

362,S SPORTS INFORMATION (3-0-3)

The role of communication media in sports. For junior and senior students only. 114

Staff

375,F/S SPORTS SCIENCE INTERNSHIP (Credit variable)

Internship experience for senior students in sports medicine and sports science tracks. Prereq- permission of instructor.

Spence, D.

411,F ATHLETIC COACHING (2-0-2)

Coaching techniques, concepts, and problems in major athletic sports. Prereq- permission of instructor.

Etnyre, B.

412,S MOTOR CONTROL (3-0-3)

Exploration of the neurophysiological, behavioral, and biomechanical aspects of motor control.

Etnyre, B.

431,S COACHING OF BASKETBALL (2-0-2)

Study of coaching methods and strategies for developing high level athletic performance.
Disch, J.

432,S COACHING OF BASEBALL (2-0-2)

Bland, R.

433,F COACHING OF FOOTBALL (2-0-2)

Bland, R.

434,S COACHING—TRACK & FIELD (2-0-2)

Spence, D.

436,F COACHING OF VOLLEYBALL (2-0-2)

Disch, J.

464,S SPORT AND THE LAW (3-0-3)

Legal aspects of sport and recreation. For junior and senior students only.

Staff

490,S SEMINAR IN SPORTS MEDICINE (3-0-3)

Case study approach is used to present sports related injuries, management, and rehabilitation. Prereq- Phed 341.

Spence, D.; Staff

495,F INDEPENDENT STUDY (Credit variable)

For junior and senior students only.

Lee, E.

496,S INDEPENDENT STUDY (Credit variable)

See Phed 495.

Lee, E.

498,F/S SPECIAL TOPICS (Credit variable)

Poindexter, H.

Health Courses

103,S NUTRITION (3-0-3)

Concepts underlying the science of nutrition; food composition, calories and needs for energy, special nutrients, and nutritional deficiencies.

Long, K.

107,F CONCEPTS IN HEALTH SCIENCE (3-0-3)

Designed to acquaint prospective health educators with the structure and function of health in our society.

Staff

201,F INTRO-ENVIRONMENTAL SYSTEMS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5 The chemical, physical, and biological components of the environment as natural resources and the effect of pollution on their maintenance and utilization. Also offered as Envi 201.

Ward, C.

358 COURSES OF INSTRUCTION

208,S CHEMICAL ALTERATIONS OF BEHAVIOR (3-0-3)

Investigates the use, abuse, and misuse of alcohol, tobacco, and psychoactive drugs.

Staff

306,S HUMAN SEXUALITY (3-0-3)

Designed to explore the physiological, psychological, and sociological parameters of human sexuality, to provide accurate sex information, and to develop healthy attitudes toward sexuality.

Iammarino, N.

308,S FIRST AID/EMERGENCY CARE/CPR (3-0-3)

American Red Cross certification program for emergency care procedures for illness, traumatic injuries, and cardiopulmonary resuscitation. Enrollment limited to 25. Also offered as Phed 304.

Staff

407,F DISEASES OF THE HUMAN ORGANISM (3-0-3)

Study of communicable, noncommunicable, and behavioral diseases with emphasis on the disease process and basic epidemiologic methods.

Iammarino, N.

410,S PROGRAM DEVELOPMENT IN HEALTH EDUC (3-0-3)

Content and methods in teaching health education; program materials and curriculum construction in secondary school health education programs. Required for Teaching Certification in Health.

Staff

495,F INDEPENDENT STUDIES (Credit variable)

Iammarino, N.

496,S INDEPENDENT STUDIES (Credit variable)

Iammarino, N.

498,F TOPICS IN HEALTH EDUCATION (Credit variable)

Iammarino, N.

498,S UNDERSTANDING CANCER (Credit variable)

Iammarino, N.

Humanities

Program in Humanities. This program is designed for undergraduates seeking a wide-ranging, critical, and integrated introduction to the humanities. In small group discussions, occasional lectures, and their own essays, students will encounter enduring issues in Western civilization. For students planning a humanities major, Humanities 101-102 will provide an excellent foundation for advanced study; for other students these courses offer valuable contributions to general education. For this reason they are required of all science-engineering, architecture, and music majors.

101,F INTRODUCTION TO HUMANITIES (3-0-3).

A study of representative works in the Western tradition in literature, philosophy, history, art, architecture, and music, from Homer to Cervantes. Discussion sections, with occasional lectures. *A foundation course.*

Staff

102,S INTRODUCTION TO HUMANITIES (3-0-3).

Continued study, in discussion and occasional lectures, of representative works in the Western tradition, from Pascal to Wallace Stevens. *A foundation course.*

Staff

Joint Venture (Business and the Humanities). The Rice Joint Venture Program, sponsored by the Career Services Center, is designed to provide liberal arts majors the opportunity to explore their interests in a possible business career. Students accepted for the program in the fall will register for Humanities 301, which will be offered in the spring. The course is an introduction to business with emphasis on basic business concepts. As a part of the curriculum, each student will also work part-time for a Houston-area business firm during the semester. Students will gain an understanding of the business community while gaining valuable experience and contacts in the business world.

301,S INTRODUCTION TO BUSINESS (3-0-3).

Prerequisite - prior acceptance to Joint Venture Internship program or permission of instructor. Preference given to humanities majors.

Mr. Sanborn

Major in Ancient Mediterranean Civilization

See pp. 157-161 for full description.

Other Humanities Listings**201,S PUBLIC SPEAKING (3-0-3).**

Permission of instructor.

Mr. Huston

211,S INTRODUCTION TO ASIAN CIVILIZATIONS (3-0-3)

Introduction to the great cultural traditions of Asia, past and present, with emphasis on evolving religious and philosophical traditions, artistic and literary achievements, and patterns of political, social, and economic change.

Ms. Klein, Mr. Smith, Mr. Wilson

270,F INTRODUCTION TO WOMEN'S STUDIES (3-0-3).

Major texts of modern feminist thought (Mary Daly, Susan Griffin, Evelyn Keller, Gerda Lerner, Adrienne Rich, Alice Walker, Virginia Wolf).

Ms. Gallop

315,F WRITING PRACTICUM (1-0-1).

Ms. Driskill

316,S WRITING PRACTICUM (1-0-1).

Ms. Driskill

320,S INTRODUCTION TO MEDIEVAL CULTURE (3-0-3).

Insights into literature, art, philosophy, history, science, and cuisine of the middle ages. Also listed as English 320. Not offered every year.

Ms. Chance

375,S FREUD (3-0-3).

Covers the major writings by the founder of psychoanalysis and explores their importance for twentieth century thought.

Ms. Gallop

385,S FEMINISM AND SEXUALITY (3-0-3).

Explores feminist thought on diverse aspects of sexuality (love, pornography, heterosexuality, fantasy, lesbianism, violence, marriage, power).

Ms. Gallop

Linguistics and Semiotics

Professor Copeland, Chair

Professors P.W. Davis, Lamb (on leave fall 1989), and Tyler

Associate Professors Polanyi and Urrutibeheity

Adjunct Professor E.D. Mitchell

Instructor Chen

Visiting Professor Hockett (fall 1989)

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. As language plays an important role throughout human life, linguistics is by its nature an interdisciplinary field. The undergraduate major therefore includes at least two non-linguistics courses, chosen in accordance with an area of concentration. The major may be undertaken with any of three areas of concentration: Cognitive Science, Language, Textual Semiotics. All majors are required to take at least eight courses (24 semester hours) in linguistics, including at least the three core courses: 300 (Linguistic Analysis), 301 (Phonology), and (402) Syntax and Semantics. The remaining requirements depend on the student's area of concentration, as follows:

Cognitive Science Concentration. Besides the three core courses, the eight required courses in linguistics must include at least two of the following: 306 (Cognitive Linguistics), 315 (Information Structures), 317 (Computation for Linguists), 411 (Neurolinguistics). In addition, the major must include at least two courses (six semester hours) in cognitive studies in other departments, chosen in consultation with the undergraduate major adviser. Appropriate courses in other departments include relevant courses in anthropology, psychology, and computer science.

Language Concentration. In addition to the eight required courses in linguistics, at least two semesters in a foreign language at the level of 300 or higher and two semesters in another language at the level of 200 or higher. Chinese and Sanskrit are especially recommended.

Textual Semiotics Concentration. At least two semesters in a foreign language at the level of 300 or higher and at least two courses in textual semiotics. The latter,

which may be counted among the eight required courses in linguistics, may be any two of the following: English 396 (Language and Philosophy in Literature), 414 (Hermeneutics and Linguistic Anthropology), 420 (Literary Semiotics), and French 491 (Text, Textuality, Literary Modernity).

In addition to the departmental requirements for the major, students must satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Honors Program. The primary purpose of the Honors Program is to provide selected undergraduate majors with an opportunity to receive advanced training, particularly in the planning and execution of independent research within their chosen areas of specialization in linguistics. A secondary purpose of the program is to establish an administrative framework for the formal recognition of outstanding students. Majors considering a career in linguistics are strongly encouraged to apply, as are all others who desire the experience of an intensive, individual research project as part of their undergraduate education.

Application to the Honors Program should be made in person to the undergraduate adviser no later than the tenth week of the second semester of a student's junior year. In support of the application, the student must prepare a brief description of the proposed research project signed by the faculty member who is to supervise the work. Acceptance into the program is at the discretion of the linguistics faculty. A statement of eligibility requirements and program requirements is available in the departmental office.

Graduate Program. The graduate program admits students planning to study for the Ph.D. degree on a full-time basis. It is structured to ensure for each student a thorough grounding in general linguistics and a sound introduction to advanced research in some field of special interest. Linguistics at Rice is treated as an inherently interdisciplinary field, with connections not only to language and literature studies, but also to psychology, anthropology, computer science, and philosophy. Study of computer science enhances a student's career opportunities as well as his or her research skills. Semiotics, as practiced at Rice, is the still broader field resulting from the extension of the concepts and analytical tools of linguistics to the broader class of language-like systems in general, including literary and artistic works and other products of human culture as well as information systems occurring in nature.

Undergraduate preparation need not include linguistics courses as such but should include courses in at least two of the following areas: anthropology, cognitive science, computer science, electrical engineering, foreign languages, logic, discrete mathematics, philosophy, and psychology. Fellowships are available for especially well-qualified students.

During the first year of residence, each entering graduate student will work closely with the linguistics graduate adviser to choose a plan of study congruent with the demands of the program and with his or her individual interests. Subsequent training is by course work, seminars, independent field study, and guided research. Students are encouraged to select areas of specialization that fit the research interests and activities of the faculty.

All students are expected to acquire a command of general linguistics and to select one or two areas of concentration. Recommended areas of concentration are:

Anthropological Linguistics
Cognitive Science
Computational Linguistics
English Linguistics

Germanic Linguistics
Semiotics
Romance Linguistics

At the end of the second semester of residence, each student is required to undergo an oral qualifying examination. The purpose of this examination is to assess the student's progress and potential as well as to identify areas of strengths and weaknesses. Continuation to the second year requires satisfactory performance on this examination. Students who pass with distinction are urged to go on directly to the Ph.D. degree. Others are eligible for a master's degree upon completion of an appropriate thesis.

Following successful completion of the qualifying examination, each student, on the basis of discussions with faculty members, and in accordance with his or her proposed area of concentration, selects a committee of advisers from among the faculty, typically a major adviser and two or three minor advisers. The major adviser will act as chairman of the committee. During the student's tenure in the program, the committee members serve as mentors and assist the student in designing an individually tailored program of advanced studies and research. The composition of the committee can be changed at any time upon agreement between the student and the advisers. Emphasis is placed on a close working relationship between the student and the members of this special committee.

On completion of the required course work and by agreement of the special committee, the student presents himself or herself to the faculty for a public comprehensive examination. This examination consists of written and oral parts and covers general linguistics and the area(s) of concentration. Responsibility for administering the examination and the determination of the results rest with the student's special committee. The linguistics graduate adviser is an *ex-officio* member of each examining committee.

For the Ph.D. degree, competence in two foreign research languages is required. In addition, a structural knowledge of a non-Indo-European language is expected. The appropriateness of the languages is determined in consultation with the graduate adviser, and in some cases specific research languages may be required because of the student's research area.

In addition to formal instruction, graduate students are given the opportunity to gain teaching experience by participating with the faculty in the design of courses and instruction of undergraduate students.

Each student is expected to present a dissertation research proposal to his or her special committee, normally by the time of the comprehensive examination. Such a proposal is required for admission to candidacy, and it must be approved by the student's special committee. At this time a dissertation adviser is selected. Normally, this is the chairman of the special committee, but with the agreement of the student and the committee members, a different dissertation adviser may be selected from within or from outside the special committee. Each student presents himself or herself for a public examination in defense of the completed dissertation. Responsibility for accepting the dissertation rests with the special committee.

Linguistics

Linguistics Courses

200,F/S LANGUAGE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

An introduction of the scientific study of language, the methods of linguistic prehistory, the language families of the world, and the interrelationships of language and thought. Also offered as Anth 200.

Meyer, C.

300,F LINGUISTIC ANALYSIS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

English and other languages as objects of scientific analysis; phonological structure, morphology and syntax, semantic structure, techniques of linguistic analysis. Also offered as Anth 300.

Copeland, J.

301,S PHONOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Articulatory phonetics, the analysis of speech; structural patterns which underline speech sounds. Types of phonological structure found in the world's languages. Also offered as Anth 301.

Copeland, J.

305,F HISTORICAL LINGUISTICS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

The processes of linguistic change and their relationships to social and geographical contexts. Emphasis on Indo-European. Also offered as Anth 305.

Mitchell, E.

306 COGNITIVE LINGUISTICS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

The study of linguistic data as evidence for the structure of the cognitive system which makes it possible for a speaker of a language to speak and understand the language. Prereq- Ling 200 or Ling 300 or permission of instructor. Not offered every year.

Lamb, S.

309,F PSYCHOLOGY OF LANGUAGE (3-0-3)

Human and other animal communication, structure of human language, word meaning and semantic memory, psychological studies of syntax, bilingualism, language and thought, language errors and disorders. Also offered as Psyc 309.

Martin, R.

310 LANGUAGE DEVELOPMENT (3-0-3)

Also offered as Psychology 310.

Staff

313,F LANGUAGE AND CULTURE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Investigation of the systematic relations between linguistic form and expression and culture. Also offered as Anth 313.

Tyler, S.

315,S INFORMATION STRUCTURES (3-0-3)

Properties of selected semiotic systems. Relational networks, laws of form, digital logic networks. Computer data structures, human cognitive structures.

Lamb, S.

364 COURSES OF INSTRUCTION

317,F COMPUTATION FOR LINGUISTS (3-0-3)

Introduction to the processing of natural language data.

Lee, C.

353 THE PHILOSOPHY OF LANGUAGE (3-0-3)

Philosophical investigation of relations among language, thought, and reality. Specific topics include such notions as analyticity, meaning, reference, and speech act. Prereq- two courses in Ling or Phil. Also offered as Phil 353. Not offered every year.

Staff

394,S STRUCTURE OF ENGLISH LANGUAGE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Introduction to modern English grammar, phonology, and semantics. Also offered as Engl 394.

Staff

395 HISTORY OF THE ENGLISH LANGUAGE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Also offered as Engl 395. Not offered every year.

Mitchell, E.

402,F SYNTAX AND SEMANTICS (3-0-3)

Study of semantic categories and their formal expression in morphological, syntactic, and lexical units and patterns. Also offered as Anth 402.

Davis, P.

403 MODERN LINGUISTIC THEORY (3-0-3)

Selected theories of language from de Saussure to the present.

Staff

406 COGNITIVE ANTHROPOLOGY (3-0-3)

Relations between thought, language, and culture. Special emphasis given to natural systems of classification and the logical principles underlying them. Not offered every year. Also offered as Anthropology 406.

Tyler, S.

407,F FIELD TECHNIQUES AND ANALYSIS (3-0-3)

Techniques and practice in the observation, analysis, and recording of a human language. Also offered as Anth 407.

Davis, P.

408,S FIELD TECHNIQUES AND ANALYSIS (3-0-3)

Continuation of Ling 407.

Davis, P.

409,F/S SPECIAL TOPICS: (3-0-3)

Topic changes from year to year. May be repeated for credit. Prereq- Ling 300 or permission of instructor. Fall: History of Linguistics; Spring: Indo-European Morphology.

(F) Hockett, C., (S) Mitchell, E.

411,S NEUROLINGUISTICS: (3-0-3)

Language and the Brain Organization of the brain; localization of speech, language, and memory functions; hemispheric dominance; pathologies of speech and language associated with brain damage. Also offered as Anth 411.

Tyler, S.

414,F HERMENEUTICS&LINGUISTIC ANTHROPOLOGY (3-0-3)

Application of linguistic theory and method in the analysis of cultural materials. Discourse analysis; the structure and interpretation of texts and conversation. Also offered as Anth 414.
Tyler, S.

417,S COMPUTATIONAL LINGUISTICS (3-0-3)

Prereq- Ling 317 or programming experience. Not offered every year.

Polanyi, L.

420,S LITERARY SEMIOTICS (3-0-3)

Studies in application of semiotic models to the study of literature. Also offered as Span 420.
Kauffmann, R.

422,S TEXT AND CONTEXT (3-0-3)

Perspectives on literary and non-literary language. Not offered every year.

Polanyi, L.

423,F THE SPANISH LANGUAGE (3-0-3)

Synchronic study of modern Spanish phonology and syntax, including peninsular and Hispanic-American variants. Also offered as Span 423.

Urrutibeheity, H.

433,S LINGUISTIC STRUCTURE-GERMAN (3-0-3)

Synchronic study of modern German phonology, syntax, and semantics, including aspects of discourse structure. Also offered as Germ 403.

Copeland, J.

434,F HISTORY OF THE GERMAN LANGUAGE (3-0-3)

Aspects of the history of German phonology, syntax, and semantics (with related systems) from its Proto-Indo-European origins to the present. Also offered as Germ 434.

Copeland, J.

435 TOPICS IN GERMANIC LINGUISTICS (3-0-3)

1989 Topic: Historical Germanic Syntax Also offered as Germ 435. Not offered every year.

Copeland, J.

440 THE CHINESE NOVEL (3-0-3)

An exploration via translation into the symbolic and structural world of the traditional Chinese novel. The structural principles, symbolism, and aesthetic assumptions in China's rich literary tradition, with special attention given to the greatest of all Chinese novels, *Dream of the Red Chamber*. Not offered every year.

Chen, L.

443,S CHINESE LINGUISTICS (3-0-3)

Not offered every year.

Chen, L.

455 ANCIENT LANGUAGES/NEAR EAST (3-0-3)

A survey of the languages of the ancient Near East, with emphasis on the Cuneiform system of writing and on Sumerian, Akkadian, and Hittite. Particular attention will be devoted to Hittite and its relationship to the Indo-European family of languages. Not offered every year.

Baker, J.

456,F ANCIENT LANGUAGES/NEAR EAST (3-0-3)

Continuation of Ling 455, a survey of the languages of the ancient Near East, with emphasis on the Cuneiform system of writing and on Sumerian, Akkadian, and Hittite. Particular attention will be devoted to Hittite and its relationship to the Indo-European family of languages. Not offered every year.

Baker, J.

457,S ANCIENT LANGUAGES/NEAR EAST (3-0-3)

A survey of the languages of the ancient Near East, with emphasis on the Cuneiform system of writing and on Sumerian and Akkadian. Particular attention will be devoted to Akkadian and its relationship to the Semitic family of languages. Not offered every year.

Baker, J.

467,S COMPUTATIONAL PROJECTS (3-0-3)

Prereq- Ling 417 or permission of instructor.

Lamb, S.

470,S LANGUAGE DESCRIPTION (3-0-3)

Theory and practice of describing linguistic systems, including various notation systems and their relative advantages and disadvantages, the types of information that should be included in a language description and ways of organizing it, computational techniques for testing descriptions, and devices to allow the modification and expansion of the linguistic system in the course of its use. Prereq- Ling 306 or permission of instructor.

Lamb, S.

481,F/S INDEPENDENT STUDY (3-0-3)

Davis, P.

482,F/S INDEPENDENT STUDY (3-0-3)

Lamb, S.

490,F DISCOURSE ANALYSIS (3-0-3)

Linguistic, social, and cultural constraints on the structure and interpretation of discourse. Formal modeling of discourse structure as a prerequisite for computational implementation of discourse theory.

Polanyi, L.

491,F SEMANTICS: INTERDISCIPLINARY PERSPECTIVES (3-0-3)

A survey of current approaches to lexical semantics, conceptual modeling, and knowledge representation. Topics in feature theory, prototype analysis, componential analysis, and neural nets will be considered.

Polanyi, L.

500,F LINGUISTIC ANALYSIS (3-0-3)

Techniques of linguistic analysis and description.

Copeland, J.

501,S PHONOLOGY (3-0-3)

See Ling 301.

Copeland, J.

502,F SYNTAX AND SEMANTICS (3-0-3)

See Ling 402.

Davis, P.

503 MODERN LINGUISTIC THEORY (3-0-3)

See Ling 403.

Staff

- 505,F HISTORICAL LINGUISTICS (3-0-3)**
See Ling 305.
Mitchell, E.
- 506 COGNITIVE LINGUISTICS (3-0-3)**
See Ling 306.
Lamb, S.
- 507,F FIELD TECHNIQUES AND ANALYSIS (Credit variable)**
See Ling 407.
Davis, P.
- 508,S FIELD TECHNIQUES AND ANALYSIS (Credit variable)**
Continuation of Ling 507.
Davis, P.
- 515,F STUDIES IN HISPANIC LINGUISTICS (3-0-3)**
Staff
- 516,S STUDIES IN HISPANIC LINGUISTICS (3-0-3)**
Topic: "Spanish American Dialectology" Also offered as Span 516.
Urrutibeheity, H.
- 550,F/S DEPARTMENTAL COLLOQUIUM (1-0-1)**
Faculty, graduate students, and invited guests meet weekly to present reports on current research or to discuss current issues in linguistics and semiotics.
Staff
- 551 SEMINAR IN PHONOLOGY (3-0-3)**
Lamb, S.
- 552,S SEMINAR IN SYNTAX & SEMANTICS (3-0-3)**
Davis, P.
- 553 SEMINAR IN LINGUISTIC STRUCTURE (3-0-3)**
Staff
- 555,S SEMINAR IN HISTORICAL LINGUISTICS (3-0-3)**
Languages of the World.
Lamb, S.
- 570,S LANGUAGE DESCRIPTION (3-0-3)**
See Ling 470.
Lamb, S.
- 581,F GRADUATE RESEARCH (Credit variable)**
Copeland, J.
- 582,S GRADUATE RESEARCH (Credit variable)**
Copeland, J.
- 583,F GRADUATE RESEARCH (Credit variable)**
Staff
- 584,S GRADUATE RESEARCH (Credit variable)**
Mitchell, E.

368 COURSES OF INSTRUCTION

585,F GRADUATE RESEARCH (Credit variable)	<i>Davis, P.</i>
586,S GRADUATE RESEARCH (Credit variable)	<i>Staff</i>
587,F GRADUATE RESEARCH (Credit variable)	<i>Lamb, S.</i>
588,S GRADUATE RESEARCH (Credit variable)	<i>Lamb, S.</i>
590,F TEACHING LINGUISTICS (Credit variable)	<i>Staff</i>
591,S TEACHING LINGUISTICS (Credit variable)	<i>Staff</i>
636,S ENGLISH AS A 2ND LANGUAGE (1-0-1)	<i>Staff</i>
800,F/S GRADUATE RESEARCH (Credit variable)	<i>Davis, P., Copeland, J.</i>

Languages

Chinese Courses

201,F ELEMENTARY CHINESE I (3-0-4) * DISTRIBUTION COURSE: CATEGORY I.1 Note: 202 must be completed to receive distribution credit for 201.	<i>Chen, L.</i>
202,S ELEMENTARY CHINESE II (3-0-4) * DISTRIBUTION COURSE: CATEGORY I.1	<i>Chen, L.</i>
301,F INTERMEDIATE CHINESE I (3-0-4) * DISTRIBUTION COURSE: CATEGORY I.1	<i>Chen, L.</i>
302,S INTERMEDIATE CHINESE II (3-0-4) * DISTRIBUTION COURSE: CATEGORY I.1	<i>Chen, L.</i>

Japanese Courses

101,F ELEMENTARY JAPANESE I (3-0-3)	<i>Nagata, F.</i>
102,S ELEMENTARY JAPANESE II (3-0-3)	<i>Nagata, F.</i>

*Sanskrit Courses***301 INTRODUCTION TO SANSKRIT I (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Not offered every year.

*Mitchell, E.***302 INTRODUCTION TO SANSKRIT II (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.1**

Not offered every year.

*Mitchell, E.***Managerial Studies**

Degree Offered: B.A.

Undergraduate Program. Students majoring in managerial studies are required to take the following ten courses: Accounting 305, Computer Science 100, Economics 211 and 448, Mathematical Sciences 376, Statistics 280, Political Science 309 and 310, and Psychology 101 and 231. Students may satisfy the Computer Science, Mathematical Sciences, and Statistics required courses by alternatives. In addition, students must take five electives from a list of approved courses in Accounting, Computer Science, Economics, Mathematical Sciences, Statistics, Political Science, and Psychology. All prospective majors should obtain the program information sheets and advising notes from the Program Director, Dr. Stephen A. Zeff, 352 Herring Hall, for full particulars about the major.

*Managerial Studies Courses***495,F SENIOR HONORS THESIS (3-0-3)**

Completion of senior honors thesis. Open only to seniors in the managerial studies honors program.

*Zeff, S.***496,S SENIOR HONORS THESIS (3-0-3)**

See Mana 495.

*Zeff, S.***497,F INDEPENDENT STUDY (3-0-3)**

Independent study on an approved project under faculty supervision. Enrollment by special permission.

Zeff, S.

498,S INDEPENDENT STUDY (3-0-3)

See Mana 497.

Zeff, S.

Mathematics

Professor Hempel, Chair
Professors Hardt, Harvey, Jones,
Polking, Semmes, Veech, and Wells
Associate Professors Boshernitzan, Gao, and Yang
Assistant Professors Forman, Poon, and Wolf
Instructors Choe, Galicki, Ross, Smith, and Swearingen

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. There are two programs for students majoring in mathematics.

1. *Regular major.* Mathematics 101, 102, 211, 212; or 221, 222; and at least 24 semester hours (eight courses) in courses numbered 300 or above in the Department of Mathematics. Students can receive advanced placement credit for Mathematics 101 by achieving a score of 4 or 5 on the AP AB level test or for Mathematics 101 and 102 by achieving a score of 4 or 5 on the BC level test. Students who have had calculus but have not taken the AP test may petition the Department of Mathematics for a waiver of the calculus requirements for a major in mathematics. Entering students are encouraged to enroll in the most advanced course commensurate with their background, and thorough advice is available from the mathematics faculty during Freshman Week.
2. *Double major.* The requirements for the double major are the same as above with the exception that up to nine of the 24 semester hours numbered 300 or above can be replaced by approved mathematics-related courses.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Graduate Program. Admission to graduate study in mathematics will be granted to a limited number of students who have indicated ability for advanced and original work. Normally, one or two years are required after the bachelor's degree to obtain an M.A. degree and three or four years to obtain a Ph.D. An M.A. is not a prerequisite for the Ph.D.

A number of graduate scholarships and fellowships are available and will be awarded on the basis of merit. As part of the graduate education in mathematics, each graduate student is normally expected to engage in teaching or other instructional duties. Generally, less than six hours a week is devoted to such duties.

Qualifying Examinations. The qualifying examinations in mathematics consist of two parts: the general examination and the advanced examination.

1. *General examination.* It consists of three parts, covering algebra, analysis, and topology. The examination will be given three times a year, in mid-September and in mid-January, and at the end of the academic year. A student should take this examination after the third semester of graduate study or sooner. A student who fails one or more parts of the general examination may, with the approval of the departmental graduate committee, be allowed to retake the appropriate part(s) at the next scheduled examination time. A student generally will not be allowed to take any part of the general examination more than twice.
2. *Advanced oral examination.* After completing the general examination, the student should prepare for an advanced oral examination by selecting some special field (e.g., homotopy theory, several complex variables, group theory, etc.) and submitting the topic to the departmental graduate committee for approval. The time of the advanced examination will be scheduled by the graduate committee and will normally be within six to nine months after the general examination. A student who fails the advanced examination may, with the approval of the graduate committee, be allowed to retake it (on the same or possibly a different topic) but will generally not be allowed to take the advanced examination more than twice.

Requirements for the Degree of Master of Arts:

1. Satisfactory completion (grade of "B" or better) of a course of study approved by the department and fulfillment of the general rules of the University (described on pages 136-139). Transfer of credits from another university will be allowed only when approved by both the department and the University Graduate Council.
2. Satisfactory performance on an examination in at least one approved foreign language (French, German, or Russian).

Other requirements for the master's degree may be satisfied in either of the following ways:

1. Completion of all the requirements for qualification as a candidate for the doctoral degree as given below.
2. Presentation and oral defense of an original thesis acceptable to the department.

Requirements for the Degree of Doctor of Philosophy:

1. Satisfactory completion (grade of "B" or better) of a course of study approved by the department. Transfer of credits from another university will be allowed only when approved by both the department and the University Graduate Council.
2. Satisfactory performance on both the general and advanced qualifying examinations described above.
3. Satisfactory performance on examinations in two approved foreign languages (French, German, or Russian).
4. The writing of an original thesis acceptable to the department.
5. Satisfactory performance on a final oral examination on the thesis.
6. Any other conditions required by the general rules of the University (described on pages 129-134).

*Mathematics Courses***101,F/S SINGLE VARIABLE CALCULUS I (3-0-3)**

* DISTRIBUTION COURSE: CATEGORY III.6

Differentiation, extrema, Newton's method, integration, fundamental theorem of calculus, area, volume, natural logarithm, exponential.

102,F/S SINGLE VARIABLE CALCULUS II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Techniques of integration, arc length, surface area, Simpson's rule, L'Hopital's rule. Infinite sequences and series, tests for convergence, power series, radius of convergence.

111,F FUNDAMENTAL THEOREM OF CALCULUS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

112,S CALCULUS AND ITS APPLICATIONS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

See Math 112.

211,F/S ORDINARY DIFFERENTIAL EQUATIONS (4-0-4)

* DISTRIBUTION COURSE: CATEGORY III.6

Separable equations, first order linear equations, nth order linear equations with constant coefficients, Laplace transforms. Vector spaces, dimension, eigenvalues and eigenvectors of matrices. Systems of linear first order differential equations, exponential of a matrix. Qualitative theory of nonlinear systems. Prereq- Math 102.

212,F/S MULTIVARIABLE CALCULUS (4-0-4)

Gradient, divergence, and curl. Lagrange multipliers. Multiple integrals. Spherical coordinates. Line integrals, conservative vector fields, Green's theorem, Stokes' theorem, Gauss' theorem.

221,F HONORS CALCULUS III (3-0-3)This course and Math 222 include the material of Math 212 and more. Topology of \mathbb{R}^n , calculus for functions of several variables, linear and multilinear algebra, theory of determinants, inner product spaces, exterior differential calculus, integration on manifolds. Existence theorems for ordinary differential equations. Enrollment by permission of department. A student may not receive credit for Math 222 and 212.**222,S HONORS CALCULUS IV (3-0-3)**

See Math 221.

312,S PRINCIPLES OF ANALYSIS (3-0-3)A careful treatment of the topology of \mathbb{R}^n , convergence of sequences and series of functions, the implicit function theorem, existence theorems for ODEs, and related topics. Not open to students with Math 222.**321,F INTRODUCTION TO MODERN ANALYSIS I (3-0-3)**

A thorough treatment of basic methods of analysis such as metric spaces, compactness, sequences and series of functions. Also further topics in analysis, such as Hilbert spaces, Fourier series, Sturm-Liouville theory. Prereq.- Math 222 or permission of department. Offered 1990-91.

321,S INTRODUCTION TO MODERN ANALYSIS II (3-0-3)

See Math 321. Offered 1990-91.

355,F LINEAR ALGEBRA (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Linear transformations and matrices, solution of linear equations, eigenvalues and eigenvectors, quadratic forms, rational canonical form, Jordan canonical form.

356,S ABSTRACT ALGEBRA (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Groups: normal subgroups, factor groups, Abelian groups. Rings: ideals, Euclidean rings, and unique factorization. Fields: algebraic extensions, finite fields. Students may not take this course and Math 463.

365,S NUMBER THEORY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Properties of numbers depending mainly on the notion of divisibility. Continued fractions. Offered alternate years. Offered 1990-91.

366,S PROJECTIVE GEOMETRY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Basic elements of classical projective geometry: projective spaces, subspaces, incidence relations, comparison with other geometries. Offered alternate years. Offered 1989-90.

381,F ANALYSIS AND APPLICATIONS (3-0-3)

Laplace transform: inverse transform, applications to constant coefficient differential equations. Boundary value problems: Fourier series, Bessel functions, Legendre polynomials. A student may not receive credit for this course and Masc 340.

382,S COMPLEX ANALYSIS (3-0-3)

Cauchy integral theorem, Taylor series, residues, evaluation of integrals by means of residues, conformal mapping, application to two-dimensional fluid flow. A student may not receive credit for this course and Math 427, or Masc 330.

401,S DIFFERENTIAL GEOMETRY (3-0-3)

Differentiable manifolds, Stokes' Theorem and deRham's Theorem, fundamental theorem of local Riemannian geometry, Lie groups, vector bundles, affine connections.

402,S DIFFERENTIAL GEOMETRY (3-0-3)

See Math 401. Not offered 1989-90.

423,F PARTIAL DIFFERENTIAL EQUATIONS (3-0-3)

Theory of distributions. Wave equation, Laplace's equation, heat equation. Fundamental solutions. Other topics include first order hyperbolic systems, Cauchy-Kowalewski theorem, potential theory, Dirichlet and Neumann problems, integral equations, elliptic equations.

424,S PARTIAL DIFFERENTIAL EQUATIONS (3-0-3)

See Math 423.

425,F REAL ANALYSIS (3-0-3)

Lebesgue theory of measure and integration.

426,S TOPICS IN REAL ANALYSIS (3-0-3)

Topics vary. Past topics include: Fourier series, harmonic analysis, probability theory, advanced topics in measure theory, ergodic theory.

427,S COMPLEX ANALYSIS (3-0-3)

Cauchy-Riemann equations, power series, Cauchy's integral formula, residue calculus, conformal mappings, special topics such as the Riemann mapping theorem, elliptic function theory.

374 COURSES OF INSTRUCTION

428,F COMPLEX ANALYSIS (3-0-3)

Special topics include Riemann mapping theorem, Runge's Theorem, elliptic function theory, prime number theorem, Riemann surfaces.

443,F GENERAL TOPOLOGY (3-0-3)

Basic point set topology. Includes set theory, well ordering. Metrization.

444,S GEOMETRICAL TOPOLOGY (3-0-3)

Introduction to algebraic methods in topology and differential topology. Elementary homotopy theory. Covering spaces.

463,F ALGEBRA I (3-0-3)

Groups, rings, fields, vector spaces. Matrices, determinants, eigenvalues, canonical forms, multilinear algebra. Structure theorem for finitely generated abelian groups. Galois theory.

464,S ALGEBRA II (3-0-3)

See Math 463.

490,F/S SUPERVISED READING (Variable)

501,F TOPICS IN DIFFERENTIAL GEOMETRY (3-0-3 each semester)

Topic to be announced.

502,S TOPICS IN DIFFERENTIAL GEOMETRY (3-0-3 each semester)

The Atiyah-Singer Theorem, Secondary Invariants, and related topics.

517,F/S MATHEMATICAL PHYSICS (3-0-3 each semester)

518,S MATHEMATICAL PHYSICS (3-0-3 each semester)

523,F FUNCTIONAL ANALYSIS (3-0-3)

Locally convex spaces. Banach spaces. Hilbert spaces. Special topics.

526,S TOPICS IN COMPLEX ANALYSIS (3-0-3 each semester)

541,F/S TOPICS IN ADVANCED TOPOLOGY (3-0-3 each semester)

542,F/S TOPICS IN ADVANCED TOPOLOGY (3-0-3)

800,F/S THESIS AND RESEARCH (Variable)

Military Science

Adjunct Professor Slayton

Men and women students may participate in a Military Science program (Army ROTC) through cross-enrollment with the University of Houston. This cross-enrollment is an arrangement between the student and the Military Science Department at the University of Houston. Academic transfer credit will be included on the student's transcript. No tuition is charged for the courses. Training in military leadership and management is emphasized with instruction given in subjects common to all branches of the U.S. Army. Eligible students have the option of completing Reserve Officers' Training Corps courses in either a four-year or a two-year program.

Graduates of the Army ROTC program are commissioned in the Regular Army, Army Reserve, or National Guard in the various branches of the U.S. Army based on the needs of the Army, academic discipline, personal preference, recommendation of the professor of military science, demonstrated ability, and prior military training or experience.

Four-Year Program. The four-year program consists of the Basic Course (Military Science I and II), taken during the first and second years, and the Advanced Course (Military Science III and IV), taken during the third and fourth years.

Two-Year Program. Students with two years of study remaining who have not participated in the Basic Course are eligible for the two-year program. Students must successfully complete the six-week Basic Camp at Fort Knox, Kentucky, during the summer to qualify for the Advanced Course. The Basic Camp substitutes for Military Science I and II. Veterans who have served on active duty for at least two years may enroll in the Advanced Course without taking the Basic Course.

Advanced Camp. All students in the Advanced Course must attend a six-week Advanced Camp at Fort Riley, Kansas, between their junior and senior years. Each student is paid approximately \$600 for the six-week period.

Leadership Laboratory. All students in the Reserve Officers' Training Corps (ROTC) program must participate in a weekly, two-hour leadership laboratory.

Scholarships. Two- and three-year scholarships are available on a competitive basis to students who participate in the Army ROTC program. Special two- and three-year scholarships are available for nonenrolled students. Each scholarship student will be eligible for annual tuition assistance of up to \$7,000 or 80% of tuition, whichever is greater. Scholarship students will also receive a \$100 monthly stipend and the Army will pay for educational fees assessed by the university (student health, athletic, lab fees, etc) up to a maximum amount set annually by the U.S. Army Cadet Command.

Nonscholarship Students. Nonscholarship students receive \$100 per month during the Advanced Course.

For more information, contact the Military Science department at the University of Houston, (713) 749-4394.

Military Science Courses

101,F/S BASIC MILITARY LEADERSHIP I (1-2-0)

An introduction to the customs, courtesies, and organization of the U.S. Army. A study of the Department of Defense and the U.S. Army's role in current world affairs. Military skills leadership laboratory is required Wednesday afternoon.

Gaidelis, S.

102,S BASIC MILITARY LEADERSHIP II (1-2-1)

Continuation of Mili 101. An introduction to the customs, courtesies, and organization of the U.S. Army. A study of the Department of Defense and the U.S. Army's role in current world affairs. Military skills leadership laboratory is required Wednesday afternoon. Prereq- Mili 101 or consent of chairman. To receive credit, student must complete Mili 101 first.

Gaidelis, S.

201,F BASIC TACTICS AND MILITARY OPERATIONS (3-2-1)

An introduction to small unit tactics and map reading. Military skills leadership laboratory required Wednesday afternoon.

McKissick, T.

202,S MANAGEMENT OF THE MILITARY (3-2-1)

A study of training management, oral communication skills, and the role of the professional soldier. Military skills leadership laboratory required Wednesday afternoon.

McKissick, T.

301,F ADVANCED TACTICS AND MILITARY OPERATIONS (3-2-2)

Military planning, operations and advanced tactics. Prereq- Basic course qualification or consent of chairman. Military skills leadership laboratory required Wednesday afternoon.

Holbrook, L.

302,S LEADERSHIP DEVELOPMENT (3-2-2)

The study of individual and group behavior and the principles and techniques of applied leadership. Prereq- Mili 301 or consent of chairman. Military skills leadership laboratory required Wednesday afternoon.

Holbrook, L.

401,F ADVANCED MILITARY SCIENCE (3-2-2)

A study of the military justice system, aspects of military law, the Geneva Convention, and military professionalism/ethics. Prereq- Mili 301 and 302 or consent of chairman. Military skills leadership laboratory is required Wednesday afternoon.

Simmons, P.

402,S MANAGEMENT OF THE MILITARY TEAM (3-2-1)

A study of the combined arms team, command and staff relationships, and Army support organizations. Prereq- Mili 401 or consent of chairman. Military skills leadership laboratory is required Wednesday afternoon.

Simmons, P.

The Shepherd School of Music

Professor Hammond, *Dean*

Professors Arad, Babikian, Cooper, Ellison, Fliegel, Holloway, S. Jones, Milburn, Luca, Schnoebelen, Trepel, and Wicks

Associate Professors Bailey, Burt, Citron,

Gottschalk, and Pickar

Assistant Professors Arbiter, R. Brown, Jaber, Lavenda, and Meconi

Lecturers Dye, Kirk, Malone, and Rose

Artist Teachers Addison, Atherholt, Bacon, Bilger, Brooks,

Chaisson, Connelly, Griebeling, Kamins, Lombard, Newton,

Page, Perry, Shank, and Waters

Artists in Residence Bible and Eschenbach

Adjunct Lecturer Visser

Degrees Offered: B.A.; B.Mus.; B.Mus./M.Mus., (simultaneously); M.Mus.; D.M.A.

The Shepherd School of Music is committed to the highest quality education of musicians and offers both professional training and a broad liberal arts curriculum at the undergraduate level. At the graduate level, it offers professional music training for qualified students in programs of performance, creativity, and scholarship.

Degrees Offered. The Shepherd School of Music offers four degrees: Bachelor of Arts degree in music; the Bachelor of Music degree in performance, composition, music history, and music theory; the Master of Music degree in performance, composition, choral and instrumental conducting, musicology, and music theory; and the Doctor of Musical Arts degree in composition and selected areas of performance. Normally, four years are required for the bachelor's degrees and two years for the master's. Qualified students may elect an honors program that leads to the simultaneous awarding of the Bachelor of Music and Master of Music degrees after five years of study.

Admission. An audition, either in person or on tape, and a theory evaluation are required of each undergraduate applicant. Undergraduate admission is determined jointly by the Shepherd School faculty and by the Admission Committee of Rice University, which bases its evaluation upon successful academic achievement and standard college admission indices.

Transfer students from other colleges, conservatories, and universities are evaluated in terms of prior preparation, which may reduce the required period of study at Rice. An audition, personal or taped, and placement exams in both music history and music theory are required of transfer applicants.

An audition or personal interview, and placement exams in music history and music theory are required of graduate applicants. The Graduate Record Examination, including the advanced music tests, is required of graduate applicants in musicology, theory, and composition.

Curriculum Design. Undergraduate curricula consist of core music courses, applied music, other required music courses, chamber music and large ensembles,

non-music courses as specified by the University, and electives. Music majors are entitled to one hour of private lessons each week each semester they are enrolled as a music major. Private or group lessons beyond this may result in additional fees. After the required four semesters of instrumental or vocal study, students in the B.A. in music program who wish to continue taking private lessons must secure permission from the Dean's Office. All undergraduate majors are required to take the following core courses:

Music Theory: 211, 212, 311, 312, 411

Music History: 221, 222, 321, 322, 421

Aural Skills: 231, 232, 331, 332, 431

Students in the B.A. in music program take all of the above, with the exception of Aural Skills 331, 332, and 431. Requirements in other music areas vary with the degree program. Further information on curricular requirements for all majors and degree programs may be obtained from The Shepherd School of Music.

Information on University Distribution Requirements and Foundation courses may be found elsewhere in this catalogue. For music majors, 6 hours of music history may be counted as humanities (Group I, 2).

The B.Mus./M.Mus. program includes the core curriculum and an advanced curriculum. The first five semesters parallel the core curriculum of the four-year degrees. The sixth semester is a transitional semester in which the student must qualify for formal admission to candidacy for the master's degree as well as begin work in the advanced curriculum. If qualifying does not take place by the end of the sixth semester, the student is not allowed to register for the advanced curriculum without special permission. At least five distribution courses (preferably six) must be completed by the end of the sixth semester before the student is considered for formal admission to candidacy for the master's degree.

The final two years are devoted to the advanced curriculum, in which the student concentrates on creativity, performance, or research supported by laboratory or performing ensembles, theory and history seminars, and professional apprenticeships. Apprenticeships may involve a diversity of professional activities as appropriate for the individual. These may include participation with major or civic orchestras, choirs, or opera theaters; off-campus solo and small ensemble performances; conducting apprenticeships with professional orchestras, operas, or ballet companies; composition for films, television, public schools, and for ensembles in residence; and research in major national and international libraries. It is the responsibility of students to arrange their apprenticeships. Whenever possible, faculty members assist students in making arrangements for apprenticeships. These and any other specialized studies must be engaged by the individual student with the approval of the faculty.

Special Examinations:

1. At the end of each semester, a jury examination is given in applied music over the material studied during the semester.
2. Keyboard proficiency is required of all degree candidates except B.A. students and must be satisfied by examination. If the student has little or no knowledge of the keyboard, enrollment in secondary piano beginning in the student's first semester is encouraged until the examination requirements are met.

3. Students on the five-year program must take a qualifying examination no later than the sixth semester to determine admissibility to the student's preferred major area in the advanced curriculum. For performance majors, this examination consists of the qualifying recital and an oral examination in music history and music theory based on the compositions to be performed on the qualifying recital. The Graduate Record Examination is required by the conclusion of the sixth semester for music history, theory, and composition majors.

Performance and Large Ensembles. Students are expected to perform frequently during their residence at Rice. Performance majors must present at least two full recitals. Composition and conducting students are expected to present recitals as specified by their degree programs. Students are expected to attend both faculty and student recitals. In addition, all music majors are required to participate in the school's conducted ensembles as assigned.

Thesis. The master's degree for composition, conducting, music history, and theory majors assumes a high level of scholarship. A thesis is required of music history and theory majors. An original work of extended scope is required of composition majors. Conducting majors must present either an extended composition or project.

Warning, Music School Probation, Discontinuation. A student performing unsatisfactorily in one or more courses at the midterm period may be placed on warning. If at the end of the semester significant improvement has not been shown, the student may be placed on music probation. A student may be placed directly on probation without warning. Probation is a more serious status than warning, and it signifies that the student's work has been sufficiently unsatisfactory to preclude graduation unless significant improvement is achieved promptly. A student on music probation may be absent from class only for extraordinary reasons and may not represent the school in any public function not directly a part of a degree program.

If at the conclusion of the probationary period the student has not shown marked improvement, the student may be discontinued from the school as a music major. Any student discontinued as a music major but not on academic suspension may elect a major elsewhere in the University, subject to the requirements of the major department or school.

A minimum grade of B- is expected of all music students in their major applied area. A grade of C will be evaluated in the following manner. If in the first five semesters of an undergraduate degree program a student receives a grade of C in his applied area, he will be placed on music warning. If the student receives a second C, he will be placed on music probation. With a third C in his major applied area, the student will be discontinued as a music major.

Courses for Non-majors. Non-majors will find the following courses designed for the general student: Music 117, 118; 224; 225; 307, 308; 317, 318; 327, 328; 334, 335; individual instruction in all instruments: Music 141-197.

In addition, other music courses may be taken by the non-major with the permission of the instructor and approval of the Dean of the Shepherd School.

Musical Opportunities. Musical and educational opportunities are afforded the student both on campus and in the greater Houston area. A visiting lecturer

series, a professional concert series, and numerous visiting distinguished musicians contribute to the Shepherd School environment. The Houston Symphony Orchestra, Symphony Chorale, Houston Grand Opera, Texas Opera Theater, Houston Ballet, Concert Chorale of Houston, Da Camera Society as well as the activities of other institutions of higher learning in the area provide exceptional opportunities for musical experiences.

Composition

Music Courses

201,F COMPOSITION I (3-0-3).

Creative composition employing midcentury vocabularies supported by extensive performance, listening, and analysis of related scores. Prerequisite: permission of instructor.

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

202,S COMPOSITION II (3-0-3).

Creative composition employing current musical vocabularies, supported by appropriate performance, listening, and analysis.

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

301,F COMPOSITION III (3-0-3).

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

302,S COMPOSITION IV (3-0-3).

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

303,F/304,S UNDERGRADUATE COMPOSITION SEMINAR I, II (Credit variable).

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

305,F/306,S COMPOSITION ELECTIVE (3-0-3 each semester).

307,F/308,S COMPOSITION FOR NONMAJORS I, II (3-0-3 each semester).

***DISTRIBUTION COURSE: CATEGORY I.2**

401,F/402,S COMPOSITION V, VI (3-0-3 each semester).

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

405,F/406,S COMPOSITION ELECTIVE (3-0-3 each semester).

501,F/502,S ADVANCED COMPOSITION I, II (3-0-3 each semester).

Composition for large ensembles.

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

503,F ELECTRONIC MUSIC COMPOSITION (1-6-3 each semester).

An introduction to analog synthesizers, VC programming, and basic tape manipulation and recording techniques.

Mr. Gottschalk

504,S COMPUTER-ASSISTED MUSIC COMPOSITION (1-6-3 each semester).

An introduction to computer controlled M.I.D.I. sound synthesis systems, sequencing, multi-track tape recording, and outboard sound and signal processing. MUSI 503 required.
Mr. Gottschalk

505 ADVANCED ELECTRONIC AND COMPUTER MUSIC COMPOSITION (1-6-3 each semester).

A continuation of MUSI 504, more individual project oriented, with an emphasis on music generation computer programming. MUSI 504 required.

601,F/602,S ADVANCED COMPOSITION III, IV (3-0-3 each semester).

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

603,F/604,S GRADUATE COMPOSITION SEMINAR I, II (Credit variable).

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

701, 702 ADVANCED COMPOSITION V, VI (3 credits).

Advanced composition for doctoral students.

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

703, 704 ADVANCED COMPOSITION VII, VIII (3 credits).

Advanced composition for doctoral students.

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

705, 706 ADVANCED COMPOSITION IX, X (3 credits).

Advanced composition for doctoral students.

Mr. Burt, Mr. Cooper, Mr. Gottschalk, Mr. Jones, Mr. Lavenda, Mr. Milburn

707 DOCTORAL INDEPENDENT STUDY IN COMPOSITION (3 credits).

Major symphonic or symphonic/choral work of professional level.

Staff

Theory

Music Courses

117F/S FUNDAMENTALS OF MUSIC I (3-0-3).

***DISTRIBUTION COURSE: CATEGORY I.2**

For nonmusic majors with minimal music preparation. Rudiments of pitch and duration. Study of scales, chord structure tonality, and forms.

118,S FUNDAMENTALS OF MUSIC II (3-0-3).

***DISTRIBUTION COURSE: CATEGORY I.2**

Application of Music 117 materials. Creative work utilizing twentieth-century art and popular vocabulary.

211,F THEORETICAL STUDIES I (3-0-3).

For music majors. Theory evaluation survey is required to determine course section. Study of music aesthetics, physical properties of sound, melody, rhythm, counterpoint, instrumentation, and form. Study of and creative work in music of the later Medieval period and the Renaissance.

Mr. Lavenda

382 COURSES OF INSTRUCTION

212,S THEORETICAL STUDIES II (3-0-3).

For music majors. Discussion, analysis, and creative application of theoretical concepts and vocabulary from 1800 to present.

Mr. Lavenda

311,F THEORETICAL STUDIES III (3-0-3).

For music majors. Baroque and Early Classical music. Study of species counterpoint and of two-three-four voice tonal counterpoint. Analysis of representative compositions of diverse genre and medium.

Mr. Gottschalk

312,S THEORETICAL STUDIES IV (3-0-3).

For music majors. Late Classical and Romantic music. Chromatic harmony. Analysis of selected major works. Introduction to Linear Reductive Analysis.

Mr. Gottschalk

317,F THEORY FOR NONMAJORS I (3-0-3).

***DISTRIBUTION COURSE: CATEGORY I.2**

For nonmusic majors with appreciable instrumental and/or high school theory background. Discussion, analysis, and application of the parameters of music: melody, rhythm, harmony, counterpoint, instrumentation, and form. Application to literature to 1700.

318,S THEORY FOR NONMAJORS II (3-0-3).

***DISTRIBUTION COURSE: CATEGORY I.2**

For nonmusic majors with appreciable instrumental and/or high school theory background. Prerequisite: 317 or permission of instructor. Stylistic harmony, melody, and form from 1700 to the present.

411,F THEORETICAL STUDIES V (3-0-3).

Music of the twentieth century. Compositional devices from 1900-present. Analysis of selected major works.

Mr. Milburn, Mr. Lavenda

412,S THEORETICAL STUDIES VI (3-0-3).

Advanced analytical techniques. Practical applications of principal analytical systems from the Middle Ages to the present.

Mr. Jones

417 MUSIC FOR FILM (2 credits).

Lectures focusing on instances where music has made a decisive impact on the meaning and vitality of various films. Generalized functions of film music (pacing, characterization, psychological extension, structural delineation) are examined with reference to dramatic intent. No prior technical knowledge of either medium is assumed. Explanation or definition is offered where needed. Some background in film or music is preferred.

Mr. Burt

418 FILM MUSIC LAB (1 credit).

Discussions centering on detailed analysis of specific "cues" with the goal towards a collaboration with a filmmaker on the composition of a sound track for a short film. Lab is open to composers and is to be taken concurrently with Music 407.

Mr. Burt

511,F GRADUATE THEORY REVIEW (2-0-2).

Mr. Burt

513,F MODAL COUNTERPOINT (2-0-2).

An in-depth examination of the vocal polyphony of the 16th century, with practical applications of contrapuntal techniques.

Mr. Gottschalk

515,F/516,S ADVANCED ORCHESTRATION I, II (2-0-1 each semester).

Mr. Jones, Mr. Milburn

517,F SPECIAL STUDIES-MUSIC THEORY ANALYTICAL SYSTEMS (3-0-3).

Staff

611,F/612,S PEDAGOGY OF THEORY I, II (3-0-3 each semester).

Principal learning theories and philosophies of learning and teaching. Examination and critique of college-level materials.

Mr. Milburn

613,S CANON AND FUGUE (2-0-2).

Specialized study of imitative counterpoint. Examples from the fifteenth to twentieth centuries. Emphasis on the Baroque fugue.

Mr. Milburn

614,F/S SELECTED STUDIES IN MUSIC THEORY (3-0-3).

Advanced study of the music of a single composer..

Staff

711 ANALYTICAL APPROACHES (3 credits).

An examination of critical passages from chosen works and with specific reference to central points of view in the writings of Schenker, Forte, Babbitt, Cone.

Mr. Burt

715,F HISTORY OF THEORY (3-0-3).

History and Literature

Music Courses

221,F/222,S HISTORICAL STUDIES I, II (3-0-3 each semester).

Historical study of musical style. Introduction, first semester; Medieval and Renaissance, second semester.

Ms. Meconi

224 INTRODUCTION TO OPERA (3-0-3).

Introductory course focusing on historical, musical, and literary aspects of selected operas, including those in Houston Grand Opera current session. No prerequisite. Offered irregularly.

Ms. Schnoebelen

321,F/322,S HISTORICAL STUDIES III, IV (3-0-3 each semester).

Historical studies in music of the seventeenth, eighteenth, and nineteenth centuries. Baroque, Pre-Classical, first semester; Classical and Romantic, second semester. Correlated with Music 311, 312 and 331, 332.

Ms. Schnoebelen, Ms. Citron

384 COURSES OF INSTRUCTION

325 BAROQUE STRING/CONTINUO PERFORMANCE (credit variable).

This course combines the theoretical and pragmatic approaches to Baroque music performance problems for string and continuo players. Research from treatises on various topics will be discussed in weekly classes and then applied to the instruments in extensive performance workshops. Prerequisite: audition. Offered irregularly.

Mr. Luca, Ms. Schnoebelen

327,F/328,S MUSIC LITERATURE FOR NONMAJORS I, II (3-0-3 each semester).

***DISTRIBUTION COURSE: CATEGORY I.2**

Historical survey of music from the Middle Ages to 1750, first semester; from 1750 to the present, second semester.

Mr. Bailey

329 SPECIAL STUDIES-MUSIC HISTORY. (3-0-3).

Special studies in music history. Offered irregularly.

Staff

421,F HISTORICAL STUDIES V (3-0-3).

Twentieth century and contemporary. Historical studies in music of the twentieth century. Correlated with Music 411 and 431.

Mr. Bailey

422 RENAISSANCE MUSIC (3-0-3).

Ms. Meconi

423,F CHAMBER MUSIC LITERATURE (3-0-3).

Offered irregularly.

Staff

424,F/425,S ORGAN LITERATURE I, II (3-0-3 each semester).

Mr. Holloway

426,F PIANO LITERATURE (3-0-3).

Staff

427,F/428,S ORGAN LITERATURE III, IV (3-0-3).

Mr. Holloway

429 MUSIC OF THE MIDDLE AGES (3-0-3).

Offered irregularly.

436,F/S COLLEGIUM (1 credit).

Ms. Meconi

521 GRADUATE REVIEW OF EARLY MUSIC (0 credit).

Ms. Schnoebelen

523,F BIBLIOGRAPHY AND RESEARCH METHODS I (3-0-3).

Studies in bibliography, techniques in research methodology.

Ms. Citron

524,S BIBLIOGRAPHY AND RESEARCH METHODS II (3-0-3).

Prerequisite: Music 523 or permission of instructor. Offered irregularly.

Ms. Schnoebelen

525 PERFORMANCE PRACTICES SEMINAR (3-0-3).

Study of performance practices from treatises and music, problems in editing music. Offered irregularly.

Ms. Meconi

621,F/S SELECTED STUDIES IN MUSIC HISTORY (3-0-3).

Seminar on individual topics in music history to be announced each year. Prerequisite: Music 411, 421.

Staff

624,F/S SEMINAR ON A SELECTED COMPOSER (3-0-3 each semester).

Advanced study of the music of a single composer.

Prerequisite: Music 411, 421.

Staff

723 AESTHETICS OF MUSIC (3-0-3).

This is an introduction to music aesthetics, focusing on contemporary theories and writings. The main issues to be discussed are the creation and perception of musical beauty, expression, and meaning. Other topics include: the relationship of the score to the piece; listening; musical sense and coherence; and the possibility of objectivity. Readings will be drawn from the work of Suzanne Langer and Leonard Meyer, as well as more recent writings in phenomenology and semiotics. Offered irregularly.

Staff

725, 726 NOTATION I, II (3-0-3 each semester).

Prerequisite: permission of instructor; Offered irregularly.

Staff

Aural Skills

231.F/232,S AURAL SKILLS AND PERFORMANCE TECHNIQUES I, II (3-0-2 each semester).

Ear-training and sight-singing: solfege, rhythmic studies, intervals, chords. Emphasis on diatonic music.

Placement test required prior to enrollment. Aural skills classes must be taken in sequence.

Mr. Lavenda

331,F/332,S AURAL SKILLS AND PERFORMANCE TECHNIQUES III, IV (3-0-2 each semester).

Continuation of Music 232. Emphasis on chromatic music.

Mr. Lavenda

431,F AURAL SKILLS AND PERFORMANCE TECHNIQUES V (3-0-2).

Continuation of performance techniques. Literature of the twentieth century.

Staff

437,F GRADUATE EAR TRAINING REVIEW (3-0-2).

Offered irregularly.

Conducting

333,F/S UNDERGRADUATE CONDUCTING SEMINAR (4-0-1).

Staff

433,S SCORE READING (2-2-2).

Staff

434,F ELEMENTS OF CONDUCTING (2-0-2).

Staff

439,F CHORAL CONDUCTING I (3-0-3).

The fundamentals skills of choral conducting, including baton techniques, score reading, and rehearsal procedures. Conducting materials will be selected from representative choral works. Offered irregularly.

Mr. Jaber

440,S CHORAL CONDUCTING II (3-0-3).

Advanced techniques of choral conducting with emphasis on expressive gestures and phrasal conducting, interpretation and chironomy of chant, recitative conducting, repertoire selection, score preparation, and conducting of choral-instrumental works. Offered irregularly.

Mr. Jaber

533,F/S GRADUATE CONDUCTING SEMINAR (4-0-1).

Staff

537,F/538,S ADVANCED CONDUCTING I, II (3-9-3).

Staff

539,F PSYCHOLOGY OF CONDUCTING (1-0-1).

Offered irregularly.

Staff

630,F/S GRADUATE CHORAL CONDUCTING SEMINAR (3-0-3).

Mr. Jaber

637,F/638,S ADVANCED CONDUCTING III, IV (3-9-3 each semester).

Staff

639,S ORCHESTRA ADMINISTRATION (1-0-1).

Offered irregularly.

Staff

Individual Instruction

Course numbers for individual instruction are constituted as follows:

1. The first digit indicates function within the student's curriculum: 1 = nonmusic major; 2 = secondary, i.e., study by a music major on an instrument other than his or her principal instrument; 3 = concentration, i.e., the principal instrument of students majoring in composition, music history, theory, or conducting; 4 = music performance major for four-year undergraduates and five-year students prior to qualifying exams; 6 = music performance major for two-year graduate students and five-year students after qualifying exams.
2. The second digit indicates the instrumental "family."
3. The third digit indicates the particular instrument within the family.

Course numbers for flute are printed in complete format below. The remainder is printed in summary form.

Woodwind Instruction

Flute Courses

151,F/S FLUTE FOR NONMAJORS (1-5-2).

***DISTRIBUTION COURSE: CATEGORY I.2**

251,F/S SECONDARY FLUTE (1-5-2).

351,F/S CONCENTRATION FLUTE (1-5-2).

352,F/S CONCENTRATION FLUTE-INTENSIVE (1-25-3).

Staff

451,F/S FLUTE FOR MAJORS (1-25-3).

Staff

651,F/S FLUTE FOR MAJORS, ADVANCED, AND GRADUATES (1-25-3).

Staff

Oboe Courses

153,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 253,F/S (1-5-2);

353,F/S (1-5-2); 354,F/S (1-25-3);

453,F/S (1-25-3); 653,F/S (1-25-3).

Mr. Atherholt

Clarinet Courses

155,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 255,F/S (1-5-2);

355,F/S (1-5-2); 356,F/S (1-25-3);

455,F/S (1-25-3); 655,F/S (1-25-3).

Mr. Pickar

Bassoon Courses

157,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 257,F/S (1-5-2);

357,F/S (1-5-2); 358,S (1-25-3);

457,F/S (1-25-3); 656,F/S (1-25-3).

Mr. Kamins

459 THEORY OF WOODWIND PERFORMANCE TECHNIQUES

(1-3-1 each semester).

For non-woodwind students.

Mr. Pickar

559,F/S WOODWIND PEDAGOGY (1-3-2 each semester).

Offered irregularly.

Brass Instruction

Horn Courses

161,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2; 261,F/S (1-5-2); 361,F/S (1-5-2); 362,F/S (1-25-3); 461,F/S (1-25-3); 661,F/S (1-25-33).

Mr. Bacon

Trumpet Courses

163,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 263,F/S (1-5-2); 363,F/S (1-5-2); 364,F/S (1-25-3); 463,F/S (1-25-33); 663,F/S (1-25-3).

Mr. Bilger

Trombone Courses

165,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 265,F/S (1-5-2); 365,F/S (1-5-2); 366,F/S (1-25-3); 465,F/S (1-25-3); 665,F/S (1-25-3).

Mr. Waters

Tuba Courses

167,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 267,F/S (1-5-2); 367,F/S (1-5-2); 368,F/S (1-25-3); 467,F/S (1-25-3); 667,F/S (1-25-3).

Mr. Kirk

469 THEORY OF BRASS PERFORMANCE TECHNIQUES (1-3-1 each semester).

For non-brass students.

Staff

569,F/S BRASS PEDAGOGY (1-3-2).

Offered irregularly.

Percussion Instruction

Percussion Courses

171,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 271,F/S (1-5-2); 371,F/S (1-5-2); 372,F/S (1-25-3); 471,F/S (1-25-3); 671,F/S (1-25-3).

Mr. Brown

479,S THEORY OF PERCUSSION PERFORMANCE TECHNIQUES (1-3-1 each semester).

For non-percussion students. Offered irregularly.

Mr. Brown

579,F/S PERCUSSION PEDAGOGY (1-3-2 each semester).
Offered irregularly.

Mr. Brown

Voice Instruction

Voice Courses

173,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); **273,F/S** (1-5-2);
373,F/S (1-5-2); **374,F/S** (1-25-3);
473,F/S (1-25-3); **673,F/S** (1-25-33).

Ms. Babikian, Ms. Bible, Ms. Lombard, Ms. Griebling, Ms. Newton

474,F/S OPERA THEATER WORKSHOP (1 credit).

Operatic techniques for the singer/actor: the cultivation, through study and performance, of free, expressive and significant movement on stage, and the development of musical, dramatic and muscular sensitivity as the basis of good opera theater. Participation, according to ability, in scenes recitals and major productions.

Mr. Addison

475 THEORY OF VOCAL PERFORMANCE TECHNIQUE (1 credit).

For non-voice students. Offered irregularly.

Staff

549,F/S VOICE PEDAGOGY (1-3-2 each semester).

Offered irregularly.

571 VOCAL COACHING (1 credit).

Mr. Jaber

572,F/S OPERATIC ROLE PREPARATION (3 credits).

An in-depth study of two or more contrasting roles in which the singer might reasonably be cast, now or in the future, and performance of scenes therefrom.

Prerequisite: two semesters of Opera Workshop.

Mr. Addison

573,F DICTION I: ITALIAN (2-1-1).

Staff

574,F DICTION II: GERMAN (2-1-1).

Staff

575,F/576,S VOICE REPERTOIRE I, II (1-3-2 each semester).

Ms. Griebling

577,S DICTION III: ENGLISH (2-1-1).

Staff

578,S DICTION IV: FRENCH (2-1-1).

Staff

Keyboard and Harp Instruction

Piano Courses

181,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 281,F/S (1-5-2); 381,F/S (1-5-2); 382,F/S (1-25-3); 481,F/S (1-25-3); 681,F/S (1-25-3).

Mr. Perry, Mr. Chaisson

Organ Courses

183,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 283,F/S (1-5-2); 383,F/S (1-5-2); 384,F/S (1-25-3); 483,F/S (1-25-3); 683,F/S (1-25-3).

Mr. Holloway

Harpsichord Courses

185,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 285,F/S (1-5-2); 385,F/S (1-5-2); 386,F/S (1-25-3).
Prerequisite: Permission of instructor.

Mr. Holloway

Harp Courses

187,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); 287,F/S (1-5-2); 387,F/S (1-5-2); 388,F/S (1-25-3); 487,F/S (1-25-3); 687,F/S (1-25-3).

Ms. Rose, Ms. Page

445,F/446,S KEYBOARD PROFICIENCY I, II (2 credits).
Offered irregularly.

Mr. Holloway, Staff

482 PIANO TECHNOLOGY (2 credits).

An introduction and practicum in the tuning and maintaining of pianos. Among the topics to be discussed will be the theory and acoustics of tuning, a brief history of the piano, proper repair and replacement of sound producing mechanisms, and a general exposure to restoration. There will be hands-on experience and opportunities for supervised involvement in tuning and maintenance. The course is designed primarily but not exclusively for piano majors.

Mr. Shank

545,F/546,S KEYBOARD PROFICIENCY III, IV (2 credits).
Offered irregularly.

Mr. Holloway, Staff

546,F ORGAN PEDAGOGY (1-3-2).

Mr. Holloway

589,F/S PIANO PEDAGOGY (1-3-2).
Offered irregularly.

Mr. Shank

645,S ORGAN CONSTRUCTION (2 credits).
Offered irregularly.

Mr. Visser

String Instruction

Violin Courses

191,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); **291,F/S** (1-5-2);
391,F/S (1-5-2); **392,F/S** (1-25-3);
491,F/S (1-25-3); **691,F/S** (1-25-3).

Mr. Fliegel, Mr. Luca, Ms. Wicks

Viola Courses

193,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); **293,F/S** (1-5-2);
393,F/S (1-5-2); **394,F/S** (1-25-3);
493,F/S (1-25-3); **693,F/S** (1-25-3).

Mr. Arad, Mr. Brooks

Violoncello Courses

195,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); **295,F/S** (1-5-2);
395,F/S (1-5-2); **396,F/S** (1-25-3);
495,F/S (1-25-3); **695,F/S** (1-25-3).

Ms. Trepel

Double Bass Courses

197,F/S *DISTRIBUTION COURSE: CATEGORY I.2 (1-5-2); **297,F/S** (1-5-2);
397,F/S (1-5-2); **398,F/S** (1-25-3);
497,F/S (1-25-3); **697,F/S** (1-25-3).

Mr. Ellison, Mr. Malone

499,F THEORY OF STRING PERFORMANCE TECHNIQUES (1-3-1).
For non-string students. Offered irregularly.

Mr. Fliegel

599,F/S STRING PEDAGOGY (1-3-2 each semester).
Offered irregularly.

Ensembles

334,F/S CAMPANILE (0-3-1 each semester).

Staff

335,F/S UNDERGRADUATE CHORUS (0-3-1 each semester).
Section 1, Shepherd Singers (by audition only); Section 2, Rice Chorale.

Mr. Jaber

337,F/S UNDERGRADUATE ORCHESTRA (0-9-1 each semester).

Staff

338,F/S UNDERGRADUATE CHAMBER MUSIC (0-6-1 each semester).

Section 1, String Quartet; Section 2, Piano; Section 3, Other String Ensembles; Section 5, Woodwind; Section 6, Brass; Section 7, Percussion; Section 8, Voice; Section 10, Other Ensembles.

435,F/S CONTEMPORARY ENSEMBLE.

531,F/S ORCHESTRAL REPERTOIRE (1-3-1 each semester).

May be repeated. Section 1, Violin; Section 2, Viola; Section 3, Cello; Section 4, Bass; Section 5, Woodwinds; Section 6, Brass; Section 7, Percussion; Section 8, Harp.

635,F/S ADVANCED ORCHESTRA (0-9-1 each semester).

Staff

636,F/S ADVANCED CHAMBER MUSIC (0-6-1 each semester).

Section 1, String Quartet; Section 2, Piano; Section 3, Other String Ensembles; Section 5, Woodwind; Section 6, Brass; Section 7, Percussion; Section 8, Voice; Section 10, Other Ensembles.

640,F/S ADVANCED CHORUS (0-3-1 each semester).

Section 1, Shepherd Singers (by audition only). Section 2, Rice Chorale.

Mr. Jaber

736,F/S SOLO, CHAMBER AND CONCERTO REPERTOIRE (3 credits).

Preparation of a wide range of repertoire as determined by the instructor.

Courses Applicable to All Specializations

141,F/S GUITAR FOR NON-MAJORS (1-5-2).

* DISTRIBUTION COURSE: CATEGORY 1.2

341,F/S JUNIOR RECITAL (0-0-0 each semester).

441,F/S QUALIFYING RECITAL (0-0-0 each semester).

442,F/S RECITAL ACCOMPANYING (0-2-1 each semester).

Accompanying a single student recital, including the preview, dress rehearsal, performance, three lessons with the soloist's teacher, and practice times mutually agreeable to soloist and accompanist. May be repeated for additional credit.

443,F/S STUDIO ACCOMPANYING (0-4-1 each semester).

Accompanying private lessons in studios as assigned for a total of four hours per week. May be repeated for additional credit.

449,F/S UNDERGRADUATE INDEPENDENT STUDY (Credit variable).

641,F/S ADVANCED OR SENIOR RECITAL (0-0-0 each semester).

642,F/S ACCOMPANYING FOR ENSEMBLE CREDIT (0-4-1 each semester).

Requires permission of student's major teacher and conductor of ensemble in which student would normally perform. Taken in lieu of Music 635 or 640. Student to fulfill requirements of Music 442 or 443.

647,F/S MASTER'S THESIS IN COMPOSITION, THEORY, HISTORY AND LITERATURE, OR CONDUCTING (1-0-3).

649,F/S GRADUATE INDEPENDENT STUDY (Credit variable).

741,F/S GRADUATE RECITAL (0-0-0 each semester).

743,F/S DOCTORAL SEMINAR - INSTRUMENTAL LITERATURE (2 credits)

Directed analysis of selected works in student's current repertoire; additional works as specified by instructor. Required of DMA instrumental majors except organists, for four semesters.

745,F/S INSTRUMENTAL TECHNIQUES - WOODWINDS (1 credit)

A study of the relationships of the various instruments within a family; technical problems to be encountered in the repertoire and resolution of those problems.

749,F/S APPRENTICESHIP (Credit variable).

750,F/S DOCTORAL DOCUMENT (3 credits).

Supervised research and writing in areas of performance study. Not limited to areas of original research.

751,F/S DOCTORAL RECITAL (0 credit).

800 DISSERTATION (3 credits).

Band

Band Courses

340,F/S CONCERT BAND (0-4-1).

By audition.

Mr. Dye

342,F/S JAZZ ENSEMBLE (0-3-1).

By audition.

Mr. Dye

345,F/S APPLIED STUDIES IN JAZZ IMPROVISATION (2 credits).

Private lessons on specific advanced techniques in jazz improvisation.

415,S BAND ARRANGING (2-1-1).

Creative band arranging for marching, jazz, and concert bands. Study of contemporary harmony, musical style, and scoring supported by practical performance and analysis of student projects.

Mr. Dye

Natural Science

101,F INTRO TO THE PHYS SCIENCES (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY III.5 OR III.6**

The methods and basic principles of science, with major emphasis on mathematics, physics and chemistry. A FOUNDATION COURSE

Rorschach, Jr., H.

102,S INTRO TO THE PHYS SCIENCES (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY III.5 OR III.6**

The methods and basic principles of science, with major emphasis on mathematics, physics and chemistry. A FOUNDATION COURSE

Rorschach, Jr., H.

Naval Science

Professor R. L. Magalis, Chair

Associate Professor Locke

Assistant Professors Sonntag, Morales, and Dawson

The Department of Naval Science is administered by a senior U.S. naval officer, assisted by officers and enlisted personnel of the U.S. Navy and Marine Corps.

There are two categories of NROTC students: (1) scholarship, (2) nonscholarship.

Scholarship Students. A scholarship NROTC student is appointed a midshipman, U.S. Naval Reserve, on a nationwide competitive basis and receives retainer pay at the rate of \$100 per month for a maximum of four academic years, with all tuition, fees, books, and equipment paid for by the government. Midshipmen are required to complete prescribed naval science courses, participate in drills and three summer cruises, and, upon graduation with a baccalaureate or advanced degree, to accept a regular commission as ensign in the U.S. Navy or second lieutenant in the U.S. Marine Corps.

Nonscholarship Students. Nonscholarship students are civilian college students who enter into a mutual contract with the Secretary of the Navy in which they take naval science courses and participate in drills and one summer training cruise. In return, the Navy pays the student \$100 per month during the junior and senior years and offers a reserve commission in the Navy or Marine Corps upon graduation. Nonscholarship students may, on a local, competitive basis, be recommended for scholarship status by the professor of naval science.

Two-Year Program Students. Interested students may, in their sophomore year (junior year for five-year students at Rice), apply for the two-year NROTC program. A nationwide competition will initially determine their scholarship or nonscholarship status (see above). Following selection, applicants attend a six-week Naval Science Institute (NSI) at Newport, Rhode Island, during July and August, which is designed to provide students with course material and training normally covered during the first two years of the regular NROTC program.

Successful completion of NSI qualifies the student for enrollment in the advanced NROTC on an equal footing with the four-year students. About 15 percent of the nonscholarship students finishing NSI may be offered a two-year NROTC scholarship at that time. Additional scholarships may be awarded to the others from time to time upon the recommendation of the professor of naval science at Rice.

U.S. Marine Corps. NROTC students, either scholarship or nonscholarship, may apply for the Marine Corps program. Such selectees are referred to as Marine Corps option students and attend separate classes under a marine officer instructor during their junior and senior years.

Naval Science

Naval Science Courses

101,F NAVAL ORIENTATION (2-2-0)

An introduction to naval traditions and customs, seamanship, naval organization and missions, and the fundamental concepts of seapower.

Sonntag, C.

102,S NAV ENGINEERING-NAV SHIP SYS I (3-2-3)

A study of ship propulsion systems, auxiliary systems, steering systems, electrical power distribution, ship design, ship stability and damage control measures.

Morales, W.

201,F NAV WEAPONS-NAV SHIP SYS II (3-2-2)

A study of the theory and employment of weapons systems. The student explores the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. The physical aspects of radar and underwater sound are described in detail.

Morales, W.

202,S SEAPOWER AND MARITIME AFFAIRS (3-2-2)

Readings, discussions, and research on selected topics related to the history, importance, and impact of seapower on modern civilization.

Magalis, R.

301,F NAVIGATION (3-2-3)

A comprehensive study of coastal piloting, celestial and electronic ship navigation; involves nautical astronomy, navigational aids, satellite and inertial systems. Prereq- Requires Nava 311 lab.

Dawson, P., Work, R.

302,S NAVAL OPERATIONS (3-2-3)

An analysis of ship movements, formations, and fleet operations; includes Rules of the Road, maneuvering board, tactical publications and communications.

Dawson, P., Work, R.

303,S EVOLUTION OF WARFARE (3-2-2)

Historical survey of the evolution of the conduct of warfare. Strategy, tactics, weapons, organization, and military leaders/thinkers are studied.

Sonntag, C.

311,F NAVIGATION LAB (0)

Dawson, P., Work, R.

401,F LEADERSHIP/MANAGEMENT I (2-0-2)

An introduction to the principles and concepts of management, organization, leadership, information systems, and decision making.

Locke, W.

402,S LEADERSHIP MANAGEMENT II (1-0-1)

A comprehensive study of leadership and management principles, with particular emphasis on the practical application of interviewing, counseling techniques, human resources management, military law and discipline, and administration.

Locke, W.

410,S AMPHIBIOUS WARFARE (3-2-1)

Study of the history of amphibious warfare. Case studies examine doctrine, tactics, and the factors necessary for successful operations.

Sonntag, C.

In addition to the courses listed above, NROTC students may be required to complete certain other courses that are offered by the University.

Philosophy

Associate Professor Kulstad, *Chair*
 Professors Brody, Engelhardt, Grandy, Kolenda
 Associate Professors Crowell and Temkin
 Assistant Professors Morrison, Sullivan, and Waters

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. The philosophy major requires 30 semester hours (ten courses); at least 18 semester hours (six courses) must be in the 300 level or above. Majors must take Philosophy 201, 202, either 306 or 307, one course in logic (either 106 or 305), and two further courses in the history of philosophy (301, 302, 308, 501, or 502). If the student wishes, metaphysics (Philosophy 304), theory of knowledge (Philosophy 303), or philosophy of language (Philosophy 353) may be substituted for one of these additional history courses. A double major requires 27 hours (nine courses) with all other requirements remaining the same.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Requirements for the Degree of Master of Arts:

1. Completion with high standing of at least 24 semester hours in advanced courses approved by the department.
2. Satisfactory performance on a reading examination in one foreign language or 12 additional semester hours in advanced courses approved by the department.
3. Completion of a written thesis on a subject approved by the department.
4. Satisfactory performance on a final oral examination not limited to the student's special field of study.

Requirements for the Degree of Doctor of Philosophy:

1. Completion with high standing of 48 hours of course work approved by the department (including logic).
2. Satisfactory performance on a reading examination in one foreign language. Students whose research interests require a substantial knowledge of another discipline can petition to substitute for the language exam an examination in that other discipline.
3. Satisfactory performance on a qualifying examination.
4. Completion of a written thesis on a subject approved by the department; at least one year of thesis research must be spent in residence.
5. Satisfactory performance on a final oral examination, not limited to the student's special field of study.

Philosophy Courses

100,S PROBLEMS OF PHILOSOPHY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Survey of traditional and contemporary authors on such topics as the nature of scientific knowledge, the theory of justice, and the conflict between determinism and freedom.

Staff

101,F CONTEMPORARY MORAL AND LEGAL ISSUES (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Examination of the moral and legal issues surrounding such topics as abortion, euthanasia, war, capital punishment, and equality of opportunity. Enrollment limited to 150.

Temkin, L.

102,F FOUR PERSPECTIVES ON THE MEANING OF LIFE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Examination of contrasting orientations toward human life that emerge from the contemporary intellectual, social, and political situation.

Kolenda, K.

103,S PHILOSOPHY AND PSYCHOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Examination of the interrelationship between philosophical and psychological thought.

Staff

104,F PHILOSOPHICAL PERSPECTIVES ON SCIENCE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Philosophical issues that arise in and about science; specific theories in both natural and social science analyzed to understand the nature and impact of scientific knowledge.

Staff

105,S HISTORICAL INTRODUCTION TO PHILOSOPHY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Study and discussion of central ideas of Western philosophy as developed by its original thinkers.

McCullough, L.

106,F LOGIC (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

A system of natural deduction is used to establish the validity of arguments, the validity of which turns on their truth functional or quantificational form.

Rice, M.

398 COURSES OF INSTRUCTION

201,F HISTORY OF PHILOSOPHY I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Survey of major philosophers of the ancient and medieval world from Thales to Ockham.
Morrison, D.

202,S HISTORY OF PHILOSOPHY II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

A survey of the history of western philosophy from the seventeenth to the twentieth century, with special emphasis on the seventeenth and eighteenth centuries.

Kulstad, M.

301,S ANCIENT AND MEDIEVAL PHILOSOPHY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Survey of major philosophical writings from the fourth century B.C. through the fourteenth. Content varies from year to year.

Morrison, D.

302,S MODERN PHILOSOPHY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Examination of themes or authors in seventeenth and eighteenth century philosophy.

Kulstad, M.

303,F THEORY OF KNOWLEDGE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Topics: analysis of knowledge, foundations of knowledge, skepticism, perception, etc.
Prereq- one course in philosophy.

Staff

304,S METAPHYSICS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Examination of some classical and contemporary metaphysical systems. Particular attention is paid to the very possibility of metaphysical analysis. Prereq- one course in philosophy.

Morrison, D.

305,F MATHEMATICAL LOGIC (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Natural deduction and semantical treatment of first-order logic.

Grandy, R.

306,F ETHICS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Philosophical analysis of traditional and contemporary theories of ethics. Enrollment may be limited.

Temkin, L.

307,S SOCIAL AND POLITICAL PHILOSOPHY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

What makes a society just? On what grounds may the liberty of individuals be legitimately limited? What social ends may a state legitimately pursue?

Staff

308,S CONTINENTAL PHILOSOPHY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Selected readings from Kant, Hegel, Nietzsche, and Heidegger.

Staff

312.F PHILOSOPHY OF MIND (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Inquiry into the nature of mind with emphasis on the mind/body problem. Prereq- one course in philosophy.

Staff

313.F PHILOSOPHY OF SCIENCE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Study of the relationship between scientific theories, experiment, observation, and reality. Prereq- one course in philosophy.

Staff

315.F ETHICS, MEDICINE AND PUBLIC POLICY (3-0-3)

An examination of some of the ethical and policy questions raised by contemporary medical techniques and by contemporary modes for the delivery of medical services.

Engelhardt, H.

316.S PHILOSOPHY OF LAW (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Examination of social control of private property, compensation in the law of torts, the right to privacy and bodily integrity, and justice through compensatory discrimination, etc. Offered alternate years.

Brody, B.

318.S PHILOSOPHY IN LITERATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Study of philosophical themes in selected works in English, French, German, and Russian literature.

Staff

353.F/S THE PHILOSOPHY OF LANGUAGE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Philosophical investigation of relations among language, thought, and reality. Prereq- two courses in linguistics or philosophy. Also offered as Ling 353. Offered alternate years.

Staff

357.S ADVANCED TOPICS—MATHEMATICAL LOGIC (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Grandy, R.

390.S CONTEMPORARY TOPICS (3-0-3)

Prereq- Phil majors or permission of instructor. (Not offered this year)

Staff

401.F INDEPENDENT READING I (Variable)

Prereq- permission of the department.

Kulstad, M.

402.S INDEPENDENT READING II (Variable)

See Phil 401.

Kulstad, M.

501.F SEMINAR IN ANCIENT PHILOSOPHY (3-0-3)

Morrison, D.

502.F SEMINAR MODERN PHILOSOPHY (3-0-3)

Kulstad, M.

400 COURSES OF INSTRUCTION

503,S SEMINAR IN THEORY OF KNOWLEDGE (3-0-3)

Sullivan, S.

506,S ETHICS (3-0-3)

Temkin, L.

507,F SOCIAL & POLITICAL PHILOSOPHY (3-0-3)

Staff

508,S SEMINAR IN CONTINENTAL PHILOSOPHY (3-0-3)

Aboulafia, M.

512,S SEMINAR IN PHILOSOPHY OF MIND (3-0-3)

Staff

513,F/S SEMINAR IN PHILOSOPHY OF SCIENCE (3-0-3)

Grandy, R.

515,S WITTGENSTEIN (3-0-3)

Offered alternate years.

Kolenda, K.

519,S SEMINAR IN ANALYTIC PHILOSOPHY (3-0-3)

Offered alternate years.

Staff

521,S SEMINAR IN KANT AND HEGEL (3-0-3)

Engelhardt, H.

522,F PRAGMATISM (3-0-3)

Offered alternate years.

Staff

530,F FREGE TO LOGICAL POSITIVISM (3-0-3)

Offered alternate years.

Brody, B.

553,S SEMINAR IN PHILOSOPHY OF LANGUAGE (3-0-3)

Offered alternate years.

Staff

601,F ADVANCED INDEPENDENT READING I (Variable)

Kulstad, M.

602,S ADVANCED INDEPENDENT READING II (Variable)

Kulstad, M.

800,F/S RESEARCH AND THESIS (Variable)

Kulstad, M.

Physics

Professor Bonner, *Chair*

**Professors S.D. Baker, Duck, Dunning, Estle, Hannon,
Huang, N.F. Lane, Michel, Mutchler, Rau, J.B. Roberts,
Rorschach, Stebbings, Trammell, and Walters**

Adjunct Professor Hazlewood

Associate Professors Corcoran, Dodds, Miettinen, and Stevenson

Adjunct Associate Professor Chang

Assistant Professors Hulet and Nordlander

Adjunct Assistant Professor Kimura

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. During the first two years, all physics majors, including those electing one of the four physics options listed below, normally take the following required courses:

Mathematics 101, 102, 211, 212 (or equivalent honors courses)

Physics 101, 102, 132, 201, 202, 231

Chemistry 101, 102, 107

At the end of the sophomore year each student will be assigned a faculty adviser who will be responsible for course registration for the junior and senior years. Unless students elect one of the special options given below, seven physics lecture courses and four physics laboratory courses at or above the 300 level are required during the junior and senior years. These are:

Physics 301, 302, 311, 312

Physics 331, 332 (Advanced Laboratory)

Physics 411, 412, 425

Physics 431, 432 or 433, 434 (Senior Research)

Students will select courses in mathematics or mathematical sciences at or above the 300 level in consultation with their advisers so that they will complete three semesters beyond the two-year introductory sequence.

In addition to the departmental requirements for the major, all students, including those who select one of the options below, must satisfy the distribution requirements and complete at least 60 semester hours outside the departmental requirements. Regular physics majors normally complete a total program of 138 semester hours.

Physics majors with a special interest in space physics and astronomy, applied physics, biophysics, or geophysics may wish to elect one of the special options described below.

Option in Space Physics and Astronomy. During the first two years, the requirements coincide with those for a standard physics major (described above). In addition, Space Physics and Astronomy 251, 252, and 262 should ordinarily be elected in the sophomore year. The following upper level courses are required:

Physics 301, 302, 311, 312

Physics 331, 332 (Advanced Laboratory)

Physics 425

Space Physics and Astronomy 471

402 COURSES OF INSTRUCTION

Space Physics and Astronomy 431, 432 (Senior Research)

Upper level mathematics or mathematical sciences (two semesters)

Students selecting this option normally complete a total program of 140 semester hours. A faculty adviser who is jointly appointed by the physics and the space physics and astronomy departments will be assigned to each student.

Option in Applied Physics. During the first two years, the student normally should satisfy the physics, chemistry, and mathematics requirements listed above for a standard physics major. The following additional courses are also required for graduation.

Engineering 241

Computer Science 211

Mathematical Sciences 330, 340 (or equivalents)

Physics 311, 312, 301, 302 (or Electrical Engineering 306)

Physics 411 or 412 or Electrical Engineering 461 or approved substitute

Physics 425

Physics 331, 332, 431, 432

Electrical Engineering 326 or 342 may be substituted for Physics 331 or 332 with departmental approval.

Students selecting the applied physics option normally complete a total program of 139 semester hours.

Option in Biophysics. During the first two years, the student normally should satisfy the physics, chemistry, and mathematics requirements listed above for a standard physics major. The following additional courses are also required for graduation:

Chemistry 211, 212, 213, 214 (should be taken second year)

Biology 201, 202, 203

Biochemistry 361, 362

Physics 301, 302, 311, 312

Students selecting the biophysics option normally complete a total program of 136 semester hours.

Option in Geophysics. During the first two years, the student normally should satisfy the physics, chemistry, and mathematics requirements listed for a standard physics major. The following additional courses are also required for graduation:

Geology 101, 102

Computer Science 211

Physics 301, 302, 311, 312

Mathematical Sciences 340 (or equivalent)

Physics 431, 432, or 433, 434 (Senior Research)

Upper level mathematics or mathematical sciences (one semester)

Two upper level geology or geophysics courses to be selected with approval of the Physics Department (e.g., Geology 361, 442)

Students selecting the geophysics option normally complete a total program of 140 semester hours.

Chemical Physics Major. An interdepartmental major in chemical physics is offered in conjunction with the Department of Chemistry. Students wishing to elect this major must obtain approval from both departments. In addition to the courses required of a standard physics major during the first two years, the student would normally take the following courses:

Chemistry 211, 212, 213, 214 (should be taken second year)

Chemistry 311, 312

Physics 311, 312 (or equivalents)
 Physics 331, 332 or Chemistry 313, 314
 Physics 301, 302

Upper level mathematics or mathematical sciences (two semesters)

Students selecting a chemical physics major normally complete a total program of 136 semester hours.

Graduate Program. The Department of Physics offers studies and research leading to the degrees of Master of Arts and Doctor of Philosophy. The Department of Physics offers research facilities and thesis supervision in the fields of astrophysics, atomic and molecular physics and quantum electronics, biophysics, nuclear and particle physics, condensed matter physics and surface physics, and theoretical physics.

To be eligible for the Master of Arts degree, a graduate student must complete 30 semester hours of approved graduate level studies, including a research thesis performed under the direction of a physics faculty member. A minimum of one year of graduate study is required for the M.A.

To be eligible for the Doctor of Philosophy degree, a graduate student must first demonstrate to the department the ability to engage in advanced research. This is normally done by successfully completing the work for the Master of Arts in physics. The student must also complete in residence 60 semester hours of approved graduate level study, including 21 semester hours in core courses and a research thesis completed under the direction of a physics faculty member. A minimum of two years of graduate study is required for the Ph.D. Further details of research programs in physics and departmental degree requirements are contained in a pamphlet *Graduate Study in Physics* available from the Department of Physics on request.

Physics

Physics Courses

101,F MECHANICS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

The first semester of the calculus-based sequence in physics for science and engineering students.

Staff

102,S ELECTRICITY AND MAGNETISM (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

See Phys 101 and 132.

Staff

121,F TECHNICAL PHYSICS I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

A noncalculus survey of mechanics, sound, and thermodynamics, primarily intended for architecture and premedical students, with emphasis on problem solving. See Phys 123.

Staff

404 COURSES OF INSTRUCTION

122,S TECHNICAL PHYSICS II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

Continuation of Phys 121. Electricity, magnetism, optics, and modern physics. See Phys 124.

Staff

123,F TECHNICAL PHYSICS LAB I (0-3-1)

Recommended for all students enrolled in Phys 121, 122 and 141.

Staff

124,S TECHNICAL PHYSICS LAB II (0-3-1)

See Phys 123.

Staff

132,S ELEMENTARY PHYSICS LAB I (0-3-1)

Recommended for students enrolled in Phys 102.

Staff

141,F CONCEPTS IN PHYSICS I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.5

Emphasis on the nature of physical phenomena, the conceptual development of physics, and related cultural influences. See Phys 123,124.

Staff

201,F WAVES OPTICS AND RELATIVITY (3-0-3)

The third semester of the four-semester sequence in physics for science and engineering students. See Phys 231.

Staff

202,S MODERN PHYSICS (3-0-3)

The final semester of the four-semester sequence in physics for science and engineering students.

Staff

231,F ELEMENTARY PHYSICS LAB II (0-3-1)

Recommended for students enrolled in Phys 201.

Staff

301,F INTERMEDIATE MECHANICS (4-0-4)

Classical mechanics and appropriate mathematical methods. Emphasis on problem solving.

Staff

302,S INTERMEDIATE ELECTRODYNAMICS (4-0-4)

Classical electrodynamics and appropriate mathematical methods. Emphasis on problem solving.

Staff

311,F INTRODUCTION TO QUANTUM PHYSICS I (3-0-3)

Fundamentals of quantum mechanics and applications.

Staff

312,S INTRODUCTION TO QUANTUM PHYSICS II (3-0-3)

See Phys 311.

Staff

331,F JUNIOR PHYSICS LABORATORY I (1-3-2)

Staff

332,S JUNIOR PHYSICS LABORATORY II (1-3-2)*Staff***332,F JUNIOR PHYSICS LAB II (1-3-2)***Staff***411,F NUCLEAR AND PARTICLE PHYSICS (3-0-3)**

Foundation course in nuclear and elementary particle physics.

*Staff***412,S SOLID STATE PHYSICS (3-0-3)**

Foundation course in Solid-State physics.

*Staff***425,F STATISTICAL AND THERMAL PHYSICS I (3-0-3)***Staff***431,F SENIOR PHYSICS RESEARCH I (0-6-2)***Staff***432,S SENIOR PHYSICS RESEARCH II (0-6-2)***Staff***433,F HONORS RESEARCH I (0-12-3)**

The student pursues a research project in a similar way to Phys 431, 432 but in considerably greater depth. 118 Prereq- permission of the department.

*Staff***434,S HONORS RESEARCH II (0-12-3)**

See Phys 433.

*Staff***461,F/S INDEPENDENT RESEARCH (Variable)**

A reading course in special topics.

*Staff***462,S INDEPENDENT RESEARCH (Variable)**

See Phys 461.

*Staff***515,F ADVANCED CLASSICAL MECHANICS (3-0-3)**

Also offered as Spac 515.

*Staff***521,F QUANTUM MECHANICS I (3-0-3)**

Graduate level quantum mechanics. Also offered as Spac 521.

*Staff***522,S QUANTUM MECHANICS II (3-0-3)**

Continuation of Phys 521. Also offered as Space 522.

*Staff***526,S STATISTICAL AND THERMAL PHYSICS II (3-0-3)**

A continuation of Phys 425 intended primarily for first-year graduate students and qualified undergraduates.

Staff

406 COURSES OF INSTRUCTION

531,F ELECTROMAGNETIC THEORY I (3-0-3)

Graduate level electricity and magnetism. Also offered as Spac 531.

Staff

532,S ELECTROMAGNETIC THEORY II (3-0-3)

Graduate level electrodynamics. Also offered as Spac 532.

Staff

541,F EXPERIMENTAL NUCLEAR PHYSICS (3-0-3)

Nuclear structure and reaction mechanisms. Study of accelerators, detectors, and systematics.

Staff

542,S ELEMENTARY PARTICLE PHYSICS (3-0-3)

Theory of elementary particles and characteristic features of experimental data.

Staff

551,S STELLAR INTERIORS (3-0-3)

See Spac 551 Also offered as Spac 551.

Staff

563,F SOLID STATE PHYSICS I (3-0-3)

Fundamental concepts of crystalline solids, including crystal structure, band theory, and lattice vibration theory. Also offered as Elec 563.

Staff

564,S SOLID STATE PHYSICS II (3-0-3)

Continuation of Phys 563, including scattering of waves by crystals, transport theory, and magnetic phenomena. Also offered as Elec 564.

Staff

571,S ATOMIC AND MOLECULAR SPECTRA (3-0-3)

Not offered every year.

Staff

581,F COLLISION THEORY (3-0-3)

Potential scattering; resonances. Born and semi-classical approximations. Quantum dynamics and S-matrix theory. Multi-channel phenomena. Applications to simple atomic and nuclear systems. Prereq- Phys 521, 522.

Staff

595,F/S PHYSICS TEACHING (0-3-3)

Staff

596,S PHYSICS TEACHING (3-0-3)

Staff

621,F ADVANCED QUANTUM MECHANICS I (3-0-3)

Relativistic quantum mechanics and Quantum Electrodynamics.

Staff

622,S ADVANCED QUANTUM MECHANICS II (3-0-3)

QED, QCD, and unified theories.

Staff

800,F/S GRADUATE RESEARCH (Variable)

Staff

Policy Studies

Degree Offered: B.A.

Undergraduate Program. Students are required to take 12 courses. Three introductory social science courses (each from a different discipline, but including Economics 211 or 212) selected from:

Anthropology 201, 306, Economics 211, 212, Political Science 210, 211, 212, Psychology 101, 102, Sociology 203, 231, 353.

One course in statistical methods selected from:

Economics 350, Statistics 280, 382, Political Science 495, Psychology 339, or a more advanced course.

One course in analytical approaches: Social Science 300.

Three courses in advanced analysis selected from:

Anthropology 313, 314, 333, 336, Economics 301, 370, 372, 375, 416, 440, 455, 483, History 350, Philosophy 307, Political Science 317, 318, 337, 339, 380, 435, Psychology 231, Sociology 301, 311, 325, 425. Statistics 301.

Three courses in an applied area selected from one of the following groups:

1. Human Resources/Health/Welfare: Anthropology 381, 383, 386, 388, Economics 415, History 430, Philosophy 314, 315, Psychology 332, Religious Studies 462, 463, Sociology 313, Social Sciences 420, 430.
2. Foreign Policy/International Relations: Anthropology 353, 360, Economics 420, 430, 450, History 456, 469, Political Science 351, 354, 360, 361, 371, 372, 378, 379.
3. Law and Justice: Anthropology 326, Economics 438, History 297, 298, 397, 398, Political Science 321, 410, Philosophy 101, Sociology 321.
4. Quantitative Analysis: Economics 400, 472, Mathematical Sciences/Economics 471, 475, 476, Psychology 340, Sociology 313, 496. Statistics 381, 480, 481.
5. Urban Studies: Anthropology 348, Economics 461, Political Science 432, Sociology 308, 432, 446, 496.

One approved special topics seminar or one semester of independent work in a participating department, involving a research paper on a policy topic.

In addition to the requirements for the major, students must also satisfy the University's distribution and graduation requirements. The policy studies major can be taken only as a second major. The first major cannot be also in an interdepartmental program. See Degree Requirements and Majors, pages 63-84.

Political Science

Associate Professor Richard J. Stoll, *Chair*
Professors J. Ambler, J. Cooper, G. Cuthbertson, R. Dix,
R. Stein, and F. von der Mehden

Associate Professors J. Alford, K. Hamm and R. Wilson

Assistant Professors K. Bickers, C. Morgan

Lecturers N. Goldman and C. Hudspeth

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. Students majoring in political science are required to complete thirty semester hours (ten courses) in the field. All majors must also complete six semester hours (two courses) of advanced work, selected with the advice of the department, in any of the following fields: anthropology, economics, history, philosophy, psychology, or sociology.

Double majors in one of the above fields may automatically substitute six semester hours (two courses) in upper level courses in their second field for six of the required 30 semester hours in political science courses. Double majors whose second major is managerial studies or policy studies may automatically substitute three hours (one course). Double majors whose second field is not listed above normally are required to take 30 semester hours (ten courses) in political science. They may petition for substitution of courses in other fields, but such substitutions are permitted only when the course to be substituted has a close and significant relationship to political science.

Within the major, each student is encouraged to take a program of courses that provides both a broad understanding of the field and a specialized knowledge of some portion of it. Specific distribution requirements are minimal. However, students are required to take at least one course in any four of the six areas listed below:

- | | |
|----------------------------|-------------------------------------|
| 1. American politics | 5. Normative political theory |
| 2. Comparative government | 6. Empirical theory and methodology |
| 3. Law | |
| 4. International relations | |

Political Science 209, 210, 211, and 212 constitute the introductory courses in normative theory, American politics, international relations, and comparative government, respectively. Prospective majors are encouraged to take one or more of these courses, preferably in their first or second year. However, none is required of majors, except that Political Science 210 is the course that meets the Texas state licensing requirements in political science for teachers. It should be noted that no more than three of the above introductory courses may be counted toward the major, and that Political Science 310 may not be counted toward the major.

Two of the political science courses must be seminars (courses at the 400 or 500 level). A student may not take both seminars from the same faculty member. Reading courses will not satisfy this requirement. Students may not normally substitute a course in another department to meet this requirement. Students participating in the honors program (see below) are additionally required to take one seminar. Note that all courses at the 500 level require the student to obtain the

permission of the instructor before registering, and that all seminars have an enrollment limit of 20.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Honors Program. Political science majors who qualify may enter an honors program. The program consists of (1) a one-semester reading course in the junior year (taken either term) which will serve as the basis for drawing up a prospectus for the senior essay, plus (2) the writing of the essay, normally in the senior year. The nine semester hours completed will count toward the thirty semester hours required for the major and are counted for purposes of distribution in the appropriate area within the major.

Admission to the honors program occurs, as a rule, in the spring of the sophomore year at the time majors are selected. Others may be admitted during the junior year. Double majors are eligible for the program. Admission requires the approval of the departmental director of undergraduate studies, Mr. Cuthbertson.

Interdisciplinary Programs. The Department of Political Science participates in the interdepartmental programs in managerial studies and policy studies. See description of these programs on pages 72 and 369 for managerial studies, and 73 and 407 for policy studies.

Graduate Program. The Department of Political Science offers a graduate program leading to the M.A. and the Ph.D. The Ph.D. student is expected to complete 48 semester hours in advanced courses or seminars prior to candidacy and to present a dissertation displaying original research. Normally, the student takes the core courses in the three general fields of American government, comparative government, and international relations. The student takes additional course work and comprehensive examinations in two of these three fields. Before taking the comprehensive examinations, the student is expected to complete a course in statistical analysis, demonstrate some familiarity with traditional political theory, satisfy the language or skill requirement in his or her major field, and complete all course requirements, including a two-semester sequence in scope and methods. Specific courses are chosen in consultation with the faculty adviser. A limited master's program also is offered by the department, consisting of three semesters of full-time study. The course work for the master's degree focuses primarily upon the student's major field. The third semester is devoted largely to the preparation of a thesis.

Political Science

Political Science Courses

209,S INTRODUCTION TO CONSTITUTIONALISM AND MODERN POLITICAL THOUGHT (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Constitutionalism and authoritarianism from Machiavelli to Marx; introduction to contemporary ideologies. Together with Poli 210 meets state professional requirements for teachers.

Cuthbertson, G.

410 COURSES OF INSTRUCTION

210,F AMERICAN GOVERNMENT&POLITICS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

Major topics in American politics: public opinion, group politics, political parties, elections, congressional-presidential-bureaucratic politics, and judicial politics. Together with Poli 209 meets state professional requirements for teachers.

Alford, J.

211,S INTERNATIONAL RELATIONS (3-0-3) Not Offered

*** DISTRIBUTION COURSE: CATEGORY II.3**

An introduction to the study of international relations. The course examines topics from the role of individuals to the impact of the international system. Major issues, such as the causes of war and development of the third world are also discussed.

Stoll, R.

212,F INTRODUCTION TO COMPARATIVE POLITICS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

An examination of political institutions and behavior in selected democratic, communist, and "third world" countries.

Ambler, J.

300,S FEDERALISM AND INTERGOVERNMENTAL POLITICS (3-0-3)

Not Offered

Examines the relationships between the Federal government and the States. Lays out the effects of national policy on State governments and explores changes in intergovernmental aid transfers between levels of government.

Stein, R.

301,F STATE POLITICS (3-0-3)

This course is organized around the themes of the constraints and influences on the adoption and implementation of public policies in the American states.

Hamm, K.

305,F DIRECTED READING I (Variable)

Independent reading under the supervision of a member of the department. Open to junior majors in the honors program and to others in special cases with the permission of the instructor.

Staff

306,S DIRECTED READING II (Variable)

See Poli 305.

Staff

309,F LAW AND SOCIETY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

An examination of the nature of law and of justice; employment of the casebook method to study specific aspects of the law.

Goldman, N.

310,S LAW AND SOCIETY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

See Poli 309. Does not count toward Political Science major.

Goldman, N.

317,S CONGRESS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.3**

Examines the role of Congress in the American political system. Attention is given to the historical development of Congress, the current status of the Congress, and the functions of Congress in the American political system. Enrollment limited to 75.

Cooper, J.

318,F THE PRESIDENCY (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Presidential powers and behavior are analyzed in the context of the legal, electoral, personal, and other forces that shape and limit the actions of the president. Enrollment limited to 75.

Bickers, K.

321,F AMERICAN CONSTITUTIONAL LAW (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

Interpretation of the Constitution by the Supreme Court. (Juniors and Seniors preferred). Enrollment limited to 50.

Cuthbertson, G.

332,S URBAN POLITICS (3-0-3)

Examines issues of political behavior and public policy in urban and metropolitan areas. Specific topics include urban decline and revitalization, conflict between "Snowbelt" and "Sunbelt" cities, fiscal management, and urban and suburban relations.

Hamm, K.

336,S POLITICS OF REGULATION (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

This course will focus principally on government regulation of business and the political factors that shape its content. Enrollment limited to 75.

Bickers, K.

337,F PUBLIC POLICY AND BUREAUCRACY (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

The role public bureaucracy plays in national policy-making process. Sources of agency power are examined and then linked to different policy outcomes. Offered irregularly. Enrollment limited to 75.

Bickers, K.

340,S ANCIENT AND MEDIEVAL POLITICAL THEORY (3-0-3)

The sources of ancient and medieval political thought. Special emphasis on historical analysis of political philosophy and mythology and the influence of Plato and Aristotle.

Cuthbertson, G.

351,S POLITICS OF SOUTHEAST ASIA (3-0-3) Not offered.*** DISTRIBUTION COURSE: CATEGORY II.3**

Political processes, institutions, and attitudes in selected Southeast Asian states. Emphasis on the postwar period, but traditional forces influencing contemporary political behavior also considered. Enrollment limited to 75.

von der Mehden, F.

353,F POLITICS OF CHINA AND JAPAN (3-0-3) Not Offered*** DISTRIBUTION COURSE: CATEGORY II.3**

Political processes, institutions, and attitudes of China and Japan; emphasis on postwar developments in relation to traditional patterns, political ideology, and international politics.

von der Mehden, F.

354,F LATIN AMERICAN POLITICS (3-0-3)*** DISTRIBUTION COURSE: CATEGORY II.3**

A study of the political process in contemporary Latin America, with particular attention to selected major countries. Enrollment limited to 40.

Dix, R.

360,F WESTERN EUROPEAN DEMOCRACIES (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

A survey of government and politics in Western European democracies, with primary emphasis on Great Britain, France, and Germany. Enrollment limited to 75.

Ambler, J.

361,S COMPARATIVE COMMUNIST SYSTEMS (3-0-3) Not Offered

* DISTRIBUTION COURSE: CATEGORY II.3

A survey of government and politics in selected communist systems, including the USSR and Communist China.

Staff

371,F COMPARATIVE FOREIGN POLICY (3-0-3) Not Offered

A survey and comparative analysis of the foreign policies and policy-making systems of selected countries, including China, Japan, and the Soviet Union. Offered irregularly.

Staff

372,S AMERICAN FOREIGN POLICY (3-0-3) Not Offered

* DISTRIBUTION COURSE: CATEGORY II.3

Examines the internal and external aspects of foreign policy leadership, presidential initiative, congressional control, press, public opinion, and crisis management. Not a Managerial Studies elective. Enrollment limited to 50.

Morgan, T.

373,F INTERNATIONAL CONFLICT (3-0-3) Not Offered

Considers the theoretical basis of, and empirical evidence for, a number of explanations of the occurrence of interstate war. Contemporary theories dealing with dispute escalation, arms races, deterrence, crisis management, and low intensity conflict are also evaluated.

Morgan, T.

378,F POLITICS OF AMERICAN NATIONAL SECURITY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.3

Major issues of national security policy, including strategic doctrines, policy-making processes on defense issues, arms control, and defense of Europe. Not a Managerial Studies elective. Enrollment limited to 75.

Stoll, R.

379,F PROBLEMS IN INTERNATIONAL RELATIONS (3-0-3) Not Offered

* DISTRIBUTION COURSE: CATEGORY II.3

Enrollment limited to 75.

Morgan, T.

405,F SENIOR THESIS (3-0-3)

Open to senior honors majors with the permission of the department. Students must complete both Poli 405 and 406 to obtain credit. Enrollment limited to 20. Prereq- permission of instructor.

Cuthbertson, G.

406,S SENIOR THESIS (3-0-3)

See Poli 405.

Cuthbertson, G.

410,F ADJUDICATION CUR SOCIAL ISSUES (3-0-3) Offered Irregularly

Most political and social questions in America, as Tocqueville observed, ultimately become judicial questions. In this course we examine current developments in several fields, including basic constitutional issues, property, contracts, torts, crimes, corporate responsibility and privacy. Enrollment limited to 10 students. Prereq- Permission of the instructor.

Hudspeth, C.

430,F SEMINAR IN TEXAS POLITICS (3-0-3)

Research seminar in the history of Texas politics. Enrollment limited to 20. Prereq- permission of instructor.

Cuthbertson, G.

431,F ELECTORAL CAMPAIGNS (3-0-3)

Examines the role of campaigns in determining the outcome of political races. Enrollment limited to 20. Prereq- permission of instructor.

Stein, R.

432,F URBAN POLITICS (3-0-3) Not Offered

Research seminar examining issues of political behavior and public policy in urban and metropolitan areas. Specific topics include urban decline and revitalization, conflict between "Snowbelt" and "Sunbelt" cities, fiscal management, and urban and suburban relations. Enrollment limited to 20. Prereq- permission of instructor.

Stein, R.

433,S STATE LEGISLATURES (3-0-3) Not Offered

Research seminar examining the similarities and differences of legislatures in the 50 states. Explores the causes and consequences of these differences. Enrollment limited to 20 students.

Hamm, K.

434,S INTEREST GROUPS AND POLITICAL PARTIES (3-0-3)

Examines the organization and behavior of political parties and interest groups within the American political system. The course emphasizes the extent to which these organizations operate differently across the national, state, and local levels of government.

Hamm, K.

439,F RESEARCH SEMINAR ON SOUTHERN POLITICS (0)

Focuses on political behavior and political institutions in Southern States. Of special interest is contemporary Texas politics. Enrollment limited to 20 students.

Hamm, K.

454,F REVOLUTIONARY MOVEMENTS (3-0-3)

Causes and outcomes of revolutions, both past and contemporary, and their relationships to the societies in which they occur. Enrollment limited to 15. Prereq- permission of instructor.

Dix, R.

457,F CONDITIONS OF DEMOCRACY (3-0-3) Not Offered

An examination of why some countries are democratic and others not, with particular emphasis on the breakdown and restoration of democracy in Latin America and Southern Europe. Enrollment limited to 20.

Staff

460,F SEMINAR IN COMPARATIVE GOVERNMENT (3-0-3) Not Offered

This seminar will analyze noneconomic factors influencing development in Asia. Enrollment limited to 20. Prereq- permission of instructor.

von der Mehden, F.

462,S COMPARATIVE PUBLIC POLICY (3-0-3)

This seminar will examine the process and substance of public policy across nations, with a primary focus upon Western democracies. Attention will be given to such policy areas as education, health, economic policy, and defense. Enrollment limited to 20. Prereq- permission of instructor.

Ambler, J.

465,S INTER-AMERICAN RELATIONS (3-0-3)

This seminar will examine relations between the United States and the countries of Latin America, with particular emphasis on the efforts of the U.S. to promote or inhibit political change, including revolutionary change in Latin America. Enrollment limited to 15. Prereq- permission of instructor.

Dix, R.

466,S POLITICAL PARTIES & VOTING BEHAVIOR IN WESTERN DEMOCRACIES (3-0-3) Not Offered

This seminar will deal with the determinants of party systems, the structure and functions of parties, and theories of voting behavior in Western democracies.

Ambler, J.

470,F TOPICS-INTERNATIONAL RELATIONS (3-0-3)

Analyses of foreign policies of East and Southeast Asian states. Emphasis will be upon the interaction of domestic and international factors that help to determine foreign policy positions. The seminar will focus on the policies of Asian states toward major conflicts in the region, the role of the United States and the Soviet Union in the area, and the developing power of China and Japan. Enrollment limited to 20. Prereq- permission of instructor.

von der Mehden, F.

471,F U.S. FOREIGN POLICY (3-0-3) Not Offered

Staff

472,F AMERICAN FOREIGN POLICY (3-0-3) Not Offered

The content of American foreign policy, its sources, and the process of policy formulation. Enrollment limited to 20. Prereq- Permission of the instructor. 122

Staff

473,S SEMINAR - DOMESTIC POLICY (3-0-3) Not Offered

Staff

474,F COLLECTIVE SOCIAL CHOICE (3-0-3) Not Offered

The objective of this course is to introduce students to a growing body of literature on how and why individual preferences dominate those of others; and the relationship between decision making structures and the nature of decisional outcomes. Enrollment limited to 20. Prereq- permission of instructor.

Staff

490,S MODERN POLITICAL THEORY AND INTERDISCIPLINARY FIELDS (3-0-3) Not Offered

The development of political fiction, the political novel as political theory, and the relevance of the political novel to contemporary problems. Enrollment limited to 20.

Cuthbertson, G.

495,F INTRODUCTION TO STATISTICS (3-0-3)

This course aims at providing students with a working knowledge of statistics in political science. It involves the study of descriptive and inferential statistics, as well as hands-on experience with computer statistical packages. Enrollment limited to 20. Prereq- permission of instructor.

Staff

503,S TOPICS IN METHODS AND DATA ANALYSIS (3-0-3)

Applications of least squares and general linear model.

Staff

510,F SCOPE AND METHODS (3-0-3)

Introduction to research in political science, problems of the discipline, and basic political concepts. History of political science as a discipline. Prereq- permission of instructor.

Cooper, J.

511,F/S MEASUREMENT & RESEARCH DESIGN (3-0-3) Not Offered

Research design. Measurement theory. Data collection and modes of analysis. Use of the computer in political research. Theory building. Prereq- permission of instructor.

Alford, J.

520,F APPROACHES TO COMPARATIVE GOVERNMENT (3-0-3)

Core graduate course analyzing basic approaches to the study of comparative government. Open to qualified undergraduates with permission of instructor.

von der Mehden, F.

527,S ORGANIZATION THEORY (3-0-3) Not Offered

Examination of applications of organization theory to the study of American political institutions.

Staff

530,F/S APPROACHES TO AMERICAN GOVERNMENT (3-0-3)

Core graduate course analyzing basic approaches to the study of American politics. Prereq- permission of instructor.

Alford, J.

531,F STATE POLITICS (0) Not Offered

Examines similarities and differences in the organization of state politics. Major issues include state legislative organization, state elite behavior, and policy implementation.

Hamm, K.

537,S PUBLIC POLICY/PUBLIC ADMINISTRATION (3-0-3)

The administration and implementation of public policies across federal, state, and substate governments. Prereq- permission of instructor. Also offered as Admn 563.

Stein, R.

540,S INTERNATIONAL RELATIONS (3-0-3)

Core graduate course analyzing basic approaches to the study of international relations. Open to qualified undergraduates with permission of instructor.

Stoll, R.

564,F PUBLIC FINANCIAL MANAGEMENT (3-0-3)

Also offered as Admn 564.

Windsor, D.

565,F TOPICS IN MANAGEMENT PRODUCTION/OPERATIONS (3-0-3)

Also offered as Admn 593. THE HEALTH CARE SYSTEM 123

Staff

566,S TOPICS IN MANAGEMENT II PUBLIC/PRIVATE PARTNERSHIPS (3-0-3)

Also offered as Admn 594. Section I: Public-Private Partnerships.

Loukissas, P.

571,S POLITICAL RISK ANALYSIS (3-0-3)

Analyses of political and social factors affecting business operations abroad, including domestic instability, foreign conflict, corruption, nationalization, indigenization, etc. A simulation exercise is required. Prereq- permission of instructor. Also offered as Admn 572.

von der Mehden, F.

416 COURSES OF INSTRUCTION

580,S TOPICS IN AMERICAN POLITICS (3-0-3)

Alford, J.

580,F SEMINAR IN AMERICAN POLITICS (3-0-3) Not Offered

Staff

591,F DIRECTED READING—METHODOLOGY (3-0-3) Not Offered

Wilson, R.

593,F DIRECTED READING—AMERICAN POLITICS (3-0-3)

Staff

594,S DIRECTED READING—AMERICAN POLITICS (3-0-3)

Staff

595,F DIRECTED READING—INTERNATIONAL RELATIONS (3-0-3)

Stoll, R.

596,S DIRECTED READING—INTERNATIONAL RELATIONS (3-0-3)

Staff

597,F DIRECTED READING—COMPARATIVE POLITICS (3-0-3)

von der Mehden, F.

598,S DIRECTED READING—COMPARATIVE POLITICS (3-0-3)

Staff

600,S M A RESEARCH AND THESIS (Variable)

Research and thesis for resident students.

Staff

600,F TOPICS IN POLITICAL SCIENCE (Variable)

Research and thesis for resident students.

Stoll, R.

800,F/S PHD RESEARCH AND THESIS (Variable)

Staff

Psychology

Professor Laughery, *Chair*

**Professors Brelsford, Dipboye, Howell, Pomerantz,
Roediger, Schneider, R.N. Taylor, Tuggle, and Watkins
Adjunct Professors Overall, Wright**

**Associate Professors Burnett, D.M. Lane, R. C. Martin
Visiting Associate Professor Gillan**

Assistant Professors Cooke, Gaugler, Martell, and W.R. Wilson

**Adjunct Assistant Professors Burnside, Loveland, Goldsberry,
Montgomery, and Wunder**

Adjunct Instructors: Diddel, and Laux

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. Twenty-nine semester hours are required for a major in psychology. The following courses are required for the major in psychology: Psychology 101, 202, 203, 339, and 340. There may be no substitution or transfer credit for 339 or 340. In addition to the five required courses listed above, the student must take at least one course from each of the following blocks of courses:

Block 1: Psychology 308, 309, 351, 362

Block 2: Psychology 330, 332, 372

An honors program is available that requires completion of the major requirements listed above, an honors thesis, and other requirements as determined by the student's honors committee. Candidates for the honors program must submit an application. A decision to admit a student will be made by vote of the faculty.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Graduate Program. Graduate programs are offered at both the M.A. and Ph.D. levels. The emphasis, however, is upon doctoral training, and only applicants of Ph.D. caliber are admitted.

A research thesis with public oral defense is required for both M.A. and Ph.D. degrees. In addition, 60 semester hours must be accumulated for the Ph.D. and 30 for the M.A. Included in this total are required courses in the areas of memory, cognition, engineering and industrial/organizational psychology, social psychology, and methodology, plus whatever offerings are available in the student's specialty area. The three specialty areas currently offered are cognitive-experimental, industrial-organizational/social, and engineering psychology.

Competence in a foreign language is not required. The student must, however, pass an admission-to-candidacy procedure designed to establish his or her expertise in the chosen specialty area.

Psychology Courses

101,F/S INTRODUCTION TO PSYCHOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Overview of current research and theory in a variety of subareas of psychology.

Roediger, H., Brelsford, J.

202,F INTRODUCTION TO SOCIAL PSYCHOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

An introduction to the major theories and supporting research in social psychology. Prereq-
Psyc 101.

Schneider, D.

203,S INTRODUCTION TO COGNITIVE PSYCHOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

An introduction to topics in cognitive psychology including perception, memory, psycholinguistics, problem solving and decision making. Prereq- Psyc 101.

Cooke, N.

221,F/S DEVELOPMENTAL PSYCHOLOGY (3-0-3)

Focus on behavioral changes with age and general laws of development in both human and nonhuman species. Prereq- Psyc 101.

Staff

231,S INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

An overview of the principles, techniques, and theories of psychology applied in the industrial setting. Prereq- Psyc 101, Masc 280.

Martell, R.

308,F MEMORY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Critical review of traditional and contemporary approaches to the study of remembering and forgetting. Prereq- Psyc 101, 203 or permission of instructor. Limit 50.

Watkins, M.

309,F PSYCHOLOGY OF LANGUAGE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Human and other animal communication, structure of human language, word meaning and semantic memory, psychological studies of syntax, bilingualism, language and thought, language errors and disorders. Prereq- Psyc 101, 203 or permission of instructor. Limit 50. Offered alternate years. Also offered as Ling 309.

Martin, R.

329,F TESTS AND MEASUREMENT (3-0-3)

Techniques for measuring individual differences and critical review of theories of individual differences in intelligence and personality. Prere- Psyc 101, 339 and permission of instructor.. Limit 50.

Gaugler, B.

330,F PERSONALITY THEORY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Consideration of those aspects of personality emphasized by the major theorists past and present. Prereq- Psyc 101, 202. Limit 50.

Dipboye, R.

332,S ABNORMAL BEHAVIOR (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Reactions to stress, neurotic traits, therapy, depression, and schizophrenia. The course presents an eclectic, empirically-based exploration of the subject of abnormal psychology and explores topics and theories in the light of research findings. Prereq- Psyc 101, 202 and permission of instructor. Limit 50.

Burnett, S.

339,F STATISTICAL METHODS-PSYCHOLOGY (3-1-4)

Introduction to quantitative and computer methods applicable to the analysis of experimental data. Prereq- Psych 101 or permission of instructor. Limit 50.

Brelsford, J.

340,S RESEARCH METHODS (3-1-4)

A continuation of Psyc 339 with a strong emphasis on individual student experiments and the writing of research reports. Prereq- Psyc 101, 339. Limit 50.

Watkins, M., Martell, R.

- 351,F PSYCHOLOGY OF PERCEPTION (3-0-3)**
*** DISTRIBUTION COURSE: CATEGORY II.4**
 An overview of the sensory and cognitive processes involved in human vision and audition. Prereq- Psyc 101, 203 or permission of instructor. Offered alternate years.
Martin, R.
- 362,S PHYSIOLOGICAL PSYCHOLOGY (3-0-3)**
 An overview of the neurophysiological correlates of behavior. Prereq- Psyc 101.
Staff
- 372,S ADVANCED SOCIAL PSYCHOLOGY (3-0-3)**
*** DISTRIBUTION COURSE: CATEGORY II.4**
 Theories and research in social psychology with emphasis given to the implications for societal problems and interpersonal dynamics. Limit 40. Prereq- Psyc 101, 202 and permission of instructor.
Schneider, D.
- 431,S ADVANCED TOPICS – SOCIAL PSYCHOLOGY (3-0-3)**
 Prereq- permission of instructor.
Martell, R.
- 431,F ADVANCED TOPICS – SOCIAL PSYCHOLOGY: SUPERVISED RESEARCH (3-0-3)**
 Prereq- permission of instructor.
Schneider, D.
- 433,F/S ADVANCED TOPICS – COGNITIVE PSYCHOLOGY (3-0-3)**
 Prereq- permission of instructor.
Roediger, H.
- 435,F/S ADVANCED TOPICS — I/O PSYCHOLOGY (3-0-3)**
 Prereq- permission of instructor.
Dipboye, R.
- 437,S ADVANCED TOPICS–GENERAL PSYCHOLOGY: SUPERVISED RESEARCH & READINGS (3-0-3)**
 Prereq- permission of instructor. Psychology and Law
Schneider, D.
- 437,F ADVANCED TOPICS–GENERAL PSYCHOLOGY SUPERVISED RESEARCH & READINGS (3-0-3)**
 Prereq- permission of instructor. Creativity and Intelligence
Burnett, S.
- 438,F/S ADVANCED TOPICS — ENGINEERING PSYCHOLOGY (3-0-3)**
 Supervised reading and research on selected topics in engineering psychology.
Laughery, K.
- 439,F/S ADVANCED TOPICS — PSYCHOPATHOLOGY (3-0-3)**
 Prereq- permission of instructor.
Burnett, S.
- 442,S COMPUTER APPLICATIONS (3-0-3)**
 Use of small computers in psychological research. Prereq- permission of the instructor. Limit 10.
Cooke, N.

420 COURSES OF INSTRUCTION

450,F ANIMAL BEHAVIOR METHODS (3-0-3)

Use of animal behavior as models of various applied human situations. Limit 5. Prerequisite: permission of the instructor.

Wright, A.

470,S ENGINEERING PSYCHOLOGY (3-0-3)

Principles of psychology and human performance applied to the design of modern systems. Prereq- Psyc 101, 203, or permission of instructor. Limit 50.

Laughery, K.

491,F/S INDEPENDENT STUDY AND RESEARCH (3-0-3)

Prereq- Permission of instructor.

Howell, W.

499,F/S SENIOR THESIS (Variable)

Prereq- 101, 339, 340 and permission of instructor.

Burnett, S.

500,F MEASUREMENT IN PSYCHOLOGY (3-0-3)

An introductory course on the principles of measurement in psychological research including the topics of psychophysics and scaling, measurement theory, and test theory.

Burnett, S., Gaugler, B., Martin, R.

501,F INTRODUCTION TO PSYCHOLOGICAL STATISTICS (3-0-3)

Introduction to quantitative and computer methods for analyzing experimental data.

Brelsford, J.

502,S ADVANCED PSYCHOLOGICAL STATISTICS I (3-0-3)

Introduction to inferential statistics with emphasis on analysis of variance and multiple regression. Prerequisite: 501 or permission of instructor.

Martin, R.

503,F ADVANCED PSYCHOLOGICAL STATISTICS II (3-0-3)

A continuation of 502, focussing on multiple regression. Other multivariate techniques and distribution-free statistics are also covered. Prerequisite: 502 or permission of instructor.

Lane, D.

504,S COMPUTER APPLICATIONS IN PSYCHOLOGY (3-0-3)

Introduction to SAS, Hypercard, Excel, Basic and other software (software will vary from semester to semester), using Macintosh computers and focussing on data analysis and computer-based experimentation.

Lane, D.

507,S RESEARCH METHODS (3-0-3)

Graduate level treatment of a wide range of laboratory and field research methodologies. Offered alternate years.

Martell, R.

510,F/S TOPICS IN GENERAL PSYCHOLOGY (3-0-3)

Lectures or seminar discussions on topics of broad interest. An example would be discussions of Great Books in Psychology. May be repeated for credit.

Staff

511,S HISTORY AND SYSTEMS OF PSYCHOLOGY (3-0-3)

The philosophical foundations of psychology, the development of scientific models in the 19th century, 20th century schools of psychology, the growth of fields of modern psychology. Offered alternate years.

Schneider, D.

512,S DECISION MAKING (3-0-3)

An overview of the principal concepts, theories, methods, and evidence associated with the exploration of human decision functions. Both descriptive and normative approaches are critically examined from a variety of perspectives: behaviorial, cognitive, applied. Offered every 3 years.

Howell, W.

520,F FOUNDATIONS OF COGNITIVE PSYCHOLOGY (3-0-3)

An introduction to the basic topics in cognitive psychology, including perception, memory, psycholinguistics, concept formation, problem solving, and decision making.

Cooke, N.

521,F PERCEPTION (3-0-3)

The study of how people interpret signals from their senses in a meaningful way. Offered every 3 years.

Pomerantz, J.

522,S INFORMATION PROCESSING AND ATTENTION (3-0-3)

The study of such problems as information overload, selective attention, response conflict, and automatic and controlled processing. Offered every 3 years.

Lane, D.

523,F MEMORY AND COGNITION IN ANIMALS (3-0-3)

Lecture, discussion, and laboratory course in learning and behaviorial control. Explores the application of conditioning techniques to the study of memory and cognition in animals. Prerequisite: permission of instructor. Limit 5.

Wright, A.

524,F MEMORY (3-0-3)

An overview of the issues and research in remembering and forgetting. Offered alternate years.

Roediger, H., Watkins, M.

525,S PSYCHOLINGUISTICS (3-0-3)

The psychology of language, including the study of speech perception, reading, syntax, meaning, bilingualism, language and thought, language errors and disorders. Offered alternate years.

Martin, R.

526,S ARTIFICIAL INTELLIGENCE AND COGNITIVE SCIENCE (3-0-3)

The study of cognitive processes from the vantage point of the human as a computer, with an emphasis on expert systems and their development, parallel distributed processing models, and connectionism. Offered every 3 years.

Cooke, N., Lane, D., Martin, R.

527,F THINKING (3-0-3)

The study of such higher mental processes such as forming concepts, solving problems, making decisions and reasoning. Offered every 3 years.

Cooke, N.

528,S COGNITIVE NEUROPSYCHOLOGY (3-0-3)

Study of the implications of neuropsychological data for cognitive theory. Offered alternate years.

Martin, R., Roediger, H.

529,F/S COGNITIVE RESEARCH SEMINAR (1-0-1)

A weekly student-staff seminar on current and recent research about mental phenomena. May be repeated for credit.

Martin, R.

422 COURSES OF INSTRUCTION

530,F FOUNDATIONS OF I/O PSYCHOLOGY (3-0-3)

Graduate level introduction to the study of human behavior in the work setting. Prerequisite: permission of instructor.

Gaugler, B.

531,S PERSONNEL PSYCHOLOGY (3-0-3)

The application of psychological research and theory to problems of organizing human resource utilization. Prerequisite: Foundations of I/O Psychology (Psyc 530). Offered alternate years.

Gaugler, B.

532,F ORGANIZATIONAL PSYCHOLOGY (3-0-3)

An in-depth examination of selected research and theory in organizational psychology with an emphasis on work motivation, leadership, and group dynamics. Offered alternate years.

Dipboye, R., Martell, R.

540,S FOUNDATIONS OF ENGINEERING PSYCHOLOGY (3-0-3)

An introduction to the basic topics in engineering psychology including basic methods of systems analysis, display-control design, mental and physical workload analysis, and environmental factors in human performance.

Brelsford, J., Laughery, K.

541,S HUMAN-COMPUTER INTERACTIONS (3-0-3)

Topics covered are relevant to the creation of effective interface design methodology, interaction modes, hypertext, mental models, visual display characteristics, input devices, and on-line help.

Cooke, N., Lane, D.

542,F HUMAN RELIABILITY AND SAFETY (3-0-3)

Topics covered include human reliability in systems, accident analysis techniques, hazard and risk perception, and safety communications. Offered every 3 years.

Laughery, K.

550,F FOUNDATIONS OF SOCIAL PSYCHOLOGY (3-0-3)

Review of theories of social psychology with an emphasis on current empirical research.

Schneider, D., Martell, R.

551,S INDIVIDUAL DIFFERENCES AND PERSONALITY (3-0-3)

Consideration of individual differences in motivation, behavior, and cognition. Offered every 3 years.

Schneider, D.

560,S PSYCHOLOGY PRESENTATIONS (2-2-3)

A practicum on oral and written psychology presentations. May be repeated for credit. Offered alternate years.

Staff

561,S TEACHING IN PSYCHOLOGY (3-1-3)

Assistance in the teaching of undergraduate and occasionally graduate courses in psychology. May be repeated for credit.

Staff

571,S FIRST YEAR PROJECT (0-8-3)

An individual research project undertaken in the Spring of the first year of the graduate program.

Staff

572,F/S SECOND YEAR PROJECT (0-8-3)

An individual project undertaken during each semester of the second year of the graduate program. May be repeated for credit.

Staff

573,F/S NON-THESIS GRADUATE RESEARCH (variable)

Individual research not for first or second year project or for thesis. May be repeated for credit.

Staff

600,S TOPICS IN QUANTITATIVE METHODS (3-0-3)

Selected topics in quantitative methodology. May be repeated for credit. Offered alternate years.

Lane, D., Martin, R.

601,S MULTIVARIATE STATISTICS (3-0-3)

Topics in multivariate statistics, such as factor analysis, multiple regression, cluster analysis, multi-dimensional scaling, discriminate analysis and structural equations. Offered alternate years.

Martell, R., Martin, R.

602,S PSYCHOMETRICS (3-0-3)

Test theory including reliability, validity, scaling, norms, sampling, and factor analysis. Offered alternate years.

Lane, D.

610,F/S ADVANCED RESEARCH SEMINAR (1-0-1)

Weekly lunch-time talk by department graduate students and faculty. May be repeated for credit.

Roediger, H.

620,F/S TOPICS IN COGNITIVE PSYCHOLOGY (3-0-3)

Seminars offered on an irregular basis on special topics in cognitive psychology. May be repeated for credit. Offered alternate years.

Pomerantz, J., Martin, R.

621,S TOPICS IN MEMORY (3-0-3)

Intensive study of selected topics and theories about memory. May be repeated for credit.

Roediger, H., Watkins, M.

622,S PERCEPTUAL ORGANIZATION (3-0-3)

Issues concerning how sensory information is shaped into perceptual units, how it is grouped, and how one unit (the figure) is segregated from other units (the ground) for purposes of attention. Offered every 3 years.

Pomerantz, J.

623,S RETRIEVAL PROCESSES IN HUMAN MEMORY (3-0-3)

Studies of how information is retrieved from memory, including such topics as reminiscence and hypermnesia, the effectiveness of retrieval cues, encoding/retrieval interactions, and implicit retention. Offered every three years.

Roediger, H.

628,F/S MEMORY RESEARCH SEMINAR (1-0-1)

A weekly seminar to discuss recent research in human memory.

Watkins, M.

424 COURSES OF INSTRUCTION

629,F/S PSYCHOLINGUISTICS RESEARCH SEMINAR (1-0-1)

A weekly seminar to discuss recent research in psycholinguistics.

Martin, R.

630,F/S TOPICS IN I/O PSYCHOLOGY (3-0-3)

Selected topics in I/O Psychology, such as organizational development and change, training, test construction, utility of personnel procedures, career development, and job analysis. May be repeated for credit. Offered alternate years.

Gaugler, B., Martell, R.

631,S SOCIAL COGNITION IN ORGANIZATIONS (3-0-3)

Introduction to theory and research in social cognition as it relates to topics in organizational behavior. Offered every 3 years.

Martell, R.

632,F LEADERSHIP: THEORY AND RESEARCH (3-0-3)

Examination of the major psychological approaches to the study of leadership. Emphasis is on theory and practice in formal organizations. Offered every 3 years.

Dipboye, R., Martell, R.

633,S WORK ATTITUDES AND MOTIVATION (3-0-3)

Theory and research regarding attitudes and motivation of individuals within work organizations. Offered every 3 years.

Martell, R.

634,S PERSONNEL SELECTION (3-0-3)

Review of research and theory associated with both objective and subjective methods of selecting personnel in organizations. Offered alternate years.

Dipboye, R., Gaugler, B.

635,S THE ASSESSMENT CENTER METHOD (3-0-3)

Advanced graduate-level course on assessment center theory, research, and practice. Prerequisite: Foundations of I/O Psychology. Offered every 3 years.

Gaugler, B.

639,F/S I/O PSYCHOLOGY INTERNSHIP (variable)

Supervised experience in organizational and/or personnel psychology. May be repeated for credit.

Dipboye, R.

640,F TOPICS IN ENGINEERING PSYCHOLOGY (3-0-3)

Seminars offered on special topics in engineering psychology. May be repeated for credit. Offered alternate years.

Brelsford, J., Howell, W., Laughery, K.

649,F/S ENGINEERING PSYCHOLOGY INTERNSHIP (variable)

Supervised experience in engineering psychology. May be repeated for credit.

Brelsford, J., Laughery, K.

651,F TOPICS IN SOCIAL PSYCHOLOGY (3-0-3)

Seminars offered in special topics in social psychology. May be repeated for credit. Offered alternate years.

Schneider, D.

652,S SOCIAL COGNITION (3-0-3)

Discussion of recent research and theory in person perception, perception of and memory for social events, and social/cultural influences in cognitive processes. Offered every 3 years.

Schneider, D.

660,S PROFESSIONAL ISSUES (variable)

Selected topics on professional matters, including grant writing, licensing, and ethics in psychology. Offered every 3 years.

Howell, W.

700,F/S THESIS RESEARCH (variable)

Research for the masters thesis. May be repeated for credit.

Staff

800,F/S DISSERTATION RESEARCH (variable)

Research for the doctoral dissertation. May be repeated for credit.

Staff

Religious Studies

Professor Kelber, Chair

Professors Nielsen, Rupp, Sellers, and Stroup

Assistant Professors Klein and McKenny

Adjunct Professor Reiser

Adjunct Assistant Professor Sanborn

Lecturers Benjamin, Dunne, T.F. Freeman, and Karff

Adjunct Lecturer Heitman

Degrees Offered: B.A., M.A., Ph.D.

Undergraduate Program. All undergraduates majoring in religious studies are expected to enroll in one of the introductory courses offered at the first-or second-year level. A total of 24 semester hours (eight courses) in advanced courses are required for completion of the major. At least six semester hours (two courses) are to be elected in each of the following areas represented in the Department:

1. Historical and Biblical studies
2. Interpretation, theology, comparative religions
3. Religion in the modern world

Qualified upperclass students are given an opportunity to engage in independent work. Related courses offered by other departments may be taken for credit in religious studies with the approval of the major adviser.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Graduate Program. The Department of Religious Studies offers graduate work in a variety of fields: Judeo-Christian origins, church history, philosophy of religion (including theology), and ethics (including medical ethics). In keeping with the traditions of Rice University, study and research are not confessionally oriented. The awarding of advanced degrees is not based solely on the accumulation of credits or compliance with formal requirements. Course plans are determined according to the preparation, needs, and interests of the candidate. A capacity for independent work is considered essential to study in the department.

Cooperative Graduate Study in Medical Ethics. Under an agreement with the University of Texas Health Science Center at Houston, a cooperative program of graduate study in medical ethics is offered, leading to the M.A. and Ph.D. degrees from Rice University.

Clinical experience and case studies are provided through the Health Science Center's Program in Humanities and Technology in Medicine. Central to the cooperative plan is the interdisciplinary seminar in medical ethics (two semesters), with students and instructors from both institutions. Thus students from the Department of Religious Studies have the opportunity to work with students from such disciplines as medicine, nursing, and public health.

Library resources of the Health Science Center are open to Rice graduate students in medical ethics.

Fellowship in Religious Studies for Study Abroad. A fellowship has been established to encourage advanced students to spend a year in another university, in most cases after they have completed their comprehensive qualifying examinations for the Ph.D. degree. It is available equally to persons in any field of study offered in the department. The recipient is chosen by faculty members responsible for graduate work. The cost of air travel is paid in addition to a monthly stipend. Additional costs, such as tuition for study at particular institutes, are considered on a case-to-case basis. Award is made annually, subject to availability of funds.

Requirements for the Degree of Master of Arts:

1. Completion with high standing of a program approved by the department; normally, this includes 24 semester hours in advanced courses plus thesis work.
2. Satisfactory performance on a reading examination in French or German.
3. Satisfactory performance on preliminary written and oral examinations in the field of religious studies; normally, these include biblical studies, church history, philosophy of religion (including theology), and ethics, with detailed attention to the area of thesis specialization.
4. Completion of an acceptable thesis.
5. Satisfactory performance on a final oral examination.

Requirements for the Degree of Doctor of Philosophy:

1. Completion with high standing of a program approved by the department; normally, this includes 54 semester hours of course work, counting those given for the degree of Master of Arts. Six of these semester hours may be waived upon petition to the graduate faculty after the first year. Normal minimum residence is at least two years, even for candidates already holding advanced degrees.
2. Satisfactory performance on a reading examination in both French and German.
3. Satisfactory performance on preliminary written and oral examinations in religious studies. Candidates for the doctoral degree are expected to prepare themselves for six qualifying examinations, four of which are to cover the basic areas of biblical studies, church history, philosophy of religion (including theology), and ethics; the other two are to be taken in the major area of concentration.

4. Completion of a formal proposal and dissertation, both to be approved by the department.
5. Satisfactory performance of a final oral examination on the dissertation and related fields.

Religious Studies Courses

111,F RELIGION AND CULTURE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Examination of major traditions of the East and West. Religion in human experience: personal, historical, cultural, and theological dimensions.

Nielsen, N.

112,S RELIGION AND CULTURE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Religious alternatives. The secular versus the sacred. Competing world views, East and West. Enrollment limited.

Dunne, C.

202,S ATHEISM (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Readings in Marx, Feuerbach, Nietzsche, Sartre, Bloch, as well as classical theistic arguments.

Schubert, F.

203,F RADICAL REVOLUTIONARIES OF THOUGHT (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Study of the founders of the great religions as well as contemporary thinkers.

Schubert, F.

204,S DEITY MYSTICISM AND OCCULT (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Critical, phenomenological study of the psychology of religion and the occult. Comparative use of the categories of the Western and Eastern traditions.

Staff

205,F ARCHAEOLOGY AND THE BIBLE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

The Bible-on-location with slides from excavations in Jordan, Israel, Sinai & Cyprus. The Bible story alongside stories which architecture, pottery, metalwork, sculpture, tombs, painting & other arts in Biblical lands tell. Not offered 1989-90.

Staff

301,F MYSTICISM AND EXISTENTIALISM (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Examination of these two approaches to life in Christian and non-Christian literature, ancient and modern.

Dunne, C.

302,S JEWISH-CHRISTIAN DIALOGUE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Discussion of the basic questions which appear in interfaith exchange. Jewish and Christian beliefs about God, man, history, evil and eschatology.

Karff, S., Nelson, J., Schubert, F.

428 COURSES OF INSTRUCTION

303,F MONOTHEISTIC RELIGIONS: JUDAISM, CHRISTIANITY & ISLAM (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Lectures on the major monotheistic religions. Discussion of early, medieval, modern and post-modern paradigms in Judaism, Christianity, and Islam, and the tensions between them. Not offered 1989-90

Staff

307,F HELLENISTIC JUDAISM & CHRISTIAN ORIGINS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Early Christianity in the context of ancient Near Eastern history. 128

Kelber, W.

308,S SYNOPTIC GOSPELS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

A reading of the gospel stories from a literary perspective.

Kelber, W.

310,S PAULINE THEOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Introduction to the theological controversies between Paul and anti-Pauline Christians. Not offered 1989-90.

Staff

311,F HISTORY OF RELIGION (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Readings in the religious texts of India, China, and Japan. Study of Hinduism, Buddhism, Confucianism, and Taoism.

Preece, C.

312,S HISTORY OF RELIGION (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Study of Judaism, Christianity, and Islam in their historical development. Attention to the basic themes of Western theism. Enrollment limited.

Dunne, C.

314,S INTRODUCTION TO ISLAM (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Study of the history and traditions of the religion founded by Mohammed, Koran, Sufi mysticism and the influence of Islam in the West.

Coleman, D.

321,F SEMINAR ON CONTEMPORARY THEOLOGIANS (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.2**

Study and critical evaluation of the writings of a contemporary religious thinker. Lewis' outlook compared with that of Thomas Merton and Dietrich Bonhoeffer.

Schubert, F.

322,F INTRODUCTION TO BUDDHISM (3-0-3)

The thought, practice and historical development of Buddhism in India, Tibet, China and Japan.

Klein, A.

325,F BUDDHISM AND THE FEMALE (3-0-3)

Questions of self, relationships and personal changes explored through examining Buddhist theories and female symbolism in light of current work on or by women. (May be taken for graduate credit with supplementary work.)

Klein, A.

331,F PSYCHOLOGY OF RELIGION (3-0-3)*** DISTRIBUTION COURSE: CATEGORY I.2**

Study of the primary developments in the field, with particular emphasis on changing issues and methods. Enrollment limited.

*Dunne, C.***334,S PSYCHOLOGY OF RELIGION (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

Significant contemporary problems examined from a clinical standpoint, e.g., ideas of God, evil, anxiety, guilt, and therapeutic process.

*Sanborn, H.***341,F HUMAN RIGHTS AND DIGNITY I (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

An exploration of questions raised by contemporary phenomena such as terrorism, torture, and totalitarianism.

*Holleman, C.P.***345,F ETHICS & LIFE CYCLE I (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

Concrete problems of the life "spiral," including the quest for identity, sex ethics, medical ethics, aging, death and dying.

*McKenny, G.***347,F VARIETIES OF CONTEMPORARY RELIGIONS (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

Varying religious life styles, traditional and nontraditional, in the Indian, Black, Mexican-American, Islamic, and Jewish communities. Consideration of worship, sacred literature, ethics, community involvement, evangelical efforts. Field trips, guests, discussion.

*Freeman, T.***348,S COMMUNITIES ETHICAL DILEMMAS (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

Current community problems and their ethical and religious implications: drugs, race, inequities, poverty, law enforcement, religious intolerance. Guest speakers, visitations.

*Freeman, T.***355,F BIBLICAL ANCESTORS AND HEROES (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

Studies in the lore of kings in Ancient Israel: Genesis, Exodus, Leviticus, Numbers, Deuteronomy, Joshua. Judges, 1-2 Samuel, 1-2 Kings.

*Benjamin Jr., D.***356,S THE PROPHETS (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

Analysis of prophets in ancient Israel: 1-2 Samuel, 1-2 Kings, Amos, Hosea, Isaiah, Jeremiah, and Ezekiel. Offered alternate years

*Benjamin Jr., D.***357,F WOMEN IN THE BIBLE (3-0-3)***** DISTRIBUTION COURSE: CATEGORY I.2**

Teaching literature in Ancient Israel. Clan-mothers and queens, warriors, wives, and lovers in Proverbs, Qoheleth, Job, Psalms, Song of Songs, Ruth, Judith, Esther. 129 Not offered 1989-90.

Staff

430 COURSES OF INSTRUCTION

358,S BIBLE, CREATION & APOCALYPSE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Alpha and Omega stories in Ancient Israel: The Garden of Eden, the Flood, the Exodus, the Battle of Jericho, Isaiah's Messiah, Ezekiel's New Jerusalem, Daniel, Zechariah, Jonah. Not offered 1989-90

Staff

375,F COSMOS AND HUMANITY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Fundamental questions on the nature of humanity and its place in the universe.

Sibley, S.

376,S ORIGIN OF THE UNIVERSE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Major cosmological theories and their effect on both religious and secular thinking.

Jones, H.

401,F INDEPENDENT STUDY (3-0-3)

Kelber, W.

402,S INDEPENDENT STUDY (3-0-3)

Kelber, W.

415,S CONTEMPORARY MORAL ISSUES (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Discussion of controversial moral issues such as abortion, euthanasia, capital punishment, war, and the role of the state. Limited enrollment. Not offered 1989-90.

Staff

417,F AMERICAN RELIGIOUS EXPERIENCE (3-0-3)

Love and justice from Jonathan Edwards to Martin Luther King, Jr. (Should be preceded by Reli 307 and 456.)

Sellers, J.

454,F HISTORY OF CHRISTIANITY II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Survey from the Reformation to the seventeenth century. Not offered 1989-90.

Staff

456,F HIST OF WESTERN CHRISTIANITY: (3-0-3)

REFORMATION TO THE PRESENT Spirituality, politico-social movements, and intellectual life in the West from Luther and Calvin to Bonhoeffer, Barth, Tillich, Marx, Nietzsche, and Jung.

Stroup, J.

457,S MODERNITY, ANTI-MODERNITY & POST-MODERNITY AS STYLES OF RELIGIOSITY (3-0-3)

Problem of defining "modernity"; contemporary sociological and political theory. (May be taken for graduate credit with supplementary work.) Not offered 1989-90.

Stroup, J.

458,S FROM REFORM TO REACTION (3-0-3)

Currents of spirituality and social thought from St. Francis of Assisi to William Blake. (May be taken for graduate credit with supplementary work.) Not offered 1989-90.

Staff

462,F MEDICAL ETHICS & AMERICAN VALUES I (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Readings and discussion of the principles and priorities of medical ethics, with attention to historical development. Prereq- permission of instructor.

Heitman, E., Reiser, S.

463,S MEDICAL ETHICS & AMERICAN VALUES II (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.2

Continuation of 462, with attention to clinical experience. Prereq- Reli 462.

McKenny, G., Reiser, S.

470,S BUDDHIST WISDOM TEXTS (3-0-3)

Indo-Tibetan analyses of the mind and its functions: An introduction to Tibetan language.
Klein, A.

501,F REFORMATION: ZWINGLI-ANABAPTISTS (3-0-3)

Not offered 1989-90.

Staff

503,F CHRISTIANITY&THE MODERN WORLD (3-0-3)

Not offered 1989-90.

Stroup, J.

506,F GOSPEL AND TRADITION (3-0-3)

Kelber, W.

507,F PAULINE THEOLOGY (3-0-3)

Not offered 1989-90.

Staff

508,S JOHN AND LOGOCENTRISM (3-0-3)

Kelber, W.

509,S NEW TESTAMENT & HERMENEUTICS (3-0-3)

Not offered 1989-90.

Staff

511,F HEBREW BIBLE & HERMENEUTICS (3-0-3)

Benjamin Jr., D.

512,S RELIGION OF ANCIENT ISRAEL (3-0-3)

Benjamin Jr., D.

521,S NON-CHRISTIAN RELIGIOUS PHILOSOPHY (3-0-3)

Critical examination of major traditions of Indian and Chinese philosophy, historical development and modern expressions of Hindu and 130 Buddhist thought. Not offered 1989-90.

Staff

522,S PHILOSOPHICAL THEOLOGY (3-0-3)

Offered alternate years. Not offered 1989-90.

Staff

523,F INDEPENDENT STUDY (Variable)

Kelber, Werner

432 COURSES OF INSTRUCTION

524,S INDEPENDENT STUDY (Variable)

Kelber, Werner

525,F THEORETICAL PRINCIPLES OF INTERRELIGIOUS DIALOG

(3-0-3)

Not offered in 1989-90.

Staff

526,F SEMINAR-CONTEMPORARY THEOLOGY (3-0-3)

Not offered 1989-90.

Staff

528,S ECUMENICAL THEOLOGY SEMINAR (3-0-3)

Not offered 1989-90.

Staff

533,F SEMINAR IN HISTORICAL THEOLOGY (3-0-3)

Nielsen, N.

541,F SEMINAR IN ETHICS (3-0-3)

Sellers, J.

542,S SEMINAR IN ETHICS & SOCIETY (3-0-3)

McKenny

543,F SEMINAR IN MEDICAL ETHICS & AMERICAN VALUES I (3-0-3)

Reiser, S., Heitman, E.

544,S SEMINAR IN MEDICAL ETHICS & AMERICAN VALUES II (3-0-3)

Prereq- Reli 543.

McKenny, G., Reiser, S.

545,F ADV TUTORIAL IN MEDICAL ETHICS (3-0-3)

Tutorial studies for Graduate Students in Health Care Ethics who have completed the required first year semester.

Sellers, J.

553,F DEPARTMENTAL COLLOQUIUM (3-0-3)

McKenny

554,S DEPARTMENTAL COLLOQUIUM (3-0-3)

Kelber, W.

555,S EMERGENCE OF MODERN POLITICAL THEOLOGY (3-0-3)

Stroup, J.

556,S CHRISTIANITY & SOCIAL HISTORY (3-0-3)

Not offered 1989-90.

Staff

557,S RELIGIOSITY & SOCIAL POLICY IN AGE OF THE BAROQUE
(3-0-3)

Not offered 1989-90.

Staff

**558,F CRISIS OF MODERN CHRISTIANITY IN LITERATURE/ART/
MUSIC/FILM (3-0-3)***Stroup, J.***800,F/S THESIS RESEARCH (Variable)***Kelber, W.***Social Sciences**

The School of Social Sciences offers majors in anthropology, behavioral science, economics, political science, psychology, sociology, and statistics.

The requirements for the interdepartmental major in policy studies, which overlaps the School of Social Sciences, the School of Engineering, and the School of Humanities, is outlined on page 407. The requirements for the managerial studies major, which overlaps the School of Social Sciences, the Jones School, and the School of Engineering, is described on page 369.

*Social Science Courses***102,S INTELLECTUAL FOUNDATIONS OF THE SOCIAL SCIENCES
(3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.3 OR II.4**

A survey of fundamental ideas, theories, and approaches that have shaped the intellectual heritage of the social sciences. A FOUNDATION COURSE.

*Staff***300,S SOCIAL SCIENCE AND PUBLIC POLICY (3-0-3)***** DISTRIBUTION COURSE: CATEGORY II.4**

The course will survey how disciplines in the social sciences study public policy. Specific policy questions will be examined as a means of highlighting each discipline's approach to the study of public policy.

*Stein, R.***420,S HEALTH CARE: CHOICE & PUBLIC POLICY (3-0-3)**

Explores the generation of technology from science, its transformation by engineering intervention into workable innovations, and processes and problems of evaluating benefits and limits before it diffuses into clinical practice.

*Reiser, S.***430,F THE SHAPING OF HEALTH POLICY (3-0-3)**

As health care becomes an important institution of the private and public sector, an understanding of how policy decisions are made and implemented becomes essential. This course brings together the disciplines of government, law, ethics, economics, and history to explore health care policy. Seminars will involve faculty experts in the above disciplines, and guests who are leading national figures in 135 the shaping of public policy to present case discussions of major policy problems.

Reiser, S.

Sociology

Professor Martin, Chair
Professors Davidson, C. Gordon, and Klineberg
Associate Professor Long
Lecturer Valenzuela
Adjunct Professor D. P. Smith

Degree Offered: B.A.

Undergraduate Program. The major is designed to enable students to understand the nature of human societies as an important part of a liberal education, as a foundation for a variety of occupations, and as preparation for graduate study. The program provides students with considerable latitude in pursuing substantive interests, while ensuring a basic familiarity with theoretical approaches and issues of methodology. Majors in sociology are not required to take a foreign language; those planning graduate study, however, should be aware that many graduate departments of sociology require demonstrated competence in at least one foreign language. A minimum of 27 semester hours (nine courses) in sociology must be passed, of which at least 21 semester hours (seven courses) must be at the advanced level. In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete at least 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Requirements for the major in sociology are: (1) Sociology 203; (2) at least one of the two courses emphasizing theoretical approaches, Sociology 317 or 353; (3) Sociology 421; and (4) at least 18 semester hours (six courses) in the substantive areas of sociological specialization. A statistics course such as Mathematical Sciences 280, 301, 381, 480, or 481 or an independent study course (Sociology 403, 404, 493, 494) may be used as one of these.

All sociology courses listed are regularly offered by the present faculty, although not necessarily every year. Additional courses may be offered with the addition of new faculty or variations in present course assignments; similarly, some courses may be discontinued from the regular offerings. It is the responsibility of the student to consult the listing of University distribution requirements before registering in order to satisfy all the requirements for his or her degree. The registration of every sociology major must be signed by the departmental adviser, Professor Klineberg.

Honors Program. The honors program is designed to (1) provide undergraduates whose primary concentration is in the field of sociology with the opportunity to deepen their understanding of the sociological perspective through a two-semester program of directed independent research and writing, and (2) provide an opportunity for the recognition of undergraduates who have demonstrated unusual competence in sociology and capacity for sustained independent research.

To be eligible for the program, a student must have maintained a "B" average in at least four sociology courses beyond the introductory level. During the first semester of the junior year, students who meet this requirement are invited to submit, no later than two weeks prior to registration for the spring semester, a

description of their proposed research project to the Undergraduate Honors Committee (Professor Stephen Klineberg, chair). This committee, in consultation with the candidate, evaluates the proposal in terms of both its feasibility and its sociological significance. Upon acceptance into the program, the student is assigned a faculty adviser to supervise the student's independent research and the selection of further courses relevant to the project. It is expected that all honors candidates will have completed Sociology 421 before beginning their second semester of honors research.

Honor students register for two successive semesters of directed honors research (Sociology 493, 494). The first semester is normally devoted to a review of the relevant literature and the preparation of a detailed outline of the planned research. The research itself is normally carried out during the second semester and written up as a completed honors thesis by the end of that period.

The thesis is read and evaluated by two other faculty members in addition to the student's primary adviser and followed by an oral examination open to the public. These three faculty members share responsibility for determining departmental honors based on the student's performance in the program as a whole.

Sociology

Sociology Courses

203,F/S INTRODUCTION TO SOCIOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Introduction to the principal concepts, theories, and methods of sociology. 132

Martin, W.

231,S RACE AND NATIONALITY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

The role of race and nationality in society, ethnic cultures, prejudice, political institutions, patterns of conflict and cooperation; discrimination and its remedies.

Davidson, C.

301,F SOCIAL INEQUALITY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

A study of the extent of social inequality, its causes, costs, and benefits. Should (and can) it be abolished? Is inequality compatible with democracy?

Davidson, C.

303,S THE NEEDS OF STRANGERS (3-0-3)

A seminar to provide an intellectual framework for analyzing human efforts to help others. Readings in the humanities and social sciences will focus on such issues as: What are the most effective ways of helping others? What are the unintended consequences of good deeds? Is altruism a basic human trait? Which needs are best met through voluntary activity and which can best be met by government? Students involved in community service are encouraged to apply. Permission of instructor required.

Davidson, C.

306,F SOCIOLOGY OF GENDER (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Relationship between gender and social role. Development of the contemporary sexual division of labor and process of socialization with reference to family, education, media, and occupations.

Long, E.

311,F COLLECTIVE BEHAVIOR (3-0-3)

Consideration of relatively noninstitutionalized conduct: crowds, mobs, publics, social movements; conditions and consequences of social unrest, excitement, panic, protest, and terrorism.

Gordon, C.

313,S DEMOGRAPHY (3-0-3)

An introduction to the study of dynamics of population change. Demographic data sources, components of population change, mortality patterns, family planning, the measurement of migrations, population-economic models.

Smith, D.

317,S BASIC TRENDS IN SOCIOLOGICAL THEORY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Four basic paradigms: social factism (functional theory and conflict theory); social behaviorism (psychological behaviorism and social exchange); social definitionism (action theory and symbolic interactionism); and social constructionism (phenomenological and ethnomethodological theorizing).

Staff

321,F CRIMINOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Types of criminal behavior, theories of crime and juvenile delinquency, with attention to the role of police, courts, correction agencies, and other social structures. Field work.

Martin, W. C.

331,F POLITICS & SOCIETY IN TEXAS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Texas as an emerging industrialized state with deep roots in a Southern rural past. Populism; "folk conservatism"; cosmopolites and yahoos; theories of how Texas politics works.

Davidson, C.

334,F SOCIOLOGY OF THE FAMILY (3-0-3)

Comparative analysis of role structure, sexuality, emotional bonds, and interaction patterns in differing forms of contemporary families. The functioning of the family in differing cultures, classes, and lifestyles.

Long, E.

336,F/S MASS COMMUNICATIONS (3-0-3)

Structure, social context, and efforts of large-scale impersonal communication to dispersed and heterogeneous audiences, through such media as television, radio, print, motion pictures, and recordings.

Gordon, C.

345,F SOCIOLOGY OF MEDICINE (3-0-3)

This course gives a brief overview of relationships between social factors and health. It will analyze medicine as a solution and cause of many social and individual problems. It will examine stress and health, medicine and health care systems. Describes cross-cultural differences in health, alternative sources in health policies, patterns of diseases 133 and health policies in other countries.

Staff

346,S DEVIANT BEHAVIOR (3-0-3)

This course will compare and contrast various explanations of deviant behavior, linking those explanations to general sociological theory. Special attention will be given to mental illness and substance abuses as categories of deviance.

Staff

353,F CONCEPTIONS OF HUMAN NATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

The perspectives of sociobiology, psychoanalysis, behaviorism, and symbolic interactionism; the "paradigm shift" toward viewing human beings as actively engaged in the construction of reality.

Klineberg, S.

354,S PERSONALITY & SOCIAL SYSTEMS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

An attempted integration of the perspectives of psychology and sociology in relation to the determinants of individual behavior and to the processes of social change.

Staff

360,S TELEVISION IN AMERICAN CULTURE (3-0-3)

Analysis of television as popular art, in the context of politics, industry, and other cultural forms.

Gordon, C.

386,S SEXUALITY AND THE SOCIAL ORDER (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

Ways societies conceive of and regulate sexuality in members' lives; sexual value systems; forms of sexual conduct (especially number and identities of participants and intimacy and power relations among them); the changing role of sexuality over the typical life span; forms and effects of sexual communication, and issues in the future of sexuality.

Gordon, C.

403,F INDEPENDENT STUDY (3-0-3)

Directed reading and written papers on subjects not regularly offered; advanced study of subjects on which courses are offered. Prereq- permission of the department.

Staff

404,S INDEPENDENT STUDY (3-0-3)

Directed reading and written papers on subjects not regularly offered; advanced study of subjects on which courses are offered. Prereq- permission of the department.

Staff

411,F SOCIAL CHANGE (3-0-3)

Analysis of on-going transformations in gender roles and family structures, work-roles and public policies, global economic and environmental interdependencies, public attitudes and beliefs. Individual and collective responses to the challenges of our time.

Klineberg, S.

421,F THE CRAFT OF SOCIOLOGY (3-0-3)

* DISTRIBUTION COURSE: CATEGORY II.4

What has been, and is today, the "work" of sociology? This question will be addressed by a self-reflective exploration of the discipline—its historical and social origins and development, its shifting philosophical foundations, its methodological refinements, its ethical and political implications—and discussion of sociological studies, both classic and controversial.

Long, E.

425,F/S POLITICAL SOCIOLOGY (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Examination of social phenomena that impinge on political systems; mass society, informal power structures, ideology, intergroup conflict, insurgent social movements.

Staff

430,S SOCIOLOGY OF RELIGION (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

Religious beliefs, symbols, actions, organizations, roles, and various interrelationships between religion and society, including new religious movements, secularization, and functional alternatives to religion. Field work.

Martin, W.

433,F SOCIOLOGY OF THE LIFE CYCLE: (3-0-3)

DEATH AND DYING Consideration of the social meanings of death in various cultures; medical and other definitions of death; attitudes toward death and dying; career of the self in life and death; too-early, on-time and too-late deaths; "near-death experiences"; social management of death and dying in various organizational settings (homes, hospitals, nursing homes, hospices, battle fields, etc.); changing causes of death, mortality rates and demographic characteristics of dying persons; various types of death (suicide, accident, illness, murder, war, etc.); relations of aging and death; implications of changing death patterns for individuals, families, organizations, and societies in this nuclear age.

Gordon, C.

436,S SOCIOLOGY OF LITERATURE (3-0-3)

Examination of social actors and institutions involved in production, dissemination, and reception of literature: authors, publishers, and other literary "gatekeepers;" critics who shape the literary canon; and audiences - what they read and how books ("good" or "trash") function in their lives.

Staff

443,S SOCIOLOGY OF DEVELOPMENT (3-0-3)

A comprehensive overview of the relationship between sociological factors and economic and social development. The approach will be multidisciplinary. The course has been tailored to suit all backgrounds.

Asare, B.

450,F TOPICS IN STUDY OF RELIGION: (3-0-3)

FUNDAMENTALISM An examination of fundamentalist religious institutions, behavior, and thought with consideration of fundamentalist attitudes toward, participation in, and impact on politics, economics, education, mass communication and family life. Attention will be given to both Christian and Islamic examples. Some field work required.

Martin, W.

475,F SOCIAL MOVEMENTS (3-0-3)

This course examines both the historical development and contemporary relevance of social movements in an empirical and theoretical context. Examination of the classical literature on collective behavior and social movements, as well as recent criticisms of these perspectives. Utilization of these historical data and theoretical approaches to assess the impact and potential future of social movements in Europe and the U.S.

Staff

481,F PERSPECTIVES ON THE FUTURE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY II.4**

An exploration of the major processes underlying the transformation of industrial societies, with particular reference to the impact of technological developments and environmental constraints, as they interact with human values and aspirations, to shape the contours of the future.

Klineberg, S.

492,S DIRECTED HONORS RESEARCH (3-0-3)

Sociological research under faculty supervision. First semester: review of relevant literature and preparation of outline for planned research. Second semester: research carried out and honors thesis completed. Open only to students in sociology honors program.

Staff

493,F DIRECTED HONORS RESEARCH (3-0-3)

Sociological research under faculty supervision. First semester: review of relevant literature and preparation of outline for planned research. Second semester: research carried out and honors thesis completed. Open only to students in sociology honors program.

Staff

496,S RESEARCH: HOUSTON AREA SURVEY (3-0-3)

The "research team" will continue the series of annual surveys exploring the ways Houston residents are reacting to changes in American society. By participating fully in sampling procedures, questionnaire construction, interviewing, and data analysis, students will gain direct experience with the logic and skills of survey research, in a project of professional quality.

Klineberg, S.

Space Physics and Astronomy

Professor Dessler, *Chair*

Professors Chamberlain, Cloutier, Dufour,

Dunning, Few, *Assistant Chairman* J.W. Freeman, Haymes,

Heymann, Michel, O'Dell, Stebbings, Walters, Weisheit, and Wolf

Assistant Professor Bland (Hawthorn)

Adjunct Assistant Professors Jost, Noble, and Newman

Senior Research Scientists Hill, Reiff and Voigt

Associate Research Scientist Smith

Assistant Research Scientist Ledley

Degrees Offered: B.A. in physics with space physics and astronomy option, M.S., Ph.D.

Undergraduate Program. There is no undergraduate major in the department; however, the Department of Physics offers a space physics and astronomy option leading to a B.A. with a major in physics for students with an interest in studies directed toward space physics and astronomy. The course requirements for this option can be satisfied in any order consistent with prerequisites. The following is a typical program (laboratory courses in parentheses):

<i>First Year:</i>	Physics 101, 102 (132) Mathematics 101, 102 Chemistry 101, 102
<i>Second Year:</i>	Space Physics and Astronomy 251, 252 Physics 201, 202 (231, 331) Mathematics 211, 212
<i>Third Year:</i>	Physics 301, 302 Physics 311, 312 Mathematics or Mathematical Sciences elective
<i>Fourth Year:</i>	Space Physics and Astronomy 471

Physics 425, 431, 432

Math elective

Additional courses in space physics, electrical engineering, mathematics, computer science, geology, and other subjects may be helpful to undergraduates enrolled in the space physics option. The department has prepared a list of such courses and should be consulted prior to registration. In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 130 semester hours. See Degree Requirements and Majors, pages 63-84.

Graduate Program. Research opportunities exist for graduate studies leading to degrees of Master of Science and Doctor of Philosophy in the Department of Space Physics and Astronomy. To gain such a degree, a student must be knowledgeable in many areas of space physics and astronomy and expert in at least one.

Because of the interdisciplinary nature of the Department's activities, holders of bachelor's degrees in astronomy, chemistry, electrical engineering, geophysics, physics, or any of several other scientific and engineering disciplines may apply for admission to graduate study in the department. Research programs in the Department of Space Physics and Astronomy include astronomy, astrophysics, atmospheric electricity, atomic physics, experimental and theoretical space plasma physics, meteoritics, and planetary atmospheres.

The requirements for M.S. and Ph.D. degrees are outlined below. A booklet giving more detailed and specific information is available from the departmental office.

Requirements for the Degree of Master of Science. Candidates for the master's degree must complete successfully at least 30 semester hours of approved graduate level studies and must demonstrate an understanding of physics and astronomy in an oral examination by their faculty committee. They must prepare a written thesis on an original research topic and defend the thesis orally.

Requirements for the Degree of Doctor of Philosophy. The basic requirement for a doctorate is demonstration of the capacity for independent, original research. Additional formal requirements are indicated below.

A student is normally admitted to candidacy for the Ph.D. degree by satisfying the requirements for the M.S. degree in space physics and astronomy as outlined above. A student who already holds a recognized M.S. degree or who does not desire to receive a master's degree may become a candidate for the Ph.D. through procedures described in the booklet available from the departmental office.

Candidates who hold a master's degree could possibly complete requirements for the doctorate in two years; however, a minimum of three years' graduate study is normally required. Students must complete at least 60 semester hours of approved graduate level studies, prepare a thesis on an original research topic, and defend the thesis orally. The thesis must be of a quality acceptable for publication in a reputable scientific journal. Further details of research programs in space physics and astronomy and departmental degree requirements are contained in a pamphlet available on request from the Department of Space Physics and Astronomy.

*Space Physics and Astronomy Courses***201,F/S STARS, GALAXIES & THE UNIVERSE (3-0-3)***** DISTRIBUTION COURSE: CATEGORY III.5**

An introductory course for students in academic programs. The formation, evolution, and death of stars; the composition and evolution of galaxies; the structure and evolution of the universe. Prereq- Nsci 101, 102.

Bland, J.

202,F/S THE SOLAR SYSTEM (3-0-3)*** DISTRIBUTION COURSE: CATEGORY III.5**

An introductory course for students in academic programs. Motions of planets; the moon and eclipses; structure and energetics of the sun; recent discoveries about the planets and their moons. Prereq- Nsci 101, 102.

Bland, J.

235,F/S SPACE COLONIES (3-0-3)

Physics of the planetary and space environment, reforming planets to make them habitable, calculation of spacecraft orbits, design and construction of large space structures, power generation, and specialized manufacturing. Prereq- Nsci 101, 102. Not offered in 1989-90.

Staff

251,F GALACTIC ASTRONOMY I (3-2-3)

A survey of the structure and components of our Galaxy with emphasis on the physical properties of stars and the interstellar medium. Subjects include stellar structure, formation, evolution, and remnants; as well as the properties and distribution of interstellar gas and dust. Incorporated into the course are two observational projects related to telescope observing techniques and astrophotography. Intended for SE students who have had at least two semesters of physics, calculus, and chemistry.

Dufour, R.

252,S GALACTIC ASTRONOMY II (3-2-3)

A continuation of Spac 251a, with emphasis on the motions of stars in our Galaxy and its evolution. The morphology and physical properties of other galaxies will be discussed and extended to include current knowledge about the large-scale properties of the universe and theories regarding its formation and evolution. Two observational projects are incorporated into the course. Prereq-: Spac 251a, or consent of instructor.

Dufour, R.

346,S ATMOSPHERE, WEATHER & CLIMATE (3-0-3)*** DISTRIBUTION COURSE: CATEGORY III.**

This course will emphasize the fundamental science of the atmospheric system. The course will be directed toward the non-SE students; it will be quantitative and will involve problem solving but will not require advanced mathematics. Among the subjects to be covered are: climate changes, solar radiation and the Earth's energy budget, atmospheric motions and circulation, clouds and storms, and atmospheric environmental concerns.

Few, A.

431,F SENIOR RESEARCH (3-0-3)

For majors in the spac option.

Staff

432,S SENIOR RESEARCH (3-0-3)

For majors in the spac option.

Staff

442 COURSES OF INSTRUCTION

433,F HONORS RESEARCH I (3-0-3)

Student pursues a research project similar to Spac 431, 432 in considerably greater depth. Prereq- permission of the department.

Staff

434,S HONORS RESEARCH II (3-0-3)

Student pursues a research project similar to Spac 431, 432 in considerably greater depth. Prereq- permission of the department.

Staff

443,F INTRODUCTION ATMOSPHERIC SCIENCE (3-0-3)

Fundamentals of meteorology and climatology: radiation and energy balance, measurements, thermodynamics, clouds, weather systems and motions on small and global scales. Also offered as Envi 443 and Mech 477.

Few, A.

471,F SOLAR SYSTEM PHYSICS (3-0-3)

The Sun, solar-terrestrial relationships, solar wind, ionospheres, and magnetospheres. Prereq- Spac 251, 252; Phys 301, 302, 311, 312 or equivalent.

Cloutier, P.

503,S PLASMA ASTROPHYSICS I (3-0-3)

Magnetohydrodynamics, gas dynamics, particle drifts, electrical conductivities. Emphasis on applications.

Cloutier, P.

504,F PLASMA ASTROPHYSICS II (3-0-3)

Plasma waves, confinement, and instabilities. Emphasis on applications. Not offered in 1989-90.

Staff

506,F/S ADVANCED PLASMA PHYSICS (3-0-3)

Kinetic theory of waves in a hot magnetized plasma; electrostatic waves; examples relevant to space plasma physics. Introduction to non-linear plasma physics, including simple analytic solutions, BGK waves, double layers, the Korteweg-deVries equation. Parametric instabilities. Weak turbulence theory. Prereq- Spac 504. Not offered in 1989-90.

Staff

507,F RESEARCH TOPICS (2-0-1)

A presentation of current research programs in the department.

Dunning, B.

508,S RESEARCH TOPICS (2-0-1)

A presentation of current research programs in the department.

Dessler, A.

511,S PLANETARY ATMOSPHERES I (3-0-3)

Vertical structure of the atmosphere of the Earth and other planets; basic atmospheric hydrodynamics; chemistry and dynamics of the Earth's atmosphere; radiative transfer and spectroscopy applied to optically thick situations.

Chamberlain, J.

512,F PLANETARY ATMOSPHERES (3-0-3)

Ionospheres: Their aeronomy and propagation of radio waves; airglow; and aeronomy of neutral gases; exospheric structure; stability of planetary climate changes. Not offered in 1989-90.

Staff

515,F CLASSICAL DYNAMICS AND GRAVITATION (3-0-3)

Advanced topics in classical dynamics. Evolution of chaotic and N-body systems. Brief review of special relativity. General relativity; gravitational waves and radiation.

Michel, C.

525,F QUANTUM THEORY OF ATOMS AND MOLECULES (3-0-3)

An introduction to the quantum mechanics of single- and multi-electron atoms and of diatomic molecules, emphasizing spectroscopy and the interpretation of observations in space physics and astronomy.

Dunning, B.

531,F ELECTROMAGNETIC THEORY I (3-0-3)

Also offered as Phys 531.

Wolf, R.

532,S ELECTROMAGNETIC THEORY II (3-0-3)

Also offered as Phys 532.

Weisheit, J.

551,F/S STRUCTURE AND EVOLUTION OF STARS (3-0-3)

Physics of stellar interiors. Evolution of stars off the main sequence. Supernovae; white dwarfs, neutron stars, and pulsar phenomena. Offered in alternate years.

Chamberlain, J.

552,S NEBULAR ASTROPHYSICS (3-0-3)

Introduction of the physics of emission nebulae. Topics include: radiative transfer, photoionization and thermal equilibria, and internal gaseous dynamics. Analysis of the spectra of nebulae, novae and supernova remnants.

O'Dell, R.

555,F/S RADIATION MEASUREMENT AND ASTROPHYSICAL OBSERVATIONS (3-0-3)

Study of methods by which astronomical data are obtained. Cosmic rays and the entire electromagnetic spectrum, from the gamma-ray to the radio region, are considered. Instruments suitable for each energy range, and demands of different observing environments (from subterranean to orbiting observatories) are addressed. Offered in alternate years.

O'Dell, R.

561,F/S STRUCTURE AND EVOLUTION OF GALAXIES (3-0-3)

Properties of normal and active galaxies. Analysis of the stellar and gaseous content of the Milky Way; comparison with other galaxies. Kinematics of disk systems. Models of the chemical and dynamical evolution of galaxies. Offered in alternate years. Not offered in 1989-90.

Dufour, R.

562,F/S STRUCTURE AND EVOLUTION OF THE UNIVERSE (3-0-3)

Study of the observed contents and large-scale structure of the universe vis-a-vis the standard (Big Bang) cosmological model. Formation and evolution of self-gravitating systems. Quasars and related phenomena. Offered in alternate years. Not offered in 1989-90.

Weisheit, J.

564,S ATMOSPHERIC DYNAMICS (3-0-3)

Hydrodynamic equations of motion on a rotating planet solved for static, and perturbed and instable flows for mesoscale and macroscale weather systems on Earth and other planets. Also offered as Envi 564.

Staff

595,F TEACHING SPACE PHYSICS & ASTRONOMY (Variable)

For graduate students.

Staff

596,S TEACHING SPACE PHYSICS & ASTRONOMY (Variable)

For graduate students.

Staff

603,F SPECIAL TOPICS: STELLAR DYNAMICS

A reading and seminar course in the physics of stellar systems, with emphasis on gravitational N-body phenomena. Prereq- Spac 515; Spac 561 and 503 helpful, but not required.

Weisheit, J.

605,S MAGNETOSPHERIC PHYSICS (3-0-3)

The course describes the plasma physics of the Earth's magnetosphere, including interactions of the magnetosphere with the solar wind, the ionosphere, and the neutral atmosphere. The observational knowledge is summarized, and the basic theories of the most important phenomena are developed. The emphasis is on large-scale physics, but small-scale waves and instabilities are discussed in some detail in cases where they affect the large-scale phenomena.

Wolf, R.

800,F/S GRADUATE RESEARCH (Variable)

Spanish, Portuguese, and Classics

Associate Professor Urrutibéheity, *Chair*

Professors Castañeda, Leal, and Levin

Associate Professors Kauffmann, Pérez, Rea, Wallace, and Yamal

Assistant Professor Yunis

Lecturers Daichman, Eaker, and Kiperman

Degrees Offered: B.A. and M.A. in Spanish; B.A. in Classics*

Study is offered in Classics, Greek, Latin, Portuguese, and Spanish. A fully equipped language laboratory is in operation. Laboratory work is required of students in the beginning classes of all modern languages.

Qualified upperclass students may engage in independent work at the discretion of the department.

*For information on curriculum in Classics please see separate section in catalogue.

Spanish

Undergraduate Program. A student majoring in Spanish may pursue the following options: (1) language, (2) literature, or (3) Latin American studies. For an option in language or literature, 30 semester hours (ten courses) offered in fulfillment of major requirements must be Spanish courses numbered 300 or higher. For an option in Latin American studies, a minimum of 18 semester hours (six courses)

in Spanish courses numbered 300 or higher must be taken, plus six semester hours (two courses) of Portuguese, and at least 12 semester hours (four courses) related to the Latin American field in other departments. Qualified upperclass students are offered an opportunity to earn up to six semester hours in independent work. For specific requirements as to courses and the sequence to be followed, see the departmental advisers. All majors must have their programs approved by the department.

In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours. See Degree Requirements and Majors, pages 63-84.

Requirements for the Degree of Master of Arts:

1. Completion with high standing of a program approved by the department; normally, this includes 24 semester hours in advanced courses plus six semester hours of thesis work.
2. Satisfactory performance on a reading examination in one foreign language other than Spanish approved by the department.
3. Satisfactory performance on a written comprehensive examination in Spanish, which tests the student's competence in the chosen area of specialization and in the remaining areas of Hispanic literature and linguistics.
4. One semester of college Latin or equivalent.
5. One semester of "Teaching College Spanish" and practice teaching.
6. Completion of an acceptable thesis.
7. Satisfactory performance on a final oral examination on the thesis.

Summer Graduate and Undergraduate Program. Each summer since 1973, the Department of Spanish has offered programs designed to prepare students to study the Spanish language and do research on Spanish Literature and Linguistics. The program has now been established in Seville, Spain. Partial scholarships are available. Two graduate level courses are given every summer.

Spanish Courses

101,F/S FIRST YEAR SPANISH (3-1-4)

* DISTRIBUTION COURSE: CATEGORY I.1

NOTE: 102 must be completed to receive dist. credit for 101. Introduction to the study of the Spanish language with emphasis on the development of audiolingual skills. Language laboratory work required.

Staff

102,F/S FIRST YEAR SPANISH (3-1-4)

* DISTRIBUTION COURSE: CATEGORY I.1

Continuation of Span 101.

Staff

103,F ACCELERATED BEGINNING SPANISH (6-2-8)

* DISTRIBUTION COURSE: CATEGORY I.1

Double course comparable to Span 101, 102 designed to achieve in one semester maximum proficiency in spoken language. Five classes a week, language lab twice a week.

Hansz, I., Daichman, G.

446 COURSES OF INSTRUCTION

201,F/S SECOND YEAR SPANISH (3-1-4)

*** DISTRIBUTION COURSE: CATEGORY I.1**

Contemporary short stories and essays provide current linguistic models and serve as the point of departure for class conversation and discussion. Thorough grammar review.

Kauffmann, R.

202,S SECOND YEAR SPANISH (3-1-4)

*** DISTRIBUTION COURSE: CATEGORY I.1**

Continuation of Span 201.

Kauffmann, R.

204,S ACCELERATED INTERMEDIATE SPANISH (6-2-8)

*** DISTRIBUTION COURSE: CATEGORY I.1**

Continuation of Span 103 comparable to Span 201, 202. Contemporary short stories provide current linguistic models and serve as the point of departure for class conversation and discussion.

Daichman, G., Hansz, I.

304,F/S LATIN-AMERICAN LITERATURE (3-0-3)

*** DISTRIBUTION COURSE: CATEGORY I.1**

Selected works of outstanding writers from Latin America. Readings and class discussions in English. Open to all students.

Rea, J.

305,F INTERMEDIATE SPANISH: LEGAL & COMMERCIAL (3-0-3)

Introduction to general business and legal practices and terminology useful in subsequent business or legal career. Prerequisite: Second-year proficiency or permission of instructor.

Kiperman, A.

306,S INTERMEDIATE SPANISH: MEDICAL (3-0-3)

Introduction to general medical terminology and the reading of medical texts and journals. Useful in subsequent medical career. Offered every year. 139 Prereq-second year proficiency or permission of instructor.

Staff

311,F ADVANCED SPANISH (3-0-3 each semester)

*** DISTRIBUTION COURSE: CATEGORY I.1**

Third-year course designed primarily to improve spoken language. Emphasis is on new vocabulary and idioms, morphology, syntax, and mechanisms of interference.

Staff

312,S ADVANCED SPANISH (3-0-3 each semester)

*** DISTRIBUTION COURSE: CATEGORY I.1**

Third-year course designed primarily to improve spoken language. Emphasis is on new vocabulary and idioms, morphology, syntax, and mechanisms of interference.

Staff

319,F SURVEY OF SPANISH LITERATURE (3-0-3 each semester)

*** DISTRIBUTION COURSE: CATEGORY I.1**

The history of Spanish literature through representative readings from the medieval period to the present. Emphasis on stylistic analysis.

Pérez, J.

320,S SURVEY OF SPANISH LITERATURE (3-0-3 each semester)

*** DISTRIBUTION COURSE: CATEGORY I.1**

The history of Spanish literature through representative readings from the medieval period to the present. Emphasis on stylistic analysis.

Pérez, J.

321,F SURVEY OF SPANISH-AMERICAN LITERATURE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

The main literary trends and outstanding writers in Spanish America.

*Staff***322,S SURVEY OF SPANISH-AMERICAN LITERATURE (3-0-3)**

* DISTRIBUTION COURSE: CATEGORY I.1

The main literary trends and outstanding writers in Spanish America. Offered alternate years.

*Rea, J.***323,F/S HISPANIC CULTURE & CIVILIZATION (3-0-3)**

* DISTRIBUTION COURSE: CATEGORY I.1

Topics relating to the development of social, political, and economic institutions of Spain form the basis for extensive conversation, discussion, and composition.

*Pérez, J.***324,F/S CULTURE & CIVILIZATION OF LATIN AMERICA (3-0-3)**

* DISTRIBUTION COURSE: CATEGORY I.1

The development of social, political, and economic institutions of Latin America forms the basis for extensive conversation, discussion, and composition.

*Staff***341,F SPANISH LITERATURE FROM 1800 TO PRESENT (3-0-3 each semester)**

* DISTRIBUTION COURSE: CATEGORY I.1

The generation of 1898.

*Kauffmann, R.***342,S SPANISH LITERATURE FROM 1800 TO PRESENT (3-0-3 each semester)**

* DISTRIBUTION COURSE: CATEGORY I.1

*Pérez, J.***352,F ADVANCED RHETORIC AND COMPOSITION (3-0-3)**

Designed to strengthen written rhetorical skills by using such materials as films, literary texts, and current periodicals.

*Pérez, J.***361,F GOLDEN AGE DRAMA (3-0-3 each semester)**

* DISTRIBUTION COURSE: CATEGORY I.1

Development of the "comedia," illustrated by selected works of Lope de Vega, Tirso de Molina, Ruiz de Alarcon, and other seventeenth-century playwrights.

*Castañeda, J.***362,S GOLDEN AGE DRAMA (3-0-3 each semester)**

* DISTRIBUTION COURSE: CATEGORY I.1

Development of the "comedia," illustrated by selected works of Calderon de la Barca and other seventeenth-century playwrights.

*Castañeda, J.***381,F PROSE AND LYRIC POETRY OF THE GOLDEN AGE (3-0-3 each semester)**Analysis of poetry and prose emphasizing mysticism, the development of lyric poetry from Garcilaso to Gongora, the picaresque novel, and Cervantes' *Don Quixote, Part I*. Offered alternate years.*Castañeda, J.*

448 COURSES OF INSTRUCTION

382,S PROSE AND LYRIC POETRY OF THE GOLDEN AGE (3-0-3 each semester)

Analysis of poetry and prose emphasizing development of the Baroque, and Cervantes' *Don Quixote, Part II*. Offered alternate years.

Castañeda, J.

403,F ADVANCED SPANISH THROUGH MEDIA (3-0-3)

Course for advanced undergraduates. Emphasis on perfecting listening comprehension and speaking ability. Topics for oral expression developed from selected Spanish-language films to be viewed in class. Recommended for students interested in maintaining or improving near-native or native command of the language.

Daichman, G.

405,F SPANISH AMERICAN LITERATURE (3-0-3 each semester)

* DISTRIBUTION COURSE: CATEGORY I.1

Rea, J.

406,S SPANISH AMERICAN LITERATURE (3-0-3 each semester)

Masterpieces of contemporary Spanish-American literature.

Yamal, R.

417,F MEDIEVAL SPANISH LITERATURE (3-0-3)

Three medieval masterpieces: *Cantar de mio Cid*, *Libro de buen amor*, and *La Celestina*.

Leal, M.

420,S LITERARY SEMIOTICS (3-0-3)

Application of semiotic models to the study of literature. Also offered as Ling 420.

Kauffmann, R.

422,F INDEPENDENT WORK (3-0-3)

Hispanic literature, Hispanic linguistics, and Hispanic culture and civilization. Reserved for qualified juniors and seniors who are particularly interested in a topic not covered in other courses. Prereq- permission of the department.

Staff

422,S SPECIAL TOPICS (3-0-3)

Hispanic literature, Hispanic linguistics, and Hispanic culture and civilization. Reserved for qualified juniors and seniors who are particularly interested in a topic not covered in other courses. Prereq- permission of the department.

Staff

423,F LINGUISTIC STRUCTURE OF SPANISH (3-0-3)

A synchronic study of modern Spanish phonology, morphology, and syntax. Special attention given to Hispanic-American variants. Also offered as Ling 423.

Urrutibéheity, H.

435,F ART & MECHANICS OF TRANSLATION (3-0-3)

Daichman, G.

507,F TEACHING COLLEGE SPANISH (1-0-1)

Teaching methods and techniques, test preparation, and evaluation. One hour per week of discussion. Students observe language class one week, teach three weeks. Required for graduate students.

Urrutibéheity, H.

511,F METHODS OF RESEARCH IN HISPANIC LITERATURE (3-0-3)

Theoretical and practical course for beginning graduate students. Emphasis on techniques of stylistic and linguistic analysis and on the bibliographical resources in the field.

Staff

515,F STUDIES IN HISPANIC LINGUISTICS: (3-0-3)

Topics: History of the Spanish Language, Spanish American Dialectology, Old Spanish.

Urrutibéheity, H.

516,S STUDIES IN HISPANIC LINGUISTICS (3-0-3)

May be repeated for credit when topics vary. Topic for Spring '90 "Old Spanish" Also offered as Ling 516.

Urrutibéheity, H.

517,F STUDIES IN MEDIEVAL SPAN. LIT. (3-0-3)

Cantar de mio Cid, Libro de buen amor, La Celestina

Leal, M.

523,F STUDIES IN GOLDEN AGE THEATRE (3-0-3)

The School of Lope de Vega.

Castañeda, J.

524,S STUDIES IN GOLDEN AGE THEATRE (3-0-3)

The School of Calderón de la Barca.

Castañeda, J.

525,F GOLDEN AGE PROSE (3-0-3)

Don Quijote, Part I.

Castañeda, J.

526,S GOLDEN AGE PROSE (3-0-3)

Don Quijote, Part II.

Castañeda, J.

535,F 19TH CENTURY SPANISH LITERATURE (3-0-3 each semester)

The generation of 1898.

Kauffmann, R.

542,S 20TH CENTURY SPANISH LITERATURE (3-0-3 each semester)

Topic: contemporary novel.

Pérez, J.

555,F/S STUDIES IN SPANISH AMERICAN LITERATURE (3-0-3 each semester)

Staff

556,S SPANISH AMERICAN LITERATURE (3-0-3)

Staff

591,F INDEPENDENT STUDY (Variable each semester)

Staff

592,S INDEPENDENT STUDY (Variable each semester)

Staff

700,F RESEARCH LEADING TO CANDIDACY (Variable each semester)

Staff

450 COURSES OF INSTRUCTION

702,S RESEARCH LEADING TO CANDIDACY (Variable each semester)

Topics in Spanish and Latin American Literary theory and Spanish Linguistics. To be taken after a student has completed departmental course requirements for the Master's, and before being admitted to candidacy.

Staff

800,F RESEARCH AND THESIS (Variable each semester)

Staff

800,S THESIS RESEARCH (Variable each semester)

Staff

Portuguese Courses

101,F FIRST-YEAR PORTUGUESE (3-1-4)

* DISTRIBUTION COURSE: CATEGORY I.1

NOTE: 102 must be completed to receive dist. credit for 101. Introduction to the study of the Portuguese language with emphasis on development of audiolingual skills. Language laboratory work required.

Leal, M.

102,S FIRST-YEAR PORTUGUESE (3-1-4)

* DISTRIBUTION COURSE: CATEGORY I.1

Introduction to the study of the Portuguese language with emphasis on development of audiolingual skills. Language laboratory work required.

Leal, M.

201,F SECOND-YEAR PORTUGUESE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Leal, M.

202,F/S SECOND-YEAR PORTUGUESE (3-0-3)

* DISTRIBUTION COURSE: CATEGORY I.1

Leal, M.

400,F/S INDEPENDENT STUDY (0-0-3)

Reserved for qualified students who wish to work on a topic not covered in other courses. Prereq-permission of the department.

Leal, M.

Classics

See "Classics" section.

Statistics

Professor J.R. Thompson, *Chairman*

Professors J.W. Brelsford, B.W. Brown, P.E. Pfeiffer, D.W. Scott, and R. Sickles

Adjunct Professors Brown, Cardus, Downs, Frankowski, Gehan, Gentle, Hsi

Jansson, Thames, and Zimmerman

Associate Professors J.D. Austin, D.M. Lane, and R.K. Wilson

Adjunct Associate Professors Atkinson, Hacker, Johnston, and White

Assistant Professors S.-T. Chiu and K. B. Ensor

Degrees Offered: B.A., M.Stat., M.A., Ph.D.

Undergraduate Program.

The Department's goals are to acquaint students with the role played in the modern world by probabilistic and statistical ideas and methods, to provide instruction in the theory and application of techniques that have been found to be commonly useful, and to train research workers in statistics. The undergraduate statistics program is flexible and may be oriented toward theoretical or applied training or toward joint work in a related department, such as Economics, Education, Electrical and Computer Engineering, Mathematical Sciences, Political Science, and Psychology.

1. Students normally take seven basic courses:
 Calculus: Mathematics 101, 102
 Differential equations and linear algebra: Mathematics 211
 Computer programming: Computer Science 210 or 211 or Mathematical Sciences 223
 Model building: Statistics 300 or 301
 Introduction to Probability and Statistics: Statistics 382
 Data Analysis: Statistics 480
2. Students also take five elective courses from the Statistics Department (or other Departments with approval from their advisor) at the 300 level or higher.

Mathematically oriented students should also take Mathematics 212 and 355 (or Mathematical Sciences 310). In addition to the departmental requirements for the major, students must also satisfy the distribution requirements and complete no fewer than 60 semester hours outside the departmental requirements for a total program of at least 120 semester hours.

Graduate Program. Graduate programs at three levels are offered: master's without thesis (M.Stat), master's with thesis (M.A.), and doctoral degree (Ph.D.). Applicants should request application materials and provide Graduate Record Examination scores (quantitative, verbal, and advanced), transcripts, three letters of recommendation, and TOEFL scores when appropriate. Support is available for well-qualified doctoral students.

Thirty semester hours of approved course work must be completed for master level degrees, with 90 hours required for the doctoral degree. Course work is

expected at the 400-level and above, but two approved 300-level courses may be offered. An original thesis with public oral defense is required for the M.A. and Ph.D. degrees. Doctoral students must perform satisfactorily on preliminary and qualifying examinations, and pass a reading examination in one foreign language.

Statistics Courses

280,F/S ELEMENTARY APPLIED STATISTICS (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

A noncalculus introduction to statistical methods with emphasis on techniques. Limit: 25 students per section.

Staff

300,S MODEL BUILDING (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Examples to illustrate mathematical formulation (modeling) of scientific problems, their solution and interpretation. Emphasis on physical science models.

Ensor, K.

301,F MODEL BUILDING (3-0-3)

* DISTRIBUTION COURSE: CATEGORY III.6

Same as Stat 300, with emphasis on behavioral science models.

Thompson, J.

329,F TESTS AND MEASUREMENTS (3-0-3)

Techniques for measuring individual differences and critical review of theories of individual differences in intelligence and personality. Also offered as Psychology 329.

Schneider

339,F STATISTICAL METHODS IN PSYCHOLOGY(3-1-4)

Introduction to quantitative and computer methods applicable to analysis of experimental data. Prerequisite: Psychology 201 and permission of instructor. Also offered as Psychology 339.

Staff

381,F/S APPLIED PROBABILITY (3-0-3)

Concepts, interpretations, elementary techniques, and applications of modern probability theory. Prereq- Math 102. Also offered as Masc 381 and Elec 331.

Pfeiffer, P.

382,F/S PROBABILITY AND STATISTICS (3-0-3)

Probability theory and the central concepts and methods of statistics. Prereq- Math 102; Math 212 is recommended. Also offered as Econ 382.

Ensor, K.

400,S ECONOMETRICS (3-0-3)

Estimation and forecasting models; topics include multiple regression time series, contingency table analysis, and Bayesian inference. Also offered as Economics 400 (see for prerequisites).

Staff

480,S INTRO-STATISTICAL METHODS (3-1-4)

A survey of statistical computing as it relates to distribution theory, estimation theory, and hypothesis testing. Prereq- Stat 382 or permission of instructor.

Chiu, S.

481,F MATHEMATICAL STATISTICS I (3-0-3)

Estimation theory. Distribution theory. Central limit theorem. Bayes theorem. Admissibility and minimaxity. Maximum-likelihood estimation. Gauss-Markov theorem. Cramer-Rao inequality. Prereq- stat 382 or 381.

Scott, D.

482,S MATHEMATICAL STATISTICS II (3-0-3)

Hypothesis testing. Confidence intervals. Neyman-Pearson theory. Uniformly most powerful tests. Nonparametric tests. Kolmogorov-Smirnov tests. Prereq- Stat 481.

Scott, D.

483 MARKOV AND MARTINGALE SEQUENCES. RENEWAL PROCESSES (3-0-3)

The Markov property and Markov sequences. Discrete-parameter martingales. Poisson and other renewal processes. Prerequisite: Statistics 381. Also offered as Mathematical Sciences 483. Not offered every year.

486,F LINEAR MODELS (3-0-3)

Multivariate normal distribution. Multiple and partial correlation. Wishart distributions. Prereq- linear algebra and Stat 481.

Staff

487,S MULTIVARIATE ANALYSIS (3-0-3)

Hotelling's T. Fisher's linear discriminant function. Principal component analysis. Multivariate analysis of variance and nonnormal distributions.

Scott, D.

488 BAYESIAN FOUNDATIONS OF STATISTICAL INFERENCE (3-0-3)

Bayes' theorem. Vague prior knowledge and natural conjugate priors. Inference for multivariate distributions. Approximation methods. Likelihood principal. Not offered every year.

490,F INDEPENDENT STUDY (3-0-3)

Thompson, J.

491,S INDEPENDENT STUDY (3-0-3)

Staff

495,S INTRODUCTION TO STATISTICS (3-0-3)

Investigation of basic concepts of statistics and their application to substantive problems in the social sciences. Prerequisite: permission of instructor. Also offered as Political Science 495.

Staff

503,S SPECIAL TOPICS IN RESEARCH METHODS AND DATA ANALYSIS (3-0-3)

Applications of least squares and general linear model. Also offered as Political Science 503. Not offered every year.

Staff

509,S ADVANCED PSYCHOLOGICAL STATISTICS (3-0-3 each semester)

Descriptive and inferential statistics for beginning graduate students. Prerequisite: permission of instructor. Also offered as Psychology 509.

Martin

454 COURSES OF INSTRUCTION

510,F ADVANCED PSYCHOLOGICAL STATISTICS (3-0-3 each semester)
Descriptive and inferential statistics for beginning graduate students. Prerequisite permission of instructor. Also offered as Psychology 510.

Staff

514,F TOPICS IN QUANTITATIVE METHODS AND RESEARCH DESIGN
(3-0-3)

Also offered as Psychology 514.

Staff

580,S INTRO TO STATISTICAL INFERENCE (3-0-3)

A survey of distribution theory, estimation theory, and hypothesis testing. Intended for graduate students in other departments. Not offered every year

581,F MATHEMATICAL PROBABILITY I (3-0-3)

Measure-theoretic foundations of probability. Open to qualified undergraduates. Also offered as Mathematical Sciences 581.

Pfeiffer, P.

582,S MATHEMATICAL PROBABILITY II (3-0-3)

Continuation of Stat 581.

Pfeiffer, P.

583,F INTRO RANDOM PROCESSES & APP. (3-0-3)

Also offered as Elec 533 and Masc 583.

Aazhang, B.

584,F ESTIMATION THEORY (3-0-3)

Staff

585,S INFORMATION AND CODING THEORY (3-0-3)

Also offered as Elec 535 and Masc 585.

Aazhang, B.

586,587,588,589,S ADVANCED TOPICS IN THEORETICAL STATISTICS
(3-0-3)

Topics in this two-year sequence include: Monte Carlo techniques, time series analysis, non-parametric statistics, hypothesis testing, and regression theory.

587,F ADV TOPICS THEORETICAL STATIS. (3-0-3)
TIME SERIES ANALYSIS

Chiu, S.

588,F TOPICS IN STATISTICS (3-0-3)
ASYMPTOTIC THEORY

Ensor, K.

600,S GRADUATE SEMINAR IN STATISTICS (credit variable)

Ensor, K.

604,S ADVANCED ECONOMIC STATISTICS (3-0-5)

Statistical inference and the testing of hypotheses; multiple and partial correlation analysis; analysis of variance and regression. Also offered as Economics 504.

Sickles

610,F ECONOMETRICS (3-0-5)

Estimation and testing in econometric models; theoretical and applied econometrics. Also offered as Economics 510 (see for prerequisites).

Staff

611,S APPLIED ECONOMETRICS (3-0-5)

Estimation and testing of systems of equations, consumer demand systems, production functions, econometric models. Also offered as Economics 511.

Sickles

686,687,688,689 ADVANCED TOPICS IN APPLIED STATISTICS (3-0-3)

Topics in this two-year sequence include; bioassay, sampling theory, survival studies, experimental design, analysis of variance, data analysis, and density estimation.

686,S ADVANCED TOPICS IN STATISTICS (3-0-3)

SIMULATION & MONTE CARLO

Thompson, J.

800,F/S THESIS (Credit variable)

Thompson, J.

Academic Calendar 1989-90

First Semester

<i>Monday, August 21—</i>	Orientation for new students
<i>Friday, August 25</i>	
<i>Monday, August 28</i>	FIRST DAY OF CLASSES
<i>Monday, August 28—</i>	Registration for graduate students
<i>Friday, September 1</i>	
<i>Monday, August 28—</i>	Registration for continuing undergraduates
<i>Tuesday, September 5</i>	
<i>Monday, September 4</i>	Labor Day Holiday
<i>Friday, September 8</i>	Deadline: adding/dropping courses without fee, 5 p.m.
	Deadline: adding courses/designating pass-fail option, 5 p.m.
<i>Friday, September 22</i>	Parents Weekend
<i>Friday, September 22—</i>	
<i>Saturday, September 23</i>	Deadline: instructors submit grades to clear <i>in-completes</i> , 5 p.m.
<i>Friday, September 29</i>	College course plans due in the Office of the Vice President for Student Affairs
	Freshman mid-semester grades due
<i>Wednesday, October 11</i>	Mid-term recess
<i>Friday, October 13</i>	
<i>Monday, October 16—</i>	All classes normally held on Monday meet. All Wednesday classes are cancelled to equalize holidays by days of the week during the semester
<i>Tuesday, October 17</i>	Deadline: Ph.D. candidacy petitions, Office of Graduate Programs, 5 p.m.
<i>Wednesday, October 18</i>	Deadline: dropping courses/converting pass-fail options to a letter grade, 5 p.m.
	Pre-registration for undergraduate students for the spring semester
<i>Wednesday, November 1</i>	Thanksgiving recess
<i>Friday, November 3</i>	
<i>Monday, November 13—</i>	
<i>Friday, November 17</i>	LAST DAY OF CLASSES
<i>Thursday, November 23—</i>	Final examinations
<i>Friday, November 24</i>	
<i>Friday, December 8</i>	
<i>Wednesday, December 13—</i>	All grades due, Registrar's Office, 5 p.m.
<i>Wednesday, December 20</i>	
<i>Wednesday, December 27</i>	

Fifteen weeks, minus five class days for holidays— seventy class days

Second Semester

FIRST DAY OF CLASSES

Registration for graduate and undergraduate students

Deadline: resolution of grades of *other*, 5 p.m.

Deadline: adding/dropping courses without fee, 5 p.m.

Deadline: adding courses/designating pass-fail option, 5 p.m.

Deadline: instructors submit grades to clear *incompletes*, 5 p.m.

College course plans due in the Office of the Vice President for Student Affairs

Majors Day

Freshman mid-semester grades due

Deadline: Master's Degree Petitions (Thesis Programs), Office of Graduate Programs, 5 p.m.

Mid-term recess

Deadline: dropping courses/converting pass-fail options to a letter grade, 5 p.m.

Pre-registration for undergraduate students for the fall semester

Deadline: sophomores file majors with Registrar

Deadline: petitions/certification forms for Master's degrees without thesis, Office of Graduate Programs, 5 p.m.

Spring recess

LAST DAY OF CLASSES

Final examinations for all degree

candidates. **Deadline:** for completing exams, 12 noon, April 26

Final examinations for remaining students

Deadline: for submission of theses for spring graduation, Office of Graduate programs, 12 noon
Grades of all degree candidates due in Registrar's Office, 9 a.m.

SEVENTY-SEVENTH COMMENCEMENT

Remaining grades due in Registrar's Office, 5 p.m.

Deadline: resolution of grades of *other*, 5 p.m.

Monday, January 8
Monday, January 8—
Wednesday, January 17

Friday, January 12
Friday, January 19

Friday, February 2

Friday, February 9

Friday, February 9

Friday, February 16

Friday, February 23

Thursday, March 1

Monday, February 26—

Friday, March 2

Friday, March 16

Monday, March 26—

Friday, March 30

Wednesday, March 28

Monday, April 2

Thursday, April 12—

Friday, April 13

Friday, April 20

Saturday, April 21—

Thursday, April 26

Wednesday, April 25—

Wednesday, May 2

Friday, April 27

Saturday, April 28

Saturday, May 5

Wednesday, May 9

Friday, June 1

Fifteen weeks minus seven class days for holidays — sixty-eight class days.

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RICE

The Admission Office
Rice University
P.O. Box 1892
Houston, Texas 77251