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APRIL 10, 1973 NUMBER 791

RECORD OF THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

THE ONE HUNDRED AND
SEVENTY-NINTH SESSION

SCHOOL OF PUBLIC HEALTH

Announcements for the Session 1973-1974

THE UNIVERSITY OF NORTH CAROLINA PRESS
CHAPEL HILL, N. C.

THE UNIVERSITY OF NORTH CAROLINA

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The University of North Carolina was chartered in 1789 and opened its doors to students in 1795. It has been governed by a Board of Trustees chosen by the Legislature and presided over by the Governor. During the period 1917-1972, the Board consisted of one hundred elected members and a varying number of ex-officio members.

By act of the General Assembly of 1931, without change of name, it was merged with The North Carolina College for Women at Greensboro and The North Carolina State College of Agriculture and Engineering at Raleigh to form a multicampus institution designated The University of North Carolina.

In 1963 the General Assembly changed the name of the campus at Chapel Hill to The University of North Carolina at Chapel Hill and that at Greensboro to The University of North Carolina at Greensboro, and, in 1965, the name of the campus at Raleigh to North Carolina State University at Raleigh.

Charlotte College was added as The University of North Carolina at Charlotte in 1965, and, in 1969, Asheville-Biltmore College and Wilmington College became The University of North Carolina at Asheville and The University of North Carolina at Wilmington respectively.

A revision of the North Carolina State Constitution adopted in November 1970 included the following: "The General Assembly shall maintain a public

system of higher education, comprising The University of North Carolina and such other institutions of higher education as the General Assembly may deem wise. The General Assembly shall provide for the selection of trustees of The University of North Carolina . . . ." In slightly different language, this provision had been in the Constitution since 1868.

On October 30, 1971, the General Assembly in special session merged, without changing their names, the other ten-state-supported senior institutions into the University as follows: Appalachian State University, East Carolina University, Elizabeth City State University, Fayetteville State University, North Carolina Agricultural and Technical State University, North Carolina Central University, North Carolina School of the Arts, Pembroke State University, Western Carolina University, and Winston-Salem State University. This merger became effective on July 1, 1972.

The Board of Trustees became the Board of Governors and the number was reduced to thirty-five members (thirty-two after July 1, 1973) elected by the General Assembly. It is "responsible for the general determination, control, supervision, management, and governance of all affairs of the constituent institutions." However, each constituent institution has a local board of trustees of thirteen members, eight of whom are appointed by the Board of Governors, four by the Governor, and one, the elected president of the student body, whose principal powers are exercised under a delegation from the Board of Governors.

Each institution has its own faculty and student body, and each is headed by a chancellor as its chief administrative officer. Unified general policy and appropriate allocation of function are effected by the Board of Governors and by the President with other administrative officers of the University. The General Administration office is located in Chapel Hill.

The chancellors of the constituent institutions are responsible to the President as the chief administrative and executive officer of The University of North Carolina.

CALENDAR OF EVENTS
1973-1974

Summer Session, 1973

First Term

May 31, Thursday	Registration for first term.
June 1, Friday	First day of classes.
June 8, Friday	Last day for submitting an application for a degree and an application for admission to candidacy for the master's degree for the August Commencement. Last day for submitting an application for degree for the doctoral degree.
June 15, Friday	Examination for reading knowledge in English will be given in 223 Greenlaw, Department of English. Students should register to take the exam by June 11 in 204 Greenlaw.
July 3, Tuesday	Last day of classes for first term.
July 5-6, Thursday-Friday	Final examinations in courses for the first term.

Second Term

July 9, Monday	Registration for the second term.
July 10, Tuesday	First day of classes.
July 17, Tuesday	Doctoral dissertations and master's theses for candidates for the August Commencement must be filed in the Graduate School by this date.
July 28, Saturday	Written examinations for the master's candidates for the August Commencement may not be taken after this date.
August 4, Saturday	Last day for final oral examinations for the master's or doctoral degrees for graduation in August.
August 10, Friday	Last day of classes for second term.
August 13-14, Monday-Tuesday	Final examinations in courses for the second term.

Fall Semester, 1973

August 27-29 Monday-Wednesday	Registration for the fall semester.
August 30, Thursday	Class work begins.
August 31, Friday	Examination for proficiency and reading knowledge in English will be given at 5:00 P.M. in 101 Greenlaw, Department of English. Students should register to take the exam by August 28 at 204 Greenlaw.
October 19, Friday	Last day for submitting an application for a degree and an application for admission to candidacy for the master's degree for the December Commencement. Last day for submitting an application for degree for the doctoral degree.

November 21, Wednesday	Thanksgiving recess begins at 1:00 P.M.
November 23, Friday	Last day to drop a course.
November 26, Monday	Classes resume in all departments at 8:00 A.M.
November 30, Friday	Doctoral dissertations and master's theses for candidates for the December Commencement must be filed in the Graduate School by this date. (No typing extension will be given for this graduation.)
December 1, Saturday	Written examinations for master's candidates for the December Commencement may not be taken after this date.
December 7, Friday	Classes for fall semester end at 6:00 P.M.
December 8, Saturday	Last day for the final oral examination for the master's or doctoral degrees for graduation in December.
December 11-20, Tuesday-Saturday Monday-Thursday	Examinations in courses.

Spring Semester, 1974

January 8, Tuesday	Registration for the spring semester.
January 9, Wednesday	Class work begins.
January 18, Friday	Examination for reading knowledge in English will be given at 5:00 P.M. in 223 Greenlaw, Department of English. Students should register to take the exam by January 15 at 204 Greenlaw.
January 25, Friday	Last day for submitting an application for a degree, and an application for admission to candidacy, for the master's degree, for the May Commencement. Last day for submitting an application for degree for the doctoral degree.
March 11, Monday	Spring recess begins at 8:00 A.M.
March 18, Monday	Classes resume in all departments at 8:00 A.M.
March 22, Friday	Doctoral dissertations and master's theses for candidates for the May Commencement must be filed in the Graduate School by this date.
April 11, Thursday	Last day to drop a course.
April 13, Saturday	Written examinations for the master's candidates for the May Commencement may not be taken after this date.
April 25, Thursday	Classes for spring semester end at 6:00 P.M.
April 27, Saturday	Last day for final oral examinations for the master's or doctoral degrees for graduation in May.
April 29-May 8 Monday-Saturday Monday-Wednesday	Examinations in courses.
May 12, Sunday	Commencement.

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THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

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1. Died February 21, 1972.

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---

2. Resigned December 31, 1972.
2a. Died June 11, 1973.
3. Resigned August 31, 1972.

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---

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WILLIAM D. JOHNSON, B.S., M.S., Instructor in Biostatistics

WILLIAM BURNS JONES, B.S., M.D., M.P.H., Adjunct Associate Professor of Health Administration

ELIZABETH W. JUKES, B.S., M.S., Adjunct Associate Professor of Public Health Nutrition

ARNOLD DANIEL KALUZNY, B.S., M.H.A., Ph.D., Associate Professor of Health Administration

BERTON H. KAPLAN, B.S., M.S., Ph.D., Professor of Epidemiology

ELLEN B. KAPLAN, B.S., M.A., Instructor (part-time) in Biostatistics

WILLIAM KAPLAN, B.S., M.P.H., D.V.M., Adjunct Associate Professor of Laboratory Practice (field)

LEO KAUFMAN, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

FLORENCE KAVALER, B.A., M.D., M.S., M.P.H., Adjunct Associate Professor of Health Administration

[7a]NORBERT LAWRENCE KELLY, JR., A.B., M.A., Ph.D., Adjunct Associate Professor of Health Education

[8]ROSEMARY MAY KENT, B.A., M.A , M.P.H., Ph.D., Associate Professor of Health Education

ELTON KESSEL, B.A., M.D., M.P.H., Lecturer in Health Administration

6. Resigned August 31, 1972.
7. Died July 21, 1972.
7a. Died March 28, 1973.
8. Resigned September 15, 1972.

JOHN C. KEY, B.S., M.S.P.H., M.S.W., Ph.D., Assistant Professor of Health Education

JEROME KIRK, B.A., Ph.D., Adjunct Associate Professor of Health Education

DAVID G. KLEINBAUM, A.B., A.M., Ph.D., Assistant Professor of Biostatistics

LYNN K. KNAUFF, B.A., M.S.P.H., Assistant Professor of Maternal and Child Health

EDNA H. KNOTT, B.S., M.P.H., Adjunct Instructor of Laboratory Practice

GARY KOCH, B.S., M.S., Ph.D., Associate Professor of Biostatistics

JACOB KOOMEN, B.S., M.D., M.P.H., Adjunct Associate Professor of Health Administration

BENJAMIN JEFFRY KORGEN, B.S., M.A., Ph.D., Assistant Professor of Physical Oceanography

KAROL J. KROTKI, B.A., M.A., M.A., Ph.D., Adjunct Professor of Biostatistics

ROY R. KUEBLER, JR., A.B., M.A., Ph.D., Professor of Biostatistics

EDWARD J. KUENZLER, B.S., M.S., Ph.D., Professor of Environmental Biology

LAWRENCE L. KUPPER, B.S., M.S., Ph.D., Assistant Professor of Biostatistics

PETER A. LACHENBRUCH, B.A., M.S., Ph.D., Associate Professor of Biostatistics

JAMES C. LAMB III, B.S.C.E., M.S., S.E., Sc.D., Professor of Sanitary Engineering

JOHN EDGAR LARSH, JR., B.A., M.S., Sc.D., Professor of Parasitology and Laboratory Practice

DONALD T. LAURIA, B.C.E., M.S.S.E., Ph.D., Assistant Professor of Environmental Engineering

FRANK E. LAW, D.D.S., M.P.H., Visiting Professor of Health Administration

DOROTHEA CROSS LEIGHTON, A.B., M.D., Professor of Mental Health

FORREST E. LINDER, B.A., M.A., Ph.D., Professor of Biostatistics, Director of Laboratories for Population Statistics, and Associate Director of Carolina Population Center

JOAN W. LINGNER, B.S., M.S., Ph.D., Assistant Professor of Biostatistics

LINDA WEST LITTLE, B.A., M.S.P.H., Ph.D., Assistant Professor of Environmental Biology

FRANK ALOYSIUS LODA, B.A., M.D., Lecturer in Maternal and Child Health

ROBERT A. LODDENGAARD, B.E.E., M.S.P.H., Instructor in Health Administration

GARRIE J. LOSEE, B.A., Adjunct Professor of Biostatistics

MARIE LOUISE LOWE, R.N., B.S., M.A., Ph.D., Assistant Professor in Public Health Nursing

ANDERS S. LUNDE, B.A., M.A., Ph.D., Adjunct Professor of Biostatistics

JOHN LYMAN, B.S., M.S., Ph.D., Professor of Environmental Chemistry

ROLF PETER LYNTON, B.Sc., (Econ.), M.A., Ph.D., Associate Professor of Mental Health

LYNN GRAY MADDRY, B.S., M.S.P.H., Ph.D., Adjunct Associate Professor of Laboratory Practice

WILLIAM FRED MAYES, B.S., M.D., M.P.H., Professor of Health Administration, Dean Emeritus

[9]EDWARD GRAFTON McGAVRAN, A.B., M.D., M.P.H., Sc.D., Dean, Emeritus

MARIE J. McINTYRE, R.N., B.S., M.S., Hyg., Associate Professor of Public Health Nursing

FREDERICK E. McJUNKIN, B.C.E., M.S.S.E., Associate Professor of Environmental Engineering

MARY HELEN McLACHLAN, M.A., Visiting Lecturer, Public Health Nutrition

ANTHONY McMICHAEL, B.S., M.D., Ph.D., Assistant Professor of Epidemiology

ERIC MICHAUX, L.L.B., Adjunct Associate Professor of Health Education

C. ARDEN MILLER, M.D., Professor of Maternal and Child Health

FORREST O. MIXON, B.S., M.S., Ph.D., Adjunct Associate Professor of Environmental Engineering

BEATRICE BELL MONGEAU, B.S.P.H.N., M.P.H., Instructor in Public Health Nursing

MAX D. MOODY, A.B., M.A., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

MARGARET LEE MOORE, B.S., Cert. P.T., M.S., Ed.D., Assistant Professor of Health Administration

ROBERT BURNS MOORHEAD, B.A., M.P.A., Instructor in Health Administration

DAVID H. MOREAU, B.S., M.S., Ph.D., Associate Professor, Systems Analysis

LUCY SHIELDS MORGAN, A.B., M.A., M.S., Ph.D., Professor of Health Education, Emeritus

ROBERT M. MORONEY, A.B., M.S.W., M.S.H., Ph.D., Assistant Professor of Health Administration

NAOMI MINNER MORRIS, B.A., M.D., M.P.H., Associate Professor of Maternal and Child Health

SARAH TAYLOR MORROW, B.S., M.D., M.P.H., Adjunct Associate Professor of Material and Child Health

KIRK T. MOSLEY, B.A., M.D., M.P.H., Dr.P.H., Adjunct Professor of Health Administration

CLAUDE WAYNE MOSS, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

ROBERT J. MYERS, B.A., M.A., Ph.D., Visiting Professor of Biostatistics

9. Died August 29, 1972.

[10]GAD NATHAN, M.Sc., Ph.D., Visiting Associate Professor of Biostatistics

VIRGINIA MARGARET NELSON, B.A., R.N., B.S., M.P.H., Associate Professor of Public Health Nursing

WILLIAM C. NELSON, B.S., M.S., Ph.D., Adjunct Assistant Professor of Biostatistics

JANIS P. NEWTON, B.F.A., M.F.A., M.Ed., Lecturer in Health Education

LOUIS JOSEPH NIDORF, B.A., M.A., Ph.D., Associate Professor of Health Education

ROBERT W. NOYES, A.B., M.D., Professor of Maternal and Chlid Health

DANIEL A. OKUN, B.S.C.E., M.S., Sc.D., Professor of Environmental Engineering

CHARLES R. O'MELIA, B.C.E., M.S.E., Ph.D., Professor of Environmental Sciences and Engineering

ABDEL R. OMRAN, M.D., D.P.H., M.P.H., Dr.P.H., Professor of Epidemiology

JAMES J. PALMERSHEIM, A.A., B.S., M.S., Ph.D., Adjunct Assistant Professor of Biostatistics

RALPH CLINTON PATRICK, JR., A.B., A.M., Ph.D., Associate Professor of Epidemiology

ERNEST A. PEARSON, JR., A.B., D.D.S., M.P.H., Adjunct Associate Professor of Health Administration

FREDERIC K. PFAENDER, B.S., M.S., Ph.D., Assistant Professor of Environmental Microbiology

G. BRIGGS PHILLIPS, B.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

HARRY T. PHILLIPS, M.D., D.P.H., Professor of Health Administration

LEO PINE, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

DANA E. A. QUADE, B.A., Ph.D., Professor of Biostatistics

K. V. RANGANATAHAN, M.B.B.S., B.S.Sc., M.P.H., Adjunct Associate Professor of Health Education

JOHN K. READ, B.S., M.S., Ph.D., Associate Professor of Parasitology and Laboratory Practice

PARKER CRAMER REIST, B.S., S.M., S.M., Sc.D., Professor of Air and Industrial Hygiene

WILSON B. RIGGAN, B.S., Ph.D., Adjunct Associate Professor of Biostatistics

LYMAN A. RIPPERTON, B.A., B.S., Ph.D., Professor of Air Hygiene

ROSLYN Q. ROBINSON, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

JOHN RODAK, JR., A.B., S.M., Instructor in Health Administration

10. Resigned July 31, 1972.

FRANZ WESTON ROSA, B.S., M.D., M.P.H., Adjunct Professor of Maternal and Child Health

J. HUGH ROSE, B.S., Visiting Professor of Biostatistics

LEONARD S. ROSENFELD, B.S., M.D., M.P.H., Professor of Health Administration

NADINE H. RUND, B.A., Ph.D., Adjunct Associate Professor of Health Education

GEORGES SABAGH, B.A., M.A., Ph.D., Adjunct Professor of Biostatistics

EVA SALBER, M.B., D.P.H., M.D., Lecturer in Material and Child Health

EARL SCHAEFER, B.S., M.A., Ph.D., Professor of Maternal and Child Health

MORRIS SCHAEFER, B.S., M.A., D.P.A., Professor of Health Administration

THEODORE D. SCURLETIS, B.S., M.D., Adjunct Associate Professor of Maternal and Child Health

PRANAB K. SEN, B.S., M.S., Ph.D., Professor of Biostatistics

BABUBHAI V. SHAH, B.Sc., M.Sc., Ph.D., Adjunct Associate Professor of Biostatistics

CHARLES C. SHEPARD, B.S., M.S., M.B., M.D., Adjunct Associate Professor of Laboratory Practice (field)

[11]MINDEL C. SHEPS, M.D., M.P.H., Professor of Biostatistics

JABBAR K. SHERWANI, B.S., M.C.E., Ph.D., M.P.A., Associate Professor of Systems Analysis and Hydrology

MORRIS A. SHIFFMAN, D.V.M., M.P.H., Docteur-Veterinaire, M.G.A., Ph.D., Professor of Environmental Health

MARK S. SHUMAN, B.S., Ph.D., Assistant Professor of Environmental Chemistry

CARL M. SHY, M.D., Dr.P.H., Adjunct Assistant Professor of Epidemiology

EARL SIEGEL, B.S., M.D., M.P.H., Professor of Maternal and Child Health

CECIL SLOME, M.B., Ch.B., D.P.H., Associate Professor of Epidemiology

MARIAN SMALLEGAN, A.B., M.A., Ed.D., Assistant Professor of Mental Health

JERRY ALAN SOLON, A.B., M.A., Ph.D., Visiting Professor of Health Administration

ROBERT SMITH, B.A., M.B., B.A.O., B.Ch., M.A., M.D., Associate Professor of Health Administration

ALEXA M. SORANT, S.B., A.M., Instructor in Biostatistics

JANE B. SPRAGUE, B.A., M.A., Instructor in Health Administration

[12]DIRK J. SPRUYT, B.A., M.D., M.P.H., Assistant Professor of Health Administration

ARTHUR C. STERN, M.E., M.S., Professor of Air Hygiene

11. Died January 16, 1973.
12. Absent on leave, 1972-1973.

GUY W. STEUART, M.A., M.Ed., M.P.H., Ph.D., Professor of Health Education

J. RICHARD STEWART, B.S., M.S., Ph.D., Visiting Assistant Professor of Biostatistics

JEANNE B. STILLMAN, B.A., M.S.P.H., Instructor in Health Administration

E. BARBARA STOCKING, R.N., B.S., M.P.H., Associate Professor of Maternal and Child Health (Nursing)

CHIRAYATH SUCHINDRAN, B.Sc., M.Sc., M.S.P.H., Ph.D., Visiting Instructor in Biostatistics

CORRINA SHERRON SUTTON, B.A., M.P.H., Ph.D., Adjunct Assistant Professor of Laboratory Practice

BOYD R. SWITZER, M.A., Ph.D., Assistant Professor of Public Health Nutrition

MICHAEL JOSEPH SYMONS, B.A., M.P.H., Ph.D., Assistant Professor of Biostatistics

CLYDE THORNSBERRY, B.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

RALPH TOMLINSON, B.A., M.A., Ph.D., Visiting Professor of Biostatistics

EDWARD STONE TRAINER, A.B., M.S.P.H., Instructor in Health Administration

CRAIG D. TURNBULL, B.A., M.P.H., Ph.D., Assistant Professor of Biostatistics

ALVIS G. TURNER, JR., B.S., M.S.P.H., Ph.D., Assistant Professor of Environmental Sciences

EUNICE NICKERSON TYLER, Ph.B., M.P.H., Ph.D., Professor of Health Education, Emeritus

HERMAN ALFRED TYROLER, A.B., M.D., Professor of Epidemiology

J. RICHARD UDRY, B.S., M.A., Ph.D., Professor of Maternal and Child Health

[13]NEWTON UNDERWOOD, B.S., M.S., Ph.D., Professor of Radiological Science

H. MAC VANDIVIERE, A.B., M.A., M.D., Adjunct Associate Professor of Laboratory Practice (field)

JAMES E. VENEY, B.A., M.S., Ph.D., Associate Professor of Health Administration

A. WOUTER VOORS, M.D., M.P.H., Dr.P.H., Associate Professor of Epidemiology

EDWARD H. WAGNER, A.B., M.D., M.P.H., Assistant Professor of Epidemiology

PATRICIA F. WALLER, A.B., M.S., Ph.D., Associate Professor of Health Administration

KENNETH W. WALLS, A.B., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

PHILLIP J. WALSH, B.S., M.S.P.H., Ph.D., Adjunct Assistant Professor of Radiological Hygiene

ARTHUR W. WALTNER, A.B., M.S., Ph.D., Professor of Radiological Science

13. Died March 13, 1973.

DAVID G. WARREN, A.B., J.D., Adjunct Associate Professor of Health Administration

JULIA DAY WATKINS, B.A., R.N., M.P.H., Associate Professor of Public Health Nursing

NANCY M. WATSON, B.S., M.S., Instructor in Public Health Nursing

ROBERT BRIGGS WATSON, B.S., M.D., M.P.H., Professor of Parasitology and Laboratory Practice

NORMAN FRED WEATHERLY, B.S., M.S., Ph.D., Professor of Parasitology and Laboratory Practice

STANLEY J. WEIDENKOPF, B.S.C.E., M.P.H., Eng.D., Professor of Environmental Engineering

CHARLES M. WEISS, B.S., Ph.D., Professor of Environmental Biology

I. OSCAR WEISSMAN, M.D., M.P.H., Lecturer in Health Administration

HENRY BRADLEY WELLS, B.A., M.S.P.H., Ph.D., Professor of Biostatistics

JANICE RUTH WESTABY, R.N., B.S., M.P.H., Adjunct Associate Professor of Health Administration

HAZEL W. WILKINSON, B.S., M.S., Ph.D., Adjunct Assistant Professor of Laboratory Practice (field)

DONALD G. WILLHOIT, A.B., M.S., Sc.D., Associate Professor of Radiation Biophysics

CAROLYN A. WILLIAMS, B.S., M.S., Ph.D., Assistant Professor of Epidemiology

O. DALE WILLIAMS, B.S., M.P.H., Ph.D., Assistant Professor of Biostatistics

ROBERT NEAL WILSON, B.A., Ph.D., Professor of Mental Health

SUZANNE R. WOLFE, B.A., M.A., Instructor in Health Education

JOHN JOSEPH WRIGHT, A.B., M.D., M.P.H., Professor of Health Administration, Emeritus

[14]KATIE C. YELVERTON, B.S., M.A., Instructor in Biostatistics

DAVID L. ZALKIND, B.A., M.S., Ph.D., Assistant Professor of Health Administration

[15]STEPHEN J. ZYZANSKI, B.S., M.S., Ph.D., Associate Professor of Epidemiology

14. Resigned August 15, 1972.
15. Resigned July 31, 1972.

GENERAL INFORMATION

In 1936 a Division of Public Health was established within the School of Medicine at The University of North Carolina at Chapel Hill. The Division was given the status of a separate School in 1940. It is today, with the Schools of Medicine, Dentistry, Nursing and Pharmacy, a unit of the Division of Health Affairs and is accredited by the American Public Health Association. The original departments of the School were Epidemiology, Parasitology and Laboratory Practice, Public Health Administration, and Sanitary Engineering (changed in 1962 to Environmental Sciences and Engineering). Six additional departments are currently operating: Biostatistics, Health Education, Maternal and Child Health, Mental Health, Public Health Nursing, and Public Health Nutrition.

A Continuing Education Service is maintained in the School to stimulate and facilitate continuing education programs for professional public health workers to up-date them on scientific advances and professional innovations related to the practice of public health and to reduce the time lag between the development of new knowledge and its application in public health practice.

The School of Public Health is one of seventeen such schools in the United States accredited by the American Public Health Association. The mission of the School is to prepare individuals for professional health careers aimed at preventing disease and disability and in analyzing, improving, promoting and maintaining the optimum health of the public. Students successfully completing programs of study pursue careers for the most part either in a health service agency or in educational and other organizations in such roles as researchers, investigators, teachers, technical specialists and consultants.

As a part of the School's teaching, research and service responsibilities, close affiliations are maintained with other graduate schools and departments of the Consolidated University of North Carolina campuses, as well as with other schools and universities, health services, and research organizations. Such affiliations are local, statewide, national, and international in scope. The nature of the various affiliations includes joint sponsorship and effort in a number of teaching and research programs, joint faculty appointments, and establishment of field training centers for students in a number of official and voluntary international, federal, state, and local health organizations.

In addition to its teaching responsibilities, the School of Public Health has two other major functions: research and service to the state and region. Varied research is conducted by all departments. Similarly, all departments render field service to various organizations and agencies within the state and nation.

Graduate degrees offered by the School of Public Health are the Master of Science (M.S.), Doctor of Philosophy (Ph.D.), and the following professional graduate degrees: Master of Public Health (M.P.H.), Master of Science in Public Health (M.S.P.H.), Master of Science in Environmental Engineering (M.S.E.E.), and Doctor of Public Health (Dr.P.H.). All requirements concerning these degrees are administered by the faculty of the School of Public Health with the approval of the Administrative Board of the Graduate School.

Students of all races are equally welcome in the University of North Carolina. Persons of all racial backgrounds may apply for and accept admission, confident that the policy and regular practice of the institution will protect them from discrimination.

Students in the School of Public Health have all the rights and privileges of the student body at The University of North Carolina at Chapel Hill. They may take courses in other departments of the University, North Carolina State University, and Duke University, provided they are properly qualified and have the approval of their faculty advisers. Certain courses in chemistry, biochemistry, microbiology, economics, education, political science, social work, sociology, anthropology, and statistics have an especially close relationship to public health.

The School of Public Health admits only those students who would be expected to profit most by the educational program offered. It reserves the right to limit the number of students admitted to any course and drop from the roll any student whose work is unsatisfactory for any reason. It will be assumed that all applicants have assented to these conditions.

ADMISSION POLICIES

The regular entrance requirements of the Graduate School must be met by all students applying for admission to the School of Public Health.

The applicant must hold the bachelor's or master's degree from an accredited college or university with a grade average of B or better in the area of the major, and must present credentials show-

ing the completion of prerequisite courses for the special field he proposes to undertake in a graduate program. Applicants with a grade-point average below 3.0 in the major can be considered only if they submit scores for the Graduate Record Examination.

Work done **in abstentia** will not be counted for graduate credit except that, in certain cases approved by the Administration, part of the work on the thesis for a higher degree may be done elsewhere. All such work, even when credited, is subject to the final examination required for the degree.

All master's degrees are terminal degrees. The students must be readmitted for the doctoral program if his Department deems it advisable for him to continue beyond the master's level.

Health. Each new student, before his arrival at the University, is required to send the Director of Student Health Service a report of a physical examination properly completed by his own physician. The health questionnaire is furnished by the Graduate Office and included in the letter of admission. A former student who has been approved for readmission to the University and who has been away from the University for a year or more is required also to submit the medical form. Since clearance for registration will not be granted until all pre-entrance medical requirements have been met, those who arrive in Chapel Hill without completing these requirements must defray the costs of having the physical examination, laboratory examinations, and immunizations performed by the Student Health Service.

APPLICATION FOR ADMISSION

All applicants are required to pay a $10.00 non-deductible, non refundable application fee.

The program of study is arranged in a sequence which makes it advisable for students to enter the School in the fall semester. Admission at other times is granted only for exceptional reasons. Letters of inquiry regarding admission and requests for application forms should be addressed to the Dean, School of Public Health, Universty of North Carolina, Chapel Hill, North Carolina. Applicants are urged to conform to the deadlines for submitting application material: July 1 for Fall Semester; December 1 for Spring Semester; May 20 for First Summer Session.

TUITION AND FEES[1]

Tuition and fees per semester for bona fide residents of North Carolina are $336.50. For out-of-state students, tuition and fees per semester are $996.50. In addition, the following courses require field experience for which there is a fee: BIOS 301, $150.00; ENVR 164, $350.00; BIOS 302, EPID 315, HADM 206, HEED 240, HEED 340, MENH 280, MHCH 214, MHCH 217, NUTR 247, PHNU 397, PHNU 398, $450.00 each, and HADM 207, $600.00.

Accounts not paid by the end of the pay period are subject to a late payment fee.

SUMMER SCHOOL

The curricula of certain of the departments extend through a summer period 12 weeks. For each six week period, tuition and fees for graduate students are $131.50 for in-state, and $395.50 for out-of-state students.

RESIDENCE STATUS FOR TUITION PAYMENT[2]

1. **General:** The tuition charge for legal residents of North Carolina is less than for nonresidents. To qualify for in-state tuition, a legal resident must have maintained his domicile in North Carolina for at least the twelve months next preceding the date of first enrollment or re-enrollment in an institution of higher education in this state.[3] Student status in an institution of higher education in this state shall not constitute eligibility for residence to qualify said student for in-state tuition.

2. Minors: A minor is any person who has not reached the age of eighteen years.[4] The legal residence of a person under eighteen years of age at the time of his first enrollment in an institution of higher education in this state is that of his parents, surviving

1. Tuition and fees are subject to change without notice. Amounts given are for semester system. Additional field fee courses may be established.
2. These regulations, as amended on August 13, 1971, shall be applicable with respect to tuition payments coming due after said date.
3. The reference in this sentence to "twelve months" formerly read "six months"; Chapter 845 of the 1971 Session Laws, which was ratified on July 13, 1971, made the change from "six months" to "twelve month." The office of the Attorney General has rendered the following opinion:
   'The eligibility of all students who have applied and have been accepted by state-supported institutions of higher education prior to July 13, 1971, shall be determined upon the individual having maintained his domicile in North Carolina for at least the six months next preceding the date of first enrollment or re-enrollment in an institution of higher education in this State. The twelve-month requirement as provided for in Chapter 845 of the 1971 Session Laws does not apply to any individual who applied for admission and was accepted by a state-supported institution of higher education prior to July 13, 1971. The student already enrolled as an in-state student, qualifying as such by compliance with the six-month requirement prior to July 13, 1971, shall retain in-state status.'
4. Chapter 585 of the 1971 Session Laws, which became effective on July 5, 1971, changed the age of adulthood from twenty-one years to eighteen years.

parent, or legal guardian. In cases where parents are divorced or legally separated, the legal residence of the father will control unless custody of the minor has been awarded by court to the mother or to a legal guardian other than a parent. No claim of residence in North Carolina based upon residence of a guardian in North Carolina will be considered if either parent is living unless the action of the court appointing the guardian antedates the student's first enrollment in a North Carolina institution of higher education by at least twelve months.

3. Adults: An adult is any person who has reached the age of eighteen years. Persons, eighteen or more years of age at the time of first enrollment in an institution of higher education, are responsible for establishing their own domicile. Persons reaching the age of eighteen, whose parents are and have been domiciled in North Carolina for at least the preceding twelve months, retain North Carolina residence for tuition payment purposes until domicile in North Carolina is abandoned. If North Carolina residence is abandoned by an adult, maintenance of North Carolina domicile for twelve months as a non-student is required to regain in-state status for tuition payment purposes.

4. Married Students: The legal residence of a wife follows that of her husband, except that a woman currently enrolled as an in-state student in an institution of higher education may continue as a resident even though she marries a nonresident. If the husband is a nonresident and separation or divorce occurs, the woman may qualify for in-state tuition after establishing her domicile in North Carolina for at least twelve months as a non-student.

5. Military Personnel: No person shall lose his in-state resident status by serving in the Armed Forces outside of the State of North Carolina. A member of the Armed Forces may obtain in-state residence status for himself, his spouse, or his children after maintaining his domicile in North Carolina for at least the twelve months next preceding his or their enrollment or re-enrollment in an institution of higher education in this state.

6. Aliens: Aliens lawfully admitted to the United States for permanent residence may establish North Carolina residence in the same manner as any other nonresident.

7. Property and Taxes: Ownership of property in or payment of taxes to the State of North Carolina apart from legal residence will not qualify one for the in-state tuition rate.

8. Change of Status: The residence status of any student is determined as of the time of his first enrollment in an institution of higher education in North Carolina except: (a) in the case of a nonresident student at the time of first enrollment who has subsequently maintained domicile as a non-student for at least twelve consecutive months and (b) in the case of a resident who abandons his legal residence in North Carolina. In either case, the appropriate tuition rate will become effective at the beginning of the first subsequent term enrolled.

9. Responsibility of Students: Any student or prospective student in doubt concerning his residence status must bear the responsibility for securing a ruling by stating his case in writing to the admissions officer. The student who, due to subsequent events, becomes eligible for a change in classification, whether from out-of-state to in-state or the reverse, has the responsibility of immediately informing the Office of Admissions of this circumstance in writing. Failure to give complete and correct information regarding residence constitutes grounds for disciplinary action.

10. Appeals of Rulings of Admission Officers: Any student or prospective student may appeal the ruling of the admissions officer in writing to the Chancellor of the institution. The Chancellor may use any officer or committee which he deems appropriate in review of the appeal. Appeal of the Chancellor's ruling may be made to the President of the University, such appeals to be filed with the Chancellor and forwarded by him to the President.

Southern Regional Education Board Tuition Contract

The in-state tuition rate would apply to any out-of-state student who might be attending the School of Public Health under the Southern Regional Education contract arrangement for participating states.

Registration and Payment of Bills

All students are expected to report for registration on the opening date of the fall semester.

Bills for the fall and spring semesters are payable at the Cashier's Office **at the time of each registration or within one week after the date of registration.** Failure to pay or to make proper arrangement for paying results in the assessment of an extra fee of $5.00. This ruling does not apply to fellowship students or students who are sent by agencies.

APPLICATION FEE AND ADMISSION DEPOSIT

A non-refundable application fee of $10.00 must be submitted with application for admission to the Graduate School. An applicant who has been offered admission may reserve his place with payment of a $100.00 deposit which is credited against 1st semester tuition.

If, after remitting the deposit, the applicant gives notice of withdrawal by May 1, in the case of admission for the Fall semester or at least one month prior to the beginning of the term in the case of Spring or Summer admissions, the deposit will be refunded. Payment by check or money order should be sent directly to the University Cashier, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina 27514, along with an Admission and Deposit Record. No payment should be sent either to the Graduate School, to the School of Public Health, or to the department of one's major. Due to the number of applicants, we will not be able to hold your place if this deposit is not received within one month of the date of the admission letter.

Students who make the deposit and who attend the University on a fellowship, traineeship, or other award which pays directly to the University the entire cost of tuition and fees may obtain refunds of the entire deposit after November 1.

Students who wish to reserve residence rooms must make separate room deposits. See **Residence Hall Accommodations.**

GENERAL UNIVERSITY REGULATIONS AND POLICIES

Persons enrolled in the School of Public Health are members of the student body of The University of North Carolina at Chapel Hill, and are responsible for conducting themselves in conformity with the moral and legal restraints found in any law-abiding community. General regulations of the University relating to student conduct apply to all students—graduate, undergraduate, or professional. All students are subject to the regulations of Student Government under the Honor Code and Campus Code.

Policies, Procedures, and Disciplinary Actions in Cases of Disruption of Educational Process

The following statement has been incorporated in the Bylaws of the Board of Trustees of the University, and is quoted for the information of all members of the University Community.

Section 5-1. Policies Relating to Disruptive Conduct

The University of North Carolina has long honored the right of free discussion and expression, peaceful picketing and demonstrations, the right to petition and peaceably to assemble. That these rights are a part of the fabric of this institution is not questioned. They must remain secure. It is equally clear, however, that in a community of learning willful disruption of the educational process, destruction of property, and interference with the rights of other members of the community cannot be tolerated. Accordingly, it shall be the policy of the University to deal with any such disruption, destruction or interference promptly and effectively, but also fairly and impatiently without regard to race, religion, sex or politcal beliefs.

Section 5-2. Definition of Disruptive Conduct

(a) Any faculty member (the term "faculty member," wherever used in this Chapter V, shall include regular faculty members, full-time instructors, lecturers, and all other persons exempt from the North Carolina State Personnel System [Chapter 126 of the General Statutes as amended] who receive compensation for teaching, or other instructural functions, or research at the University), any graduate student engaged in the instructional program, or any student who, with the intent to obstruct or disrupt any normal operation or function of the University or any of its component institutions, engages, or incites others to engage, in individual or collective conduct which destroys or significantly damages any University property, or which impairs or threatens impairment of the physical well-being of any member of the University community, of which, because of its violent, forceful, threatening or intimidating nature or because it restrains freedom of lawful movement, otherwise prevents any member of the University community from conducting his normal activities within the University, shall be subject to prompt and appropriate disciplinary action, which may include suspension, expulsion, discharge or dismissal from the University.

The following, while not intended to be exclusive, illustrate the offenses encompassed herein, when done for the purpose of obstructing or disrupting

any normal operation or function of the University or any part of its component institutions: (1) occupation of any University building or part thereof with intent to deprive others of its normal use; (2) blocking the entrance or exit of any University building or corridor or room therein with intent to deprive others of lawful access to or from, or use of said building or corridor or room; (3) setting fire to or by any other means destroying or substantially damaging any University building or property, or the property of others on University premises; (4) any possession or display of, or attempt or threat to use, for any unlawful purpose, any weapon, dangerous instrument, explosive, or inflammable material in any University building or on any University campus; (5) prevention of, or attempt to prevent by physical act, the attending, convening, continuation or orderly conduct of any University class or activity or of any lawful meeting or assembly in any University building or on any University campus; and (6) blocking normal pedestrian or vehicular traffic on or into any University campus.

(b) Any person engaged in the instructional program who fails or refuses to carry out validly assigned duties, with the intent to obstruct or disrupt any normal operation or function of the University or any of its component institutions, shall be subject to prompt and appropriate disciplinary action under this Chapter V if (but only if) his status is such that he is not subject to the provisions of Section 4-3 of Chapter IV.

Section 5-3. Responsibilities of Chancellors

(a) When any Chancellor has cause to believe that any of the provisions of this Chapter V have been violated, he shall forthwith investigate or cause to be investigated the occurrence, and upon identification of the parties involved shall promptly determine whether any charge is to be made with respect thereto.

(b) If he decides that a charge is to be made, he shall, within thirty (30) days after he has information as to the identity of the alleged perpetrator of the offense but in no event more than twelve (12) months after the occurrence of the alleged offense, (i) refer the case to the appropriate existing University judicial body, or (ii) refer the matter to a Hearing Committee drawn from a previously selected Hearings Panel which, under this option, is required to implement action for violation of Section 5-2 (a) or (b) of this Chapter. If the case is referred to an existing University judicial body under (i) above, the procedural rules of that body shall be followed, and subsections (c) through (f) below shall not be applicable. If the matter is referred to a Hearing Committee under (ii) above, the procedural rules prescribed in subsections (c) through (f) below shall be followed.

(c) The accused shall be given written notice by personal service or registered mail, return receipt requested, stating:

(1) The specific violations of this Chapter V with which the accused is charged.

(2) The designated time and place of the hearing on the charge by the Hearing Committee, which time shall not be earlier than seven (7) nor later than ten (10) days following receipt of the notice.

(3) That the accused shall be entitled to the presumption of innocence until found guilty, the right to retain counsel, the right to present the testimony of witnesses and other evidence, the right to cross-examine all witnesses against him, the right to examine all documents and demonstrative evidence adverse to him, and the right to a transcript of the proceedings of the hearing.

(d) The Hearing Committee shall determine the guilt or innocence of the accused. If the person charged is found guilty, the Hearing Committee shall recommend to the Chancellor such discipline as said body determines to be appropriate. After considering such recommendations the Chancellor shall prescribe such discipline as he deems proper. In any event, whether the person is found guilty or not guilty, a written report shall be made by the Chancellor to the President within ten (10) days.

(e) Any person found guilty shall have ten (10) days after notice of such finding in which to appeal to the President of the University. Such an appeal if taken shall be upon the grounds set forth in Section 5-5.

(f) Any accused person who, without good cause, shall fail to appear at the time and place fixed for the hearing of his case by the Hearing Committee shall be suspended indefinitely or discharged from the University employment.

(g) A Chancellor, unless so ordered or otherwise prevented by court, shall not be precluded from carrying out his duties under this Chapter V by reason of any pending action in any State or Federal court. Should a delay occur in prosecuting the charge against the accused because the accused or witnesses that may be necessary to a determination of the charge are involved in State or Federal court actions, the time limitations set forth above in this Section 5-3 shall not apply.

(h) Conviction in any State or Federal court shall not preclude the University or any of its officers from exercising disciplinary action in any offense referred to in this Chapter V.

(i) Nothing contained in this Chapter V shall preclude the President or any Chancellor from taking any other steps, including injunctive relief or other legal action, which he may deem advisable to protect the best interests of the University.

Section 5-4. Aggravated Acts or Threatened Repetition of Acts

(a) The Chancellor of each of the component institutions of the University shall appoint an Emergency Consultative Panel which shall be composed of not less than three (3) nor more than five (5) faculty members and not less than three (3) nor more than five (5) students who shall be available to advise with the Chancellor in any emergency. No member of such Panel shall serve for more than one (1) year unless he be reappointed by the Chancellor. The Chancellor may make appointments, either temporary or for a full year, to fill any vacancies which may exist on the Panel.

(b) If, in the judgment of the Chancellor, there is clear and convincing evidence that a person has committed any of the acts prohibited under this Chapter V which, because of the aggravated character or probable repetition of such act or acts, necessitates immediate action to protect the University from substantial interference with any of its orderly operations or functions, or to prevent threats to or acts which endanger life or property, the Chancellor, with the concurrence as hereinafter provided of the Emergency Consultative Panel established pursuant to (a) above, may forthwith suspend such person from the University and bar him from the University campus; provided, however, that in the event of such suspension the person suspended shall be given written notice of the reason for his suspension, either personally or by registered mail addressed to his last known addresses, and shall be afforded a prompt hearing, which, if requested, shall be commenced within ten (10) days of the suspension. Except for purposes of attending personally any hearings conducted under this Chapter V, the bar against the appearance of the

accused on the University campus shall remain in effect until final judgment has been rendered in his case and all appellant proceedings have been concluded, unless such restriction is earlier lifted by written notice from the Chancellor.

(c) A quorum of the Emergency Consultative Panel provided for in (a) above shall consist of not less than four (4) of its members, and the required concurrence shall have been obtained if a majority of such quorum shall indicate their concurrence. The Chancellor shall meet personally with members of such Panel at the time he seeks concurrence, if it is feasible to do so. However, if the circumstances are such that the Chancellor deems it not to be feasible to personally assemble such members, then he may communicate with them or the required number of them individually by telephone or by such other means as he may choose to employ, in which event he may proceed as provided in (b) above after the required majority of such members have communicated their concurrence to him.

(d) In the Chancellor's absence or inability to act, the President may exercise the powers of the Chancellor specified in this Section 5-4 in the same manner and to the same extent as could the Chancellor but for such absence or inability to act.

Section 5-5. Right of Appeal

Any person found guilty of violating the provisions of this Chapter V by the Hearing Committee referred to in Section 5-3 shall have the right to appeal the finding and the discipline imposed upon him to the President of the University. Any such appeal shall be in writing, shall be based solely upon the record, and shall be limited to one or more of the following grounds:

(1) That the finding is not supported by substantial evidence;

(2) That a fair hearing was not accorded the accused; or

(3) That the discipline imposed was excessive or inappropriate.

It shall be the responsibility of the President to make prompt disposition of all such appeals, and his decision shall be rendered within thirty (30) days after receipt of the complete record on appeal.

Section 5-6. No Amnesty

No administrative official, faculty member, or student of the University shall have authority to grant amnesty or to make any promise as to prosecution or non-prosecution in any court, State or Federal, or before any student, faculty, administrative, or Trustee committee to any person charged with or suspected of violating Section 5-2 (a) or (b) of these Bylaws.

Section 5-7. Publication

The provisions of this Chapter V shall be given wide dissemination in such manner as the President or Chancellors may deem advisable, and shall be printed in the official catalogues which may be issued by each component institution of the University.

Procedures for Use in Case of Refusal by Graduate Student Service Appointees Who Are Not Subject to Code Section 4-3 to Perform Validly Assigned Duties

The following statement has been promulgated by the University Administration and is quoted for the information of all members of the University Community.

In the event that any graduate student fails or refuses to carry out validly assigned duties with the intent to obstruct or disrupt any normal operation or function of the University, the procedures given below will be followed. In these procedures the term "dean" identifies the deans of professional schools.

I. Administrative Procedures

1. The dean or department chairman in whose school or department the graduate student is appointed will immediately inquire into the alleged conduct. He shall, in writing, notify the graduate student involved that he is beginning an inquiry into the alleged conduct, which shall be briefly described. On the basis of his inquiry, he shall make a concise written finding of fact with respect to whether it appears that there did occur a failure or refusal to carry out validly assigned duties with the intent to obstruct or disrupt any normal operation or function of the University. He shall transmit one copy of the finding to the Chancellor and one to the graduate student involved.
2. If the inquiry indicates that the graduate student has failed or refused to carry out validly assigned duties with the intent to obstruct or disrupt any normal operation or function of the University, then the dean or chairman shall suspend the graduate student with pay from all duties until (a) the Chancellor has determined that no charge is to be made with respect thereto or (b) a final decision with respect thereto has been reached following a hearing before the body to which the matter is referred by the Chancellor.
3. If the Chancellor decides that a charge is to be made with respect to the matter and that it is to be referred to the appropriate existing University judicial body (rather than to the Hearing Committee referred to in Code Section 5-3), it shall be handled in the manner set forth below.

II. Hearing Procedures

1. The dean or chairman shall convene by written directive the Grievance Committee set up by faculty action on January 10, 1969 (see Appendix B of Faculty Legislation).
2. The dean or chairman shall, in writing, notify the graduate student of the convening of the hearing committee and shall provide the chairman of the hearing committee with a concise written summary of the charges of violation based upon the findings of the inquiry.
3. Upon convening of the hearing committee and receipt of the written charges, the chairman of the hearing committee shall forthwith set a time and place for the hearing by written notification to the graduate student and shall make the necessary arrangements for conducting the hearing. Unless manifestly impossible for reasons of specific unfairness to the graduate student or gross inconvenience to members of the hearing committee or to necessary witnesses, the hearing shall be set to commence not later than five (5) days after receipt by the graduate student of the written notice of the convening of the hearing committee. Failure on the part of the graduate student to attend the hearing without adequate cause shall result in automatic permanent suspension without pay.
4. The hearing shall be conducted on the written charges to determine their truth or falsity. The department chairman or dean who initiated the proceedings has the responsibility for presenting witnesses or documentary evidence to establish the charges. The graduate student shall

be accorded the right to counsel of his own choosing, to confront and cross-examine the witnesses against him, and to examine all documents and demonstrative evidence against him. He shall have the right to present testimony of witnesses and other evidence in his own behalf.

5. A complete transcript of the proceedings shall be furnished at the expense of the University.

6. Promptly upon the close of the hearing, the hearing committee shall render its decision, and that decision shall be presented in writing to the graduate student and his department chairman or dean.

III. Disciplinary Action and Appeal Procedure

1. If the decison is adverse to the graduate student, the department chairman or dean who initiated the proceedings shall determine what disciplinary action is to be taken.

2. An appeal may be taken in the manner described in paragraph (C) of Appendix B to the Faculty Legislation on University Government.

Firearms and Other Weapons Prohibited

The possession of bowie knives, dirks, daggers, loaded canes, sword canes, machetes, pistols, rifles, repeating rifles, shotguns, pump guns, or other firearms or explosives upon any University campus or in any University owned or operated facility, unless explicitly permitted by the appropriate Chancellor or his designated representative in writing, is forbidden. Violation of this prohibition constitutes grounds for suspension from the University.

Automobile Regulations

Every student at the University who owns and/or operates an automobile or other motor vehicle in or around Chapel Hill is required by University regulations to register it with the Traffic Office. Motor vehicle registration is made each school year during the academic registration procedure. Motor vehicles acquired after the time of enrollment must be registered at the Traffic Office within forty-eight hours after acquisition. A motor vehicle registration sticker is for registration purposes only and should not be construed as a parking permit. In no sense does the sticker guarantee the student a parking space. However, students in residence halls may have a reasonable expectation of finding a parking space within the zone in which their registration sticker is valid.

A complete set of rules and regulations governing parking and traffic will be furnished to each student at the time of registration of his motor vehicle.

HOUSING, FOOD, LAUNDRY, AND LINEN SERVICE

The University reserves the right to approve the housing of all students whether they live on or off the campus. Each University student is required to maintain a correct local address with the University. By Trustee action the administration is authorized to establish minimum standards of health, safety, and general welfare in regard to housing and to require that students maintain their residence in quarters which comply with these standards.

University-Operated Facilities

RESIDENCE HALL ACCOMMODATIONS: The University provides residence hall accommodations for approximately 6700 students in its graduate center, men's and women's undergraduate residence halls, and coeducational undergraduate residential facilities. All residence halls, or residential areas, offer snack bars, TV rooms, special study and typing rooms, coin laundry, vending machines, private telephones, and social facilities. Some provide limited kitchen facilities; all are near recreational areas, parking lots and food service. Rooms are rented by the semester with the option to cancel at the end of the Fall Semester. Rent does not cover the occupancy during periods when the University is not officially in session. A newly accepted student wishing to live in University Residence Halls should mail the full semester's rent along with the room reservation card to the University Cashier. If for any reason a student wishes to cancel the room reservation, the Department of Residence Life must be notified on or before June 15 for the fall semester, and on or before December 15 for the spring semester. The rent payment, less $25.00, is refundable upon cancellation made by the above dates. After these dates, rent payments are not refundable except for: illness which prevents enrollment or causes withdrawal; military draft; death in the family; dismissal for disciplinary or academic reasons.

RATES FOR 1973-1974 ARE: MEN—semester rent is $181.00 per person in a double room ($274.00 for limited number of single rooms.) This amount includes a $5.00 residence hall social fee.

WOMEN—semester rent is $236.00 per person in a double room ($357.00 for a very limited number of single rooms). This includes a $5.00 residence hall social fee.

COED HALLS—semester rent is $192.00 per person in a double room and $291.00 for a limited number of single rooms.

These rates are subject to change for 1973-1974.

All rooms are furnished. The University's pillow, linen, and blanket rental service is described on page 36. Students may elect to provide their own bedding.

The occupant of a room will be held directly responsible for all damage to the room and its furniture.

No pets may be kept in University residence halls or housing units. Outside aerials, cooking appliances, and air-conditioning units may not be used. Irons, self-contained coffee pots, and, under certain conditions, refrigerators are exceptions. A limited number of refrigerators are permitted in the residence halls.

After registration, rent for residence halls will not be refunded unless the student withdraws from the University during the first nine weeks of a semester because of illness (if recommended by the Director of Student Health Service), death in the family, dismissal for disciplinary or academic reasons, or military draft. A student dismissed or otherwise withdrawn from the University is expected to leave the University residence within 72 hours.

RESIDENCE HALL TENANCY: Students already living in a residence hall and desiring to retain rooms for the next academic year must make application as follows: Pay a $25.00 deposit to the University Cashier, and file a room reservation card with the Housing Assignments Office by a date announced by the Assistant Director of Residence Life - Single Student Housing. The deposit is forfeited on cancellation after June 15.

Room assignments will be cancelled and deposit forfeited unless rent for the fall semester is paid in full by June 15.

Room reservation for either of the two summer terms is made upon payment of the full amount of rent for one term.

HOUSING UNITS FOR MARRIED STUDENTS: The University has a limited number of housing units for married students. It is the general policy of the University to give priority to the applications of married graduate students.

Most of the apartments are unfurnished. There are a few prefab apartments in Victory Village which rent for $38.00 to $50.00 per month. Minimum rent for the newer brick apartments in Odum Village is $82.00 per month for one bedroom units, $92.00 per month for two bedroom apartments, including electric stoves, refrigerators, heat, and water. A limited number of two-bedroom apartments are furnished and rent for $110.00.

Early application to the Manager, Married Student Housing, Branson St., Odum Village, Chapel Hill, North Carolina 27514, is urgently recommended. Married students, especially married foreign students, should not bring their families to Chapel Hill until their housing arrangements have been settled.

The Department of Residence Life maintains listings of off-campus accommodations. Satisfactory arrangements for these places must be made by applying in person.

CONDITIONS OF TENANCY: The University reserves the right to make changes in room assignments. The University also reserves the right to require any student who it considers, for any reason, an undesirable tenant to vacate a Residence hall room. The right to occupy a room is not transferable and terminates with the expiration of the lease. Sale or transfer of a student's right to occupancy will be considered a fraudulent transaction and will result in forfeiture of the room by the lessee and the room becomes available for assignment by the Department of Residence Life. The University reserves the right to make changes at any time in room rent and other charges stated in this section.

STUDENT DINING FACILITIES: Dining facilities are operated in locations convenient to residence halls and meals are offered at reasonable rates.

Privately Owned Residence Hall Accommodations—University Square

Nearly 800 women and 700 men are housed in privately owned Granville Towers. The location is just off the UNC campus about one block from the Carolina Inn.

These supervised residence halls, one for women and one for men, have a cafeteria dining commons. The fee charged includes room and board. Further information is available from Granville Towers, University Square, Chapel Hill, N. C.

Arrangements for these accommodations should be made direct with Granville Towers Business Office.

Laundry, Linen, Pillow, and Blanket Service

LAUNDRY SERVICE: Finished laundry service at reasonable cost is provided by the University Laundry Department to students who wish to use it. This service is available on a Cash-and-Carry basis

at any of eight Laundry Call Offices. (Students desiring to do so may use the deposit system in lieu of Cash-and-Carry).

ADDITIONAL LAUNDRY SERVICES: Wash-Dry-Fold service (nothing finished) is available at any of the University Laundry Call Offices. This is an economical, Cash-and-Carry service and is separate from the finished laundry service.

LINEN RENTAL SERVICE: For students who do not wish to provide their own linen, the University Laundry will furnish two sheets, one pillow case, and three bath towels each week on an exchange basis. This service is available at all Laundry Call Offices. A fee of $33.00, which includes a $5.00 refundable deposit, for the school year (August through May) is payable when service is requested.

Pillows may be rented for $1.55 for the school year. Blankets are available for a deposit of $5.00 each, with provision for a refund of $2.00 when blanket is returned in good condition.

DRY CLEANING: Complete dry cleaning service is available at all University Laundry Call Offices on a Cash-and-Carry basis.

COIN-OP SERVICE: Coin-op service is available at Avery, Craige, James, and Joyner laundry offices.

TRAINEESHIPS, ASSISTANTSHIPS, FELLOWSHIPS, & LOANS

Federally sponsored traineeships and followships are available to properly qualified candidates. Application should be made to the School of Public Health at the time of application for admission. Traineeships or fellowships will not be awarded until the student has been admitted to the School. A few graduate assistantships are available in some departments. Graduate assistantships are "service" appointments and usually require a reduced load of academic work. Application should be made to the department to which the student is admitted.

Other work opportunities and some student loan funds are available from the University Student Aid Office. Application should be made to William M. Geer, Director, Office of Student Aid, 300 Vance Building, Chapel Hill, N. C.

STUDENT HEALTH SERVICE

The University employs a staff of full-time physicians and maintains a well-equipped infirmary under the immediate supervision of the Director of Student Health Service. When a student is ad-

mitted to the Infirmary, he is not charged for services rendered by the staff. He is, however, required to pay for any additional service—surgery, consultations, special nurses, etc.—recommended by the attending physican.

RECREATION

The University gymnasium, swimming pools, tennis courts, golf course, and large athletic fields provide ample facilities for exercise and recreation, all under the supervision and direction of a well-organized Department of Physical Education.

LIBRARIES

The Health Sciences Library is situated across the street from the School of Public Health. Other library facilities include the various departmental and school libraries and the general University Library.

GRADES

The graduate grading system is as follows: **H,** indicating work of superior quality; **P,** indicating satisfactory performance; **L,** indicating unsatisfactory work; **F,** indicating a failing performance.

The grade of **H, P,** and **L** carry full graduate credit with the exception that a student who earns a total of nine semester hours in the **L** category becomes ineligible for continued study in the Graduate School; the grade of **F** is disqualifying.

DELTA OMEGA

Election to the Delta chapter of Delta Omega, public health's national honor society, occurs shortly before graduation and is based upon attainment.

STUDENT UNION

All members of the School of Public Health student body are members of the Student Union. Its officers are made up of departmental representatives and a central Union Board which represents the entire student body. A faculty members serves as a liaison representative. Its purpose is (1) to enhance and ensure the opportunity of the student to receive an education of the highest attainable quality; (2) to represent and advocate causes and interests of the student body; (3) to stimulate interest in and en-

courage activities which relate to health in its broadest sense; and (4) to function as a channel of communication both to and from the student body.

In order to finance its functions and activities, each student is assessed a membership fee of $5.00.

DEGREES OFFERED

The following graduate professional degrees are offered: Master of Public Health, Master of Science in Public Health, Master of Science in Environmental Engineering and Doctor of Public Health. Degrees are awarded in May, August, and December, although Commencement exercises are held only in May. All Master's degrees are terminal degrees, so that a student who desires to proceed in a doctoral program must be recommended to the Graduate School by his major department.

MASTER OF PUBLIC HEALTH

This program is designed to meet the needs of individuals already proficient in one or more specialized areas of academic and/or professional knowledge pertinent to public health in preparation for positions that require additional knowledge of the broad field as well as of their own specialties.

To meet this broad objective, the students must be grounded: 1) in content areas designed to emphasize the total relation of man to his biological, physical and social environment, and to demonstrate the effect of this relationship upon man's physical, mental and social well-being, and 2) in disciplines and subject areas basic to public health methodology.

Fields of Specialization

Programs of study leading to the Master of Public Health degree are offered by the following departments: Biostatistics, Environmental Sciences and Engineering, Epidemiology, Health Administration, Health Education, Maternal and Child Health, Mental Health, Parasitology and Laboratory Practice, Public Health Nursing, and Nutrition (for the various programs offered, see under the heading of each department in a later section of this catalogue).

Requirements for Admission

The following are avenues for admission:

1. Prior doctoral degree (M.D., D.V. M., D.D.S., or equivalent) from approved schools. Also other doctoral degrees (Ph.D., etc.) from approved schools, provided the total academic preparation has included at least **six** courses in one of the broad areas germane to public health (natural or social sciences) and **two** courses in the other broad area.

2. **Prior master's degree** (professional or academic) from approved schools, provided the total program has included the minimum number of courses in the areas mentioned above.

3. **Bachelor's degrees** (from approved schools).

   a. In a professional area that qualifies the holder for a first level position in public health, provided the program has included the minimum number of courses in the areas mentioned above.

   b. Other Bachelor's degrees, provided the program has included a minimum of **ten** courses in one of the broad areas germane to public health (natural or social sciences), and **four** courses in the other broad area.

In addition, the undergraduate record of each applicant must be a strong one overall with an average grade of B or better in the subject of the major.

Requirements for the Degree

1. **Residence.** A period of residence of not less than one academic year with a more extended period for majors in various programs (see under each department in a later section of this catalogue).

2. **Course Program.** The satisfactory completion of an approved program of study that includes the following core courses: Ecology of Human Health (PUBH 100); Principles of Epidemiology (EPID 160), Public Health Statistics (BIOS 100), at least one course in Health Administration (HADM 110 or HADM 100) or Environmental Sciences (ENVR 101) or Health Education (HEED 108 or HEED 130 or HEED 133 or HEED 206), and in addition, at least one other course from outside the major department. The program must include a total of at least 30 semester hours.

If a student has had the equivalent of PUBH 100, EPID 160 or BIOS 100, he may request exemption from the course(s) by discussing the matter with the instructor(s) of the course(s). To protect the student and the accreditation of the School, all approved exemptions must be documented by filing a form signed by the instructor(s) involved and the head of his department(s). These forms are available in the office of the Associate Dean for the Academic Program, Room 360, and must be submitted to him in triplicate. Likewise, the same procedure is available to students who wish to substitute a course(s) for one or more of those listed above in Health Administration, Environmental Sciences, and Health Education.

3. **Admission to Candidacy.** An application for admission to candidacy, which includes the total course program and title of the written report (**see** below), must be filed with the Graduate School about three months before the expected date of graduation. The specific deadline is given in the "Calendar of Events" in the front sheets of this Catalogue.

4. **Written Report.** Each student is required to select a topic and submit to his major department an acceptable report that deals with some subject relevant to public health. Two typewritten copies are due in the department office at least one month before the degree is expected.

5. **Final Written Examination.** This is limited to work taken in the major department, including the written report. This must be taken not later than about one month before the degree is expected. The specific deadline is given in the "Calendar of Events" in the front sheets of this Catalogue. In the Department of Environmental Sciences and Engineering, students are required to pass an oral comprehensive examination in lieu of the written examination.

6. **Time Limitation.** All requirements for the degree must be completed within **five** years of the time the student matriculated in the program. If the program is interrupted, the student must satisfy all requirements in effect during the final year of his work.

MASTER OF SCIENCE IN PUBLIC HEALTH

This program is designed to prepare students for professional careers in specialized fields of public health. The major emphasis is upon specialization in an area of proficiency germane to public health. However, the core **(School)** requirements provide for an

orientation to the broad field of community health (concepts and practices) and for an introduction to certain public health sciences.

Fields of Specialization

Programs of study leading to the Master of Science in Public Health degree are offered by the following departments: Biostatistics, Environmental Sciences and Engineering, Epidemiology, Health Administration, Health Education, Maternal and Child Health, Mental Health, and Parasitology and Laboratory Practice. The various programs involved are listed under the heading of each department in a later section of this catalogue.

Requirements for Admission

1. A Bachelor's degree from an approved school in a program that included a minimum of 27 semester hours in the natural and/or social sciences.
2. A strong undergraduate record overall with an average grade of B or better in the subject of the major.
3. Special requirements by departments (see under each department in a later section of this catalogue).

Requirements for the Degree

1. **Residence.** A period of residence of not less than one academic year with a more extended period for majors in various programs (see under each department in a later section of this catalogue).
2. **Course Program.** The satisfactory completion of an approved program of study that includes the following core courses: Ecology of Human Health (PUBH 100) or Man and His Environment (ENVR 111), or Human Ecology and Health Systems (HADM 111), or Environmental Management (ENVR 211), and at least two courses in the sciences of public health taken outside the major department. The program must include a total of at least 30 semester hours.
3. **Admission to Candidacy.** An application for admission to candidacy, which includes the total course program and title of the written report, must be filed with the Graduate School about three months before the expected date of graduation. The specific deadline is given in the "Calendar of Events" in the front sheets of this catalogue. In the Department of Environmental Sciences and Engineering, students are required to pass an oral comprehensive examination in lieu of the written examination.
4. **Written Report.** Each student is required to select a topic and submit to his major department an acceptable report

that deals with some subject germane to his specialized program. Two typewritten copies are due in the department office at least one month before the degree is expected.

5. **Final Written Examination.** This is limited to work taken in the major department, including the written report. This must be taken not later than about one month before the degree is expected. The specific deadline is given in the "Calendar of Events" in the front of this catalogue. In the Department of Environmental Sciences and Engineering, students are required to pass an oral comprehensive examination in lieu of the written examination.
6. **Time Limitation.** All requirements for the degree must be completed within **five** years of the time the student matriculated in the program. If the program is interrupted, the student must satisfy all requirements in effect during the final year of his work.

MASTER OF SCIENCE IN ENVIRONMENTAL ENGINEERING

The curriculum leading to this degree is designed to prepare for the general field of sanitary engineering and for careers in the engineering divisions of national, state, and local health agencies; in municipal public works and service organizations; in such industries as involve sanitary problems; and in professionalism engineering organizations engaged in the investigation, design, supervision of construction, and operation of sanitary works.

Requirements for Admission

Candidates for this degree must hold an engineering degree from an institution accredited by the Engineers' Council for Professional Development or from an equivalent foreign institution—preferably in civil, sanitary, chemical, or mechanical engineering—where the curriculum has involved fundamental work in chemistry, physics, mathematics, and the engineering sciences.

Requirements for the Degree

1. **Residence.** A minimum of one calendar year (11 months) of residence for students who have graduated with high credit from approved engineering schools.
2. **Course Program.** Upon admission, presentation of an acceptable program of study covering the student's period of residence. This program must include a minimum of 30 semester hours of graduate grade.
3. **Admission to Candidacy.** An application for admission to candidacy which includes the total course program and title

of the written report (**see** below) must be filed with the Graduate School about three months before the expected date of graduation. The specific deadline is given in the "Calendar of Events" in the front sheets of this Catalogue.

4. **Written Report.** At least one month before the time at which the degree is expected to be conferred, a report upon some sanitary engineering project of the student's choice, which may be a small piece of research, the solution of a complex problem or design, or a critical understanding of a sector of knowledge. This report or essay is designed to acquaint the student with the methods employed in the acquisition, preparation, and analysis of material and to test his ability to present in writing the results of his findings.
5. **Final Written Examination.** This is limited to work taken in the major department, including the written report. This must be taken not later than about one month before the degree is expected. The specific deadline is given in the "Calendar of Events" in the front sheets of this Catalogue. In the Department of Environmental Sciences and Engineering, students are required to pass an oral comprehensive examination in lieu of the written examination.
6. **Time Limitation.** All requirements for the degree must be completed within **five** years of the time the student matriculated in the program. If the program is interrupted, the student must satisfy all requirements in effect during the final year of his work.

DOCTOR OF PUBLIC HEALTH

The Doctor of Public Health program is designed for the advanced education of individuals, already possessing the MPH (or equivalent) in fundamental and applied aspects of public health necessary for the effective conduct or supervision of research, synthesis of new knowledge and techniques into field application. This program of study will emphasize the application of knowledge to practice, which requires unusually broad understanding of the interdisciplinary nature of public health, the roles of various disciplines within the field, and the interaction between man and his environment.

Fields of Specialization

Programs leading to the Doctor of Public Health degree are offered by the departments of Biostatistics, Epidemiology, Health Administration, Health Education, Maternal and Child Health, Mental Health, and Parasitology and Laboratory Practice.

Requirements for Admission

1. Prior master's and/or doctoral degree(s) from an approved school(s), and at least 12 months of successful experience in public health practice, which may be included as part of the Dr.P.H. program.
2. Bachelor's degree from an approved school, and, normally, at least three years of successful experience in public health practice before entering the program.
3. In addition to the above experience requirements, all applicants must have received the Master of Public Health degree (Diploma from Canada) or an equivalent professional master's degree in public health. Those admitted with the Master of Science in Public Health degree must complete the School course requirements for the M.P.H. degree (page 39).

Requirements for the Degree

1. **Time Required.** A minimum of two academic years. Ordinarily, the first year is spent in full-time course work and preparation of the research prospectus.
2. **Residence.** A minimum of one academic year in continuous study.
3. **Faculty Committee.** Upon entering the program, each student is assigned an appropriate Doctoral Advisory Committee composed of at least five members, all of whom must be on the Graduate Faculty. The Chairman presides at all meetings of the Committee, schedules all special examinations (**see** below), and directs the dissertation research. If desired, co-advisers may be appointed for this purpose.
4. **Course Program** (minimum of 18 S.H., exclusive of dissertation courses and research).
   a. Major department.
   b. Related departments.

   The specific courses to be taken and the credits required will depend upon the qualifications of each student and his field of interest. However, inasmuch as this degree requires broad knowledge, it is expected that most students will be required to take courses from two or more disciplines (from within the SPH or other parts of the University). This dictates that the Faculty Committee be interdepartmental.

5. **Doctoral Examinations.** When the student has completed all of his course work or is in the terminal stage of his course program, he is eligible to take the first doctoral examination. This will be either the Doctoral Oral Examination or the Doctoral Written Examination, depending upon the policy of the major department. Both comprehensive examinations are conducted by members of the Faculty Committee and are designed to test and measure the student's knowledge of his chosen field, its content and methodology. In general, there should be a relatively brief time interval between the two examinations.

   In the case of the Doctoral Oral Examinations, at least five members of the Faculty Committee must participate and, in addition to testing the depth and breadth of the student's knowledge, they must determine the feasibility of the dissertation topic.

6. **Admission to Candidacy.** After the student has passed **both** doctoral examinations, he must apply to the Graduate School for Admission to candidacy. This admission signifies that the candidate has completed all requirements for the doctorate except the dissertation and that he has entered the research phase of his program.

7. **Research Project.** The research for the dissertation is a scientific and original project conducted by the student under supervision of his adviser or co-advisers.

8. **Dissertation.** This is expected to be of such scope, independence, and skillful presentation as to indicate that the candidate has acquired a mastery of the research methodology, and has contributed new knowledge to his subject. Two copies of the dissertation must be submitted to the Graduate School about two months prior to the expected date of graduation (a specific deadline is given in the "Calendar of Events" in the front sheets of this Catalogue).

9. **Application for Degree.** When a candidate nears the end of his research and can anticipate final approval of his dissertation, he should apply for a degree in a particular graduation. In the event the degree is not received in that graduation, he must file a **new** Application for Degree. Such applications must be filed about three months before the

time scheduled for the candidate's graduation (a specific deadline is given in the "Calendar of Events" in the front sheets of this Catalogue).

10. **Final Oral Examination.** This examination, conducted by at least five members of the Faculty Committee, must be scheduled at least one week after the dissertation has been submitted to the Graduate School, and before the end of Spring semester classes for those scheduled for May graduation (a specific deadline is given in the "Calendar of Events"). The primary purpose of this examination is to have the candidate present and defend his dissertation, but other material may be included if the Faculty Committee desires.

11. **Time Limitation.** All requirements for the degree must be completed within **eight** years of the time the student matriculated in the program. If the program is interrupted, the student must satisfy all requirements in effect during the final year of his work.

DOCTOR OF PHILOSOPHY

In addition to the above graduate professional degrees, the Doctor of Philosophy degree has been authorized by the Graduate School for students majoring in the following departments: Biostatistics, Environmental Sciences and Engineering, Epidimology, Health Education, and Parasitology and Laboratory Practice. (see under each department in a later section of this catalogue, and for more details consult the Graduate School Catalogue).

OFFICE OF CONTINUING EDUCATION AND FIELD SERVICE

The Continuing Education and Field Services Office serves as a link between the School of Public Health in Chapel Hill and the health professionals whose work affect the well-being of our citizens and their environment.

Continuing Education courses and conferences are designed for the exchange of information to keep that work as relevant as possible in the increasingly complex world of public health; interchange between professor and practitioner enables both to respond to that challenge with refreshed vitality. Representative offerings from Continuing Education have included: Southern Branch APHA Nursing Section Inservice Education Conference,

Principles of Public Health Practice, and Workshop for Health Planners.

The Continuing Education office, within the office of the Dean, works with both School of Public Health departments and field health services in facilitating communication and coordination between needs and resources. Major areas of activity include training needs analysis, course planning and management, educational evaluation and program innovation.

In addition to retraining and upgrading of inservice personnel, continuing education works with faculty of other institutions such as community colleges and technical institutes in development or revision of their health manpower training.

Support for short term courses generally comes from sources outside the University. The School of Public Health does not have funds available for this purpose. The Office of Continuing Education and Field Service has established a standard charge of $27.50 per student, per student day. Any exception to this standard fee must receive offical approval. Additional information about Continuing Education and Field Service of the School of Public Health may be obtained by writing to the Director, Continuing Education and Field Service.

POPULATION PROGRAM

The University of North Carolina has established a university-wide comprehensive program in Population Studies. The Carolina Population Center helps to stimulate support and coordinate studies on population dynamics and family planning throughout the University. It assists in building population research and teaching within the University departments, developing, interdisciplinary projects related to the population field, and maintaining relationships with other programs in North Carolina and abroad for study and service purposes.

The school of Public Health has developed a series of courses and curricula at the Master's and Doctoral levels, especially seeking to increase the understanding and competence in the population area of students who plan to work in local, national, and international family planning and population programs. The departments of Health Administration, Health Education, Biostatistics, Epidemiology and Maternal and Child Health all have established special curricula which offer interested graduate students an opportunity to concentrate on problems associated with popu-

lation growth. A new program initiated in 1970, by the Department of Health Education, is designed especially for educational media specialists. A special program for nursing students has been developed by the Department of Maternal and Child Health. These students take the basic public health course work in addition to a variety of courses in family planning and population studies in the School of Public Health and in other Schools and Departments in the University.

Additional information concerning the opportunities for study in this field may be obtained from the chairman of the departments referred to above or from the Training Officer of the Carolina Population Center. A brochure describing the population programs of the participating Departments may also be obtained from the Departments or the Training Officer.

BIOSTATISTICS FACULTY

JAMES E. GRIZZLE, B.S., M.S., Ph.D., Professor of Biostatistics

ELIZABETH J. COULTER, A.B., A.M., Ph.D., Professor of Biostatistics

[1]HERBERT A. DAVID, B.Sc., Ph.D., Professor of Biostatistics

REGINA C. ELANDT-JOHNSON, M.S., Ph.D., Professor of Biostatistics

ROBERT C. ELSTON, B.A., Dip. Ag., M.A., Ph.D., Professor of Biostatistics and Research Associate in Pathology

BERNARD G. GREENBERG, B.S., Ph.D., Kenan Professor of Biostatistics and Dean, School of Public Health

[2]DANIEL G. HORVITZ, B.S., Ph.D., Professor of Biostatistics

ROY R. KUEBLER, JR., A.B., M.A., Ph.D., Professor of Biostatistics

FORREST E. LINDER, B.A., M.A., Ph.D., Professor of Biostatistics

DANA E. A. QUADE, B.A., Ph.D., Professor of Biostatistics

PRANAB K. SEN, B.Sc., M.Sc., Ph.D., Professor of Biostatistics

[3]MINDEL C. SHEPS, M.D., M.P.H., Professor of Biostatistics

HENRY BRADLEY WELLS, B.A., M.S.P.H., Ph.D., Professor of Biostatistics

DOROTHY S. COOKE, Ph.D., M.S., Adjunct Professor of Biostatistics

LILLIAN GURALNICK, B.A., M.Sc., Adjunct Professor of Biostatistics

MORRIS H. HANSEN, B.S., M.A., Adjunct Professor of Biostatistics

KAROL J. KROTKI, B.A., M.A., M.A., Ph.D., Adjunct Professor of Biostatistics

GARRIE J. LOSEE, B.A., Adjunct Professor of Biostatistics

ANDERS S. LUNDE, B.A., M.A., Ph.D., Adjunct Professor of Biostatistics

GEORGES SABAGH, B.A., M.A., Ph.D., Adjunct Professor of Biostatistics

J. ROE GOODMAN, A.B., M.S., Visiting Professor of Biostatistics

ROBERT J. MYERS, B.A., M.A., Ph.D., Visiting Professor of Biostatistics

J. HUGH ROSE, B.S., Visiting Professor of Biostatistics

RALPH THOMLINSON, B.A., M.A., Ph.D., Visiting Professor of Biostatistics

JAMES R. ABERNATHY, B.S., M.S.P.H., Ph.D., Associate Professor of Biostatistics

1. Resigned August 31, 1972.
2. Effective January 15, 1973.
3. Died January 15, 1973.

GARY G. KOCH, B.S., M.S., Ph.D., Associate Professor of Biostatistics
PETER A. LACHENBRUCH, B.A., M.S., Ph.D., Associate Professor of Biostatistics
WILSON B. RIGGAN, B.S., Ph.D., Adjunct Associate Professor of Biostatistics
BABUBHAI V. SHAH, B.Sc., M.Sc., Ph.D., Adjunct Associate Professor of Biostatistics
[4]SOUTIR K. CHATTERJEE, B.S., M.S., Ph.D., Visiting Associate Professor of Biostatistics
[5]JOHN G. FRYER, B.Sc., Ph.D., Visiting Associate Professor of Biostatistics
[6]GAD NATHAN, M.Sc., Ph.D., Visiting Associate Professor of Biostatistics
CLARENCE E. DAVIS, B.A., M.S., Ph.D., Assistant Professor of Biostatistics
DENNIS B. GILLINGS, B.Sc., Dip. Math. Stat., Ph.D., Assistant Professor of Biostatistics
RONALD W. HELMS, B.A., M.A., Ph.D., Assistant Professor of Biostatistics
DAVID G. KLEINBAUM, A.B., A.M., Ph.D., Assistant Professor of Biostatistics
LAWRENCE L. KUPPER, B.S., M.S., Ph.D., Assistant Professor of Biostatistics
JOAN W. LINGNER, B.S., M.S., Ph.D., Assistant Profesor of Biostatistics
J. RICHARD STEWART, B.S., M.S., Ph.D., Assistant Professor of Biostatistics
MICHAEL J. SYMONS, B.A., M.P.H., Ph.D., Assistant Professor of Biostatistics
CRAIG D. TURNBULL, B.A., M.P.H., Ph.D., Assistant Professor of Biostatistics
O. DALE WILLIAMS, B.S., M.P.H., Ph.D., Assistant Professor of Biostatistics
DAVID G. HOEL, B.A., Ph.D., Adjunct Assistant Professor of Biostatistics
WILLIAM C. NELSON, B.S., M.S., Ph.D., Adjunct Assistant Professor of Biostatistics
JAMES J. PALMERSHEIM, A.A., B.S., M.S., Ph.D., Adjunct Assistant Professor of Biostatistics
[7]RICHARD E. BILSBORROW, B.A., M.A., Ph.D., Visiting Assistant Professor of Biostatistics
[8]SUKHARANJAN CHAKRAVORTI, B.Sc., M.Sc., D.Phil., Visiting Assistant Professor of Biostatistics
DAVID A. EDELMAN, B.S., M.S., Ph.D., Visiting Assistant Professor of Biostatistics
PETER B. IMREY, A.B., Ph.D., Visiting Assistant Professor of Biostatistics
[9]SARAH E. CRANFORD, A.B., M.A., Instructor in Biostatistics
WILLIAM D. JOHNSON, B.S., M.S., Instructor in Biostatistics
ELLEN B. KAPLAN, B.S., M.A., Instructor (part-time) in Biostatistics
ALEXA M. SORANT, S.B., A.M., Instructor in Biostatistics
[10]KATIE C. YELVERTON, B.S., M.A., Instructor in Biostatistics
[11]AMES K. DIAS, B.S., Instructor in Biostatistics
PRISCILLA A. GUILD, B.S., M.S.P.H., Adjunct Instructor in Biostatistics
CHIRAYATH M. SUCHINDRAN, B.Sc., M.Sc., M.S.P.H., Ph.D., Visiting Instructor in Biostatistics
ELISKA L. CHANLETT, A.B., M.A., Research Associate in Biostatistics
KADAMBARI K. NAMBOODIRI, B.S., M.S., Ph.D., Research Associate in Biostatistics

4. Resigned December 31, 1972.
5. Resigned June 30, 1972.
6. Resigned July 31, 1972.
7. Effective October 15, 1972.
8. Effective January 1, 1973.
9. Died June 11, 1973.
10. Resigned August 15, 1972.
11. Effective February 1, 1973.

CHARLES W. PETTUS, B.S., M.S., Research Associate in Biostatistics
WILLIAM M. SMITH, B.S., Ph.D., Research Associate in Biostatistics
ROBERT SPIRTAS, A.B., M.S., Research Associate in Biostatistics

Research Fellows

Charles W. Ash, B.S.
Brenda K. Edwards, B.S., M.S.
Daniel Herbert Freeman, Jr., B.A., M.S.
Frank Paul Hoffman, Jr., B.A.
Kerry L. Lee, B.S., M.S.
Judith T. Lessler, A.B., M.A.T.
David John Svendsgaard, B.S., M.S.
John D. Taulbee, B.S., M.S.P.H.
H. Dennis Tolley, B.S.
Kenneth Arthur Williams, B.A., M.S.P.H.

Field Counselors

David C. Corkey, B.S., M.S.P.H., Biostatistician, North Carolina State Board of Health, Raleigh, North Carolina

Donald J. Davids, M.S., M.P.H., J.D., Chief, Records and Statistics Section, Colorado Department of Health, Denver, Colorado

Irvin G. Franzen, A.B., M.P.H., Director, Division of Registration and Health Statistics, Kansas State Department of Health, Topeka, Kansas

Roberto Fuentes, B.A., Chief, Research and Statistics Division, D. C. Department of Human Resources, Washington, D. C.

Kurt Gorwitz, B.B.A., M.P.A., M.S., Sc.D., Chief, Michigan Center for Health Statistics, Lansing, Michigan

Vito M. Logrillo, B.S., M.P.H., Director, Office of Biostatistics, New York State Department of Health, Albany, New York

James J. Palmersheim, B.S., M.S., Ph.D., Chief, Public Health Statistics Section, North Carolina State Board of Health, Raleigh, North Carolina

Jack C. Smith, B.A., M.S., Chief, Statistical Services Unit, Family Planning Evaluation Activity, Epidemiology Program, Center for Disease Control, Atlanta, Georgia

The MPH program is designed to prepare individuals for positions in federal, state, and local agencies that require knowledge of the broad field of public health as well as specialized knowledge in Biostatistics. Thus this program emphasizes professional training; it includes five courses in public health, and only such Biostatistics courses as require no calculus. On the other hand, the five MSPH programs are more theoretical in content; they are designed to prepare students for professional careers in more specialized fields of public health. Besides the general MSPH program, conveniently referred to as the program in biometry, there are four more specialized programs which emphasize applications in: (1) demography and population studies; (2) mental

health statistics; (3) health services; and (4) environmental biostatistics. The student in any of these programs is of course required to take the core courses specified by the School for the respective degree. In addition, he must take field training (BIOS 302), unless he has had sufficient previous professional experience; and at least 18 semester hours in other Biostatistics courses, including: elementary probability and statistical inference (BIOS 105, 150, or 160, depending on his interests and on his program); statistical analysis (BIOS 145, 151, or 161); statistical data processing (BIOS 108 or 109); and sampling (BIOS 164). (Whenever a specific course is mentioned in connection with some program, it is to be understood that any equivalent course may be substituted.) Each student must write a report that deals with some subject relevant to public health. And finally, he must pass a general written examination in Biostatistics.

The MS degree in Biostatistics is awarded in a research-oriented program in theory and methodology. The student is required to have a foundation in mathematics including advanced calculus and linear algebra, and in computer usage. Courses in basic statistics which are specifically required include elementary probability and statistical inference (BIOS 160), a first course in intermediate statistical theory (STAT 134), statistical analysis (BIOS 161), and sampling (BIOS 164); the student must also elect 9 semester hours in advanced statistics. In addition he must complete a supporting program of at least 9 semester hours in a field of application; this is often within public health, but not necessarily so, there being no specific public health requirement. Professional experience is acquired through field training (BIOS 302), or through training in statistical consulting (BIOS 340/1/2), either of which involves a written report, or through the completion of a master's thesis (BIOS 393). Each MS student also serves as a teaching assistant to a faculty member for one course each year. Finally, students must pass the Basic Written Examination in Biostatistics.

The program for the PhD degree in Biostatistics is a continuation of that for the MS, and students who are admitted to it are expected to earn the MS in Biostatistics unless they have already received an equivalent degree elsewhere. The requirements include all those described for the MS, and also the following. The student must demonstrate knowledge in depth of the computer, or reading knowledge of one modern foreign language. Additional courses in basic statistics which are specifically required are a second course in intermediate statistical theory (STAT 135), and stochastic processes (STAT 129); then there must be elected 18

semester hours (rather than 9) in advanced statistics. The supporting program for the PhD must involve at least 15 semester hours (rather than 9) in a field or fields of application. The student must attain professional experience equivalent to 6 semester hours of training in statistical consulting (BIOS 340/1/2), statistical teaching (BIOS 350/1/2), or both. Finally, in addition to the Basic Written Examination, each student must pass Doctoral Written and Oral Examinations. He must then write a dissertation on a subject in statistics, representing a contribution to knowledge; and he must defend this at a Final Oral Examination.

The DrPH program is designed for the advanced education of individuals in fundamental and applied aspects of public health. Generally an MPH degree (or equivalent) and 1 to 3 years experience in public health practice are required for admission. Each candidate for this degree with major in Biostatistics is required to have a foundation in mathematics (advanced calculus and linear algebra) and in computer usage (data processing and programming). Courses specifically required in basic statistics are elementary probability and statistical inference (BIOS 160), statistical analysis (BIOS 161), and sampling (BIOS 164); in addition, the student must elect at least 18 semester hours of further courses in intermediate and advanced statistics. He must also complete a supporting program of at least 18 semester hours in non-statistical courses relevant to public health. His professional experience must include at least 12 months in public health practice (if not completed before admission to the program), and at least 6 semester hours of training in statistical consulting (BIOS 340/1/2). Finally, each student must pass comprehensive Doctoral Oral and Written Examinations. He must then write a dissertation such as to indicate that he has acquired a mastery of the research methodology and has contributed new knowledge; and he must defend this at a Final Oral Examination.

In addition to all the programs just described, the Department of Biostatistics also participates in programs for the MS and PhD degrees with minor in Public Health but with major in either (Mathematical) Statistics in the Department of Statistics of The University of North Carolina at Chapel Hill, or in (Experimental) Statistics in the Department of Statistics of North Carolina State University at Raleigh.

Further information is available in a brochure which can be obtained by writing the Department of Biostatistics, School of Public Health, Chapel Hill, North Carolina 27514.

DEPARTMENT OF ENVIRONMENTAL SCIENCES AND ENGINEERING

DANIEL A. OKUN, Head of Department, Director, Institute for Environmental Studies

CHARLES M. WEISS, Deputy Head of Department

ROBERT L. HARRIS, Assistant Director, Institute for Environmental Studies

RICHARD F. COLE, Director, International Program in Sanitary Engineering Design

Program in Water Resources Engineering

JAMES C. LAMB III, B.S.C.E., M.S., S.E., Sc.D., Professor of Sanitary Engineering, Director of Program

HERMAN G. BAITY, A.B., B.S.C.E., M.S., Sc.D., LL.D., Professor of Sanitary Engineering, Emeritus

GEORGE E. BARNES, B.S.C.E., C.E. (hon.) M.A., Professor of Environmental Engineering, Emeritus

MILTON S. HEATH, JR., A.B., LL.B., Professor (Water Resources) (Joint appointment as Professor of Public Law and Government and Associate Director, Institute of Government)

DAVID H. HOWELLS, B.S.C.E., M.S.S.E., Professor of Environmental Engineering (Joint appointment as Professor in Department of Agricultural and Biological Engineering at N. C. State University)

MAYNARD M. HUFSCHMIDT, B.S., M.P.A., D.P.A., Professor (Regional and Environmental Planning) (Joint appointment as Professor in Department of City and Regional Planning)

DANIEL A. OKUN, B.S.C.E., M.S., Sc.D., Professor of Environmental Engineering

CHARLES R. O'MELIA, B.C.E., M.S.E., Ph.D., Professor of Environmental Sciences and Engineering

JAMES C. BROWN, B.S.C.E., M.S.S.E., Associate Professor of Sanitary Engineering

FORREST O. MIXON, B.S., M.S., Ph.D., Adjunct Associate Professor of Environmental Engineering

FREDERICK E. McJUNKIN, B.C.E., M.S.S.E., Associate Professor of Environmental Engineering and Associate Director, Water Resources Research Institute

JABBAR K. SHERWANI, B.S., M.C.E., Ph.D., M.P.A., Associate Professor of Systems Analysis and Hydrology

DAVID H. MOREAU, B.S., M.S., Ph.D., Associate Professor, Systems Analysis, Department of City and Regional Planning (Joint appointment as Associate Professor, Systems Analysis, Department of Environmental Sciences and Engineering)

RICHARD F. COLE, B.S.C.E., M.S.S.E., Ph.D., Assistant Professor of Sanitary Engineering and Director, International Program in Sanitary Engineering Design

DONALD T. LAURIA, B.C.E., M.S.S.E., Ph.D., Assistant Professor of Environmental Engineering

Program in Environmental Chemistry and Biology

J. DONALD JOHNSON, B.S., Ph.D., Professor of Environmental Chemistry, Director of Program
EDWARD J. KUENZLER, B.S., M.S., Ph.D., Professor of Environmental Biology (Joint appointment as Chairman, Curriculum in Marine Sciences and Professor, Department of Botany)
JOHN LYMAN, B.S., M.S., Ph.D., Professor of Environmental Chemistry (Chemical Oceanography) and Coordinator, University of North Carolina Marine Sciences Program
CHARLES M. WEISS, B.S., Ph.D., Professor of Environmental Biology
BENJAMIN J. KORGEN, B.S., M.A., Ph.D., Assistant Professor of Physical Oceanography, Department of Geology (Joint appointment as Assistant Professor of Physical Oceanography, Department of Environmental Sciences and Engineering)
LINDA WEST LITTLE, B.A., M.S.P.H., Ph.D., Assistant Professor of Environmental Biology
FREDERIC K. PFAENDER, B.S., M.S., Ph.D., Assistant Professor of Environmental Microbiology
MARK S. SHUMAN, B.S., Ph.D., Assistant Professor of Environmental Chemistry
DONALD E. FRANCISCO, B.A., M.A., Ph.D., Lecturer in Environmental Biology

Program in Environmental Management and Protection

MORRIS A. SHIFFMAN, D.V.M., M.P.H., M.G.A., Ph.D., Professor of Environmental Health, Director of Program
STANLEY J. WEIDENKOPF, B.S.C.E., M.P.H., Eng.D., Professor of Environmental Engineering
THOMAS D. ENGLISH, B.S., M.S., Ph.D., Adjunct Associate Professor of Environmental Management
ALVIS G. TURNER, B.S., M.S.P.H., Ph.D., Assistant Professor of Environmental Sciences

Program in Air and Industrial Hygiene

ARTHUR C. STERN, M.E., M.S., Professor of Air Hygiene, Director of Program
AUBREY P. ALTSHULLER, B.S., M.S., Ph.D., Adjunct Professor of Air Chemistry
WARREN A. COOK, A.B., Adjunct Professor of Industrial Health
DAVID A. FRASER, B.A., M.S., D.Sc., Professor of Industrial Health
LEONARD J. GOLDWATER, A.B., M.D., Med. Sci. D., M.S.P.H., Visiting Scholar, Duke University (Joint appointment as Visiting Professor of Occupational Medicine, Department of Environmental Sciences and Engineering)
PARKER CRAMER REIST, B.S., S.M., S.M., Sc.D., Professor of Air and Industrial Hygiene
LYMAN A. RIPPERTON, B.A., B.S., Ph.D., Professor of Air Hygiene
MARIO C. BATTIGELLI, M.D., M.P.H., Associate Professor of Occupational Health (Joint appointment as Associate Professor in Department of Preventive Medicine)
ROBERT L. HARRIS, B.S.Ch.E., M.S., Ph.D., Visiting Associate Professor of Air and Industrial Hygiene
HARVEY E. JEFFRIES, B.S., M.S.P.H., Ph.D., Assistant Professor of Air and Industrial Hygiene
DONALD L. FOX, B.S., Ph.D., Lecturer in Air Hygiene

Program in Radiological Hygiene

EMIL T. CHANLETT, B.S., M.S.P.H., M.S.S.E., Professor of Sanitary Engineering, Director of Program

ARTHUR W. WALTNER, A.B., M.S., Ph.D., Professor of Physics, Department of Physics, North Carolina State University (Joint appointment as Professor of Radiological Science, Department of Environmental Sciences and Engineering)

DONALD G. WILLHOIT, A.B., M.S., Sc.D., Associate Professor of Radiation Biophysics

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Programs of Study

The Department of Environmental Sciences and Engineering offers five graduate academic programs: (1) Water Resources Engineering, (2) Environmental Management and Protection, (3) Environmental Chemistry and Biology, (4) Air and Industrial Hygiene, and (5) Radiological Hygiene. In addition the International Program in Sanitary Engineering Design is offered.

The following curricula are illustrative of the courses which are usually taken by students in the respective program areas. Courses are selected by the student and his faculty adviser to suit the particular background and interest of the student. Programs leading to the Ph.D. degree are too varied to permit illustration.

Courses may be taken at Duke and NCSU without payment of additional tuition. Departmental students taking required courses at NCSU may be reimbursed for travel costs.

Interdisciplinary studies are encouraged and coordinated by organizations within the University such as the Institute for Environmental Studies, the Water Resources Research Institute, and the Institute of Marine Sciences. Joint programs of study such as the Graduate Program in Water Resources Planning and Development jointly sponsored by the Departments of Environmental Sciences and Engineering and City and Regional Planning draw on the specific resources of the two departments with students developing their major interest depending on their training in basic discipline.

The Department of Environmental Sciences and Engineering issues a current list of all departmental courses offered and a description of course content, as well as a Departmental brochure and a quarterly "ESE Notes."

PROGRAM IN WATER RESOURCES ENGINEERING

The Master of Science in Environmental Engineering curricula may be based upon courses of study involving: (1) the technical aspects of water supply and treatment, wastewater collection, treatment and disposal and the control of water pollution, or (2) the engineering, economic and administrative aspects of water resources development and management, or (3) a combination of these. Minimum course requirements are as follows.

COURSE REQUIREMENTS FOR MSEE DEGREE
WATER RESOURCES ENGINEERING

		Min. No. in Each Group
1.	**Statistics**	1
	BIOS 105 (3), Fall, Spring	
	BIOS 135 (4), Fall	
	BIOS 150 (3), Fall	
	BIOS 151 (3), Spring	

2. **Environmental Sciences** 2

ENVR 122 (4), Fall
ENVR 131 (3), Spring
ENVR 133 (3), Fall
ENVR 134 (3), Spring
ENVR 181 (2), Fall
ENVR 281 (3), Spring
ENVR 217 (3), Fall
ENVR 218 (3), Fall
ENVR 218 (3), Spring

3. **Planning** 1

ENVR 182 (3), Fall
ENVR 212 (3), Spring
ENVR 282 (3), Fall
ENVR 283 (3), Spring
ENVR 284 (3), Spring
ENVR 285 (3), 2nd Summer

4. **Water Quality Management** 1

ENVR 132 (3), Fall, Spring
ENVR 171 (2), Fall
ENVR 174 (4), Spring
ENVR 271 (3), Spring
ENVR 274 (4), Fall
ENVR 275 (3), Spring
ENVR 276 (2), Summer

5. **Design** 1

ENVR 272 (3), Fall
ENVR 273 (3), Spring
ENVR 277 (3), 1st Summer

6. **Master's Problem** 1

ENVR 270 (3 or more)

NOTE

Each student must take at least two courses in the School of Public Health outside the Environmental Sciences and Engineering Department.

ILLUSTRATIVE ONE-YEAR PROGRAM (MSEE)

Water Quality Management

Fall Semester

Course No.	Course Title	Semester Hours
ENVR 272	Water Supply and Wastewater Disposal Systems	3
BIOS 105	Principles of Statistical Inference	3
ENVR 122	Water Chemistry	4
ENVR 217	Systems Analysis in Environmental Planning	3
and/or		
ENVR 171	Principles of Water Quality Management	2
		12-15

Spring Semester

ENVR 174	Water and Wastes Treatment Processes	4
ENVR 273	Water and Wastewater Treatment Plant Design	3
ENVR 131	Biology in Environmental Science	3
EPID 162	Epidemiology in Environmental Health	2
ENVR 270	Sanitary Engineering Problem	1-3
		13-15

Summer

ENVR 270	Sanitary Engineering Problem	3-7
ENVR 276	Advanced Treatment Processes	2
ENVR 285	Special Project in Water Quality Planning	3
		8-12

ILLUSTRATIVE TWO-YEAR PROGRAM (MSEE)

Water Quality Management

1st Year—Fall Semester

Course No.	Course Title	Semester Hours
BIOS 135	Probability and Statistics	4
ENVR 122	Water Chemistry	4
ENVR 217	Systems Analysis in Environmental Planning	3
ENVR 171	Principles of Water Quality Management	2
		13

Spring Semester

ENVR 174	Water and Wastes Treatment Processes	4
ENVR 273	Water and Wastewater Treatment Plant Design	3
ENVR 131	Biology in Environmental Science	3
ENVR 270	Sanitary Engineering Problem	2-4
		12-14

Summer

ENVR	277	Engineering Project Design	3
ENVR	270	Sanitary Engineering Problem	3-6
ENVR	285	Special Project in Water Quality Planning	3
			9-12

2nd Year—Fall Semester

ENVR	272	Water Supply and Wastewater Disposal Systems	3
ENVR	132	Limnology and Water Pollution	3
ENVR	274	Chemical Reaction Engineering	4
ENVR	283	Natural Resources Law and Policy	3
			13

Spring Semester

EPID	162	Epidemiology in Environmental Health	2
ENVR	275	Industrial Water Quality Management	3
ENVR	281	Topics in Advanced Hydrology	3
ENVR	271	Modeling of Natural Aquatic Systems	3
———		Reading, Problems or Elective	3
			14

ILLUSTRATIVE ONE-YEAR PROGRAM IN WATER RESOURCES (MSEE)

Fall Semester

Course No.		Course Title	Semester Hours
ENVR	218	Environmental Systems Analysis I	3
ENVR	272	Water Supply and Wastewater Disposal Systems	3
ENVR	282	Public Investment Theory and Techniques	3
BIOS	135	Probability and Statistics	4
ENVR	171	Principles of Water Quality Management	2
			15

Spring Semester

ENVR	219	Environmental Systems Analysis II	3
ENVR	281	Topics in Advanced Hydrology	3
ENVR	284	Planning of Water Research Systems	3
EPID	162	Epidemiology in Environmental Health	2
ENVR	170, 270	Reading, Problem, or Research	3
			14

Summer

ENVR	277	Engineering Project Design	3
ENVR	170, 270	Reading, Problem, or Research	4
			7

ILLUSTRATIVE TWO-YEAR PROGRAM IN WATER RESOURCES (MSEE)

		1st Year—Fall Semester	
ENVR	218	Environmental Systems Analysis I	3
ENVR	282	Public Investment Theory and Techniques	3
BIOS	135	Probability and Statistics	4
ENVR	122	Water Chemistry	4
ENVR	183	Water Resources Seminar	1
			15
		Spring Semester	
ENVR	219	Environmental Systems Analysis II	3
ENVR	284	Planning of Water Resource Systems	3
ENVR	174	Water and Waste Treatment Processes	4
ECON	131	Intermediate Economic Theory	3
			13
		Summer	
ENVR	277	Engineering Project Design	3
ENVR	170, 270	Reading, Problem, or Research	4
MATH	135	Linear Algebra	3
			10
		2nd Year—Fall Semester	
ENVR	272	Water Supply and Wastewater Disposal Systems	3
ENVR	283	Resource Development Law and Policy	3
ENVR	183	Water Resources Seminar	1
ENVR	170, 270	Reading, Problem, or Research	3
		*Elective	3
			13
		Spring Semester	
ENVR	219	Environmental Systems Analysis II	3
ENVR	281	Topics in Advanced Hydrology	3
ENVR	170, 270	Reading, Problem or Research	3
———		Elective	3
			12

*Electives should preferably be in a single subject area.

PROGRAMS IN ENVIRONMENTAL CHEMISTRY AND BIOLOGY

The MSPH degree program is intended to prepare students with background in chemistry and biology for research and field careers relating to water treatment, municipal and industrial waste treatment, and water pollution control in industry and government. Course work and research opportunities are offered in oceanography, systems ecology, and colloids, analytical and physical water chemistry, aquatic biology, microbial ecology and microbiology. The following is an outline of minimum course requirements.

CHEMISTRY AND BIOLOGY PROGRAM AREA

	Number of Courses Required	
	Chemistry Program	Biology Program
1. Env. Chem. and Biology		
Chemistry	3	1
ENVR 122—Water Chemistry (4)—fall		
ENVR 126—Sols and Surfaces (3)—fall		
ENVR 128—Chemical Oceanography (4)—spring		
ENVR 222—Special Topics in Aquatic Chemistry (2)—fall, spring		
ENVR 223—Trace Analysis (3) spring		
ENVR 247—Chemistry of the Troposphere (3)—fall		
CHEM 143—Mechanistic Analysis (2)—fall		
CHEM 144—Separations (2)		
CHEM 145—Electroanalytical Chemistry (2)—fall		
CHEM 146—Analytical Spectroscopy I (2)—fall		
CHEM 147—Analytical Spectroscopy II (2)—spring		
CHEM 160—Intermediate Organic Chemistry (3)—fall, spring		
CHEM 166—Advanced Organic Chemistry (3)—fall, spring		
CHEM 168—Synthetic Aspects of Organic Chemistry (3)—spring		
CHEM 180—Principles of Physical Chemistry (3)—fall		
CHEM 181—Physical Chemistry (3)—fall		
CHEM 182—Physical Chemistry (3)—spring		
CHEM 183—Introduction of Biophysical Chemistry (3)—fall		
GEOL 142—Principles of Geochemistry (4)—		
GEOL 242—Physical Geochemistry (4)—fall (3)—spring		
Biology	1	2
*ENVR 131—Biology in Environmental Science (3)—spring		
ENVR 132—Limnology and Water Pollution (3)—spring		
ENVR 133—Environmental Biology (3)—fall		
ENVR 134—Environmental Microbiology (3)—spring		
ENVR 232—Special Topics in Aquatic Biology (2)—fall, spring		
BIOC 101—Biochemistry (6)—fall		
BIOC 105—Introduction to Biochemistry and Molecular Biology (4)—spring		
PALP 131—Parasitism and Human Disease (2)—fall		
PALP 134—Human Parasitology (3)—fall		
BACT 100—Biology and Biochemistry of Microorganisms (5)—spring		
Ecology	1	2
ENVR 132—Limnology and Water Pollution (3)—spring		
ENVR 135—Ecology (4)—fall, spring		
ENVR 226—Ecological and General Systems Theory (3)—spring		
ENVR 233—Microbial Ecology (4)—fall		

*Does not satisfy biology requirement.

	Number of Courses Required	
	Chemistry Program	Biology Program
ENVR 235—Ecology of Phytoplankton (4)—fall		
ZOOL 109—Introduction to Hydrobiology (4)—spring		
ZOOL 140S—Biological Oceanography (6)—summer		
ZOOL 146—Marine Ecology (4)—spring		
Techniques	1	1
ENVR 115—Electron Microscopy (3)—spring		
ENVR 124—Analytical Methods in Environmental Sanitation (3)—fall		
ENVR 163—Radiation Instrumentation (3)—fall		
ENVR 217—Systems Analysis in Environmental Planning (3)—fall		
ENVR 221—Instrumental Methods of Analysis (4)—fall		
CHEM 141—Laboratory in Analytical Research Techniques I (2)		
CHEM 142—Laboratory in Analytical Research Techniques II (2)		
CHEM 181L—Physical Chemistry Laboratory (3)—fall		
CHEM 182L—Physical Chemistry Laboratory (3)—spring		
2. Environment and Health	1	1
EPID 160—Principles of Epidemiology (2)—fall		
EPID 162—Epidemiology in Environmental Health (2)—fall, spring		
3. Statistics	1	1
BIOS 105—Principles of Statistical Inference (3)—fall, spring		
BIOS 135—Probability and Statistics (4)—fall		
4. Public Health	1	1
PUBH 100—Ecology of Human Health (3)—		
ENVR 211—Environmental Management (3)—summer		
5. Other Environmental Science Areas	1	1
ENVR 141—Elements of Air Hygiene (2)—summer		
ENVR 142—Elements of Industrial Hygiene (2)—summer		
ENVR 143—Applied Physiology and Toxicology (3)—fall		
ENVR 152—Elements of Food Sanitation (3)—spring		
ENVR 161—Elements of Radiological Hygiene (2)—spring, summer		
ENVR 162—Modern Physics for Environmental Science (3)—fall		
ENVR 212—Planning and Development of Environmental Hygiene Programs (3)—spring		
ENVR 261—Radiation Biophysics (3)—spring		
ENVR 171—Principles of Water Quality Management (2)—fall		
ENVR 174—Water & Waste Treatment Processes (4)—spring		
ENVR 274—Chemical Reaction Engineering (4)—fall		
ENVR 275—Industrial Water Quality Management (3)—spring		
6. Reading and Research	1	1
10 units minimum		

ILLUSTRATIVE PROGRAM IN ENVIRONMENTAL CHEMISTRY AND BIOLOGY FOR CHEMISTS (MSPH)

Fall Semester

BIOS	105	Statistical Inference	3
ENVR	122	Water Chemistry	4
EPID	162	Epidemiology in Environmental Health	2
ENVR	132	Limnology and Water Pollution	3
ENVR	135	Ecology	3
ENVR	120, 220	Reading or Problems	1
			16

Spring Semester

ENVR	128, 128L	Chemical Oceanography, Lab	4
ENVR	131	Biology in Environmental Sciences	3
ENVR	174	Water and Wastes Treatment Processes	4
ENVR	223	Trace Analysis	3
ENVR	120, 220	Reading or Problems	2
			16

Summer

ENVR	211	Environmental Management	3
ENVR	120, 220	Reading or Problems	8
			11

ILLUSTRATIVE PROGRAM IN ENVIRONMENTAL CHEMISTRY AND BIOLOGY FOR BIOLOGISTS

Fall Semester

ENVR	122	Water Chemistry	4
ENVR	133	Environmental Biology	3
BIOS	105	Statistical Inference	3
EPID	162	Epidemiology in Environmental Health	2
ENVR	235	Ecology of Phytoplankton	4
			16

Spring Semester

ENVR	115	Applied Electron Microscopy	3
ENVR	134	Environmental Microbiology	3
ENVR	132	Limnology and Water Pollution	3
ENVR	174	Water and Wastes Treatment Processes	4
ENVR	120, 220	Reading or Problems	2
			15

Summer

ENVR	120, 220	Reading or Problems	8
ENVR	211	Environmental Management	3
			11

PROGRAM IN AIR AND INDUSTRIAL HYGIENE

Designed to prepare students for careers in practice and research in air pollution and industrial hygiene. Students may follow a program leading to the Master of Science in Public Health degree, or persons with an engineering background may take a program with somewhat different emphasis leading to the Master of Science in Environmental Engineering degree. For either specialty within the program area, certain courses are required; others are highly recommended. These are listed below. A few of the courses offered are fundamental to both industrial hygiene and air pollution and are required for all students in the program. By judicious choice of elective courses, students can be prepared for professional work in either of the two specialties or for a career which combines the two.

			Credit Hours
Courses Required for All Students			
BIOS	135	Probability and Statistics, fall	4
EPID	162	Epidemiology in Environmental Health, fall, spring	2
ENVR	211	Environmental Management, summer (for M.S.P.H. students)	3
ENVR	241	Mechanics of Aerosols, fall	3
ENVR	243	Air and Its Contaminants, fall	3
Additional Courses Required for Students Primarily Interested in Industrial Hygiene			
ENVR	143	Applied Physiology and Toxicology, fall	3
ENVR	242	Industrial Hygiene Practices, spring	3
ENVR	244	Industrial Hygiene Laboratory, spring	3
Additional Courses Required for Students Primarily Interested in Air Pollution			
ENVR	144	Air Pollution Measuring, Monitoring and Survey, spring	3
ENVR	245	Air Pollution Control, spring	3
ENVR	249	Air Pollution Meteorology (required for MSEE candidates only), spring	3
Highly Recommended Elective Courses (for both air pollution and industrial hygiene students unless otherwise noted)			
ENVR	115	Applied Electron Microscopy, spring	3
ENVR	145	Instrumentation and Data Acquisition, fall	3
ENVR	146	Indsutrial Hygiene Engineering Control Design, fall	3
ENVR	154	Management of the Institutional Environment, spring (Industrial Hygiene)	3
ENVR	161	Elements of Radiological Hygiene, spring, summer (Industrial Hygiene)	2
ENVR	163	Radiation Instrumentation, fall	3

ENVR	211	Environmental Management, summer	3
ENVR	212	Planning and Development of Environmental Hygiene Programs, spring	3
ENVR	221	Instrumental Methods of Analysis, fall	4
ENVR	246	Biological Effects of Air Pollution, fall	3
ENVR	247	Chemistry of the Trophosphere	3
ENVR	275	Industrial Water Quality Management, spring	3
ENVR	283	Natural Resource Law and Policy, fall, spring	3
COMP	216x	Introduction to Computer Use, fall, spring, summer (No degree credit)	3

There is also the possibility of scheduling special projects and studies as a reading course (ENVR 140) or working for credit on a current research project (ENVR 240). The number of credit hours to be assigned for these courses is variable. Advisor concurrence is required.

PROGRAM IN ENVIRONMENTAL MANAGEMENT AND PROTECTION

Environmental Management:

The environmental management program is intended for persons concerned with the direction or supervision of environmental protection programs and with environmental planning. The major emphasis is on program planning, administration and management, as well as environmental policy development. Never management approaches to environmental control are considered.

There are two levels of training offered:

1. The advanced management one-year program limited to applicants with a substantial educational and experience background in environmental science or engineering.
2. The two-year program for applicants with limited experience includes preparation in environmental protection supplemented by basic environmental management program of study.

Environmental Protection:

This curriculum is designed to provide students with the scientific principles which are essential for the operation of environmental protection programs. It includes courses in (a) the applied sciences fundamental to understanding environmental pollution, (b) current practices, concepts, and technologies in the environmental health sciences, and (c) the basic elements of program planning and management.

The student may concentrate in one of three areas, including:

1. Community Environment—to prepare environmental planners and practitioners whose activities are directed at the interface at which environmental hazards and stresses im-

pinge on the individual and community. The program of study includes courses in community sanitation, food protection, the institutional environment, housing, noise, insect and vector control and solid waste as well as introductory courses in air and industrial hygiene and radiological health.

2. Hospital and Institutional Environment—a specialized program to prepare students for responsible administrative and technical management positions in the control of the health facilities and institutional environment. Graduates are employed by health care facilities and official agencies responsible for evaluating and accrediting such facilities.

3. Food and Consumer Protection—an in-depth curriculum in food protection is available through a program offered in cooperation with the Department of Food Science at the North Carolina State University.

Graduates of these programs are employed by health agencies, other governmental agencies, industries, and institutions with comprehensive programs of environmental control.

EXAMPLE OF A ONE-YEAR PROGRAM OF STUDY IN ENVIRONMENTAL PROTECTION(MSPH)

Fall Semester

BIOS	105	Principles of Statistical Inference	3
EPID	162	Epidemiology in Environmental Health	2
ENVR	143	Applied Physiology and Toxicology	3
ENVR	171	Principles of Water Quality Management	2
ENVR	251	Environmental Sanitation I	3
			13

Spring Semester

ENVR	154	Management of the Institutional Environment	3
ENVR	161	Elements of Radiological Hygiene	2
ENVR	212	Planning and Development of Environmental Hygiene Programs	3
ENVR	252	Food Protection	3
ENVR	253	Environmental Sanitation II	3
			14

Summer

ENVR	141	Elements of Air Hygiene	2
ENVR	142	Elements of Industrial Hygiene	2
ENVR	211	Environmental Management	3
ENVR	250	Problems in Environmental Management and Protection	VAR
			min. 7

EXAMPLE OF A ONE-YEAR PROGRAM OF STUDY IN ENVIRONMENTAL MANAGEMENT (MSPH)

Fall Semester

BIOS	105	Principles of Statistical Inference	3
ENVR	217	Systems Analysis in Environmental Planning	3
ENVR	282	Public Investment Theory and Techniques	3
HADM	101	Political, Economic and Social Perspectives on Health Administration	3
ENVR	171	Principles of Water Quality Management	2
			14

Spring Semester

ENVR	212	Planning and Development of Environmental Hygiene Programs	3
ENVR	283	Natural Resource Law and Policy	3
EPID	162	Epidemiology in Environmental Health	2
ENVR	215	Environmental Assessment	3
PLAN	241	Environmental Planning	3
			14

Summer

ENVR	211	Environmental Management	3
ENVR	277	Engineering Project Design	3
ENVR	250	Problems	6
			12

Students in Environmental Management and Protection extend the MSPH program over a two-year period which permits additional depth in course content and gives the student an opportunity to undertake an investigative project for the Master's Report.

Two year students specializing in environmental protection have the opportunity to take further course work in the institutional environmental and food protection as well as the courses offered by the other program areas of the Department.

The two-year program in Environmental Management permits further study in environmental policy, planning and management. Students in the two-year program have an opportunity to elect appropriate courses throughout the School of Public Health and in the University. These include courses in the Departments of City and Regional Planning, Political Science and Economics among others.

PROGRAM IN RADIOLOGICAL HYGIENE

Radiological Hygiene is that area of science devoted to the protection of man and his environment from undue radiation exposure and the promotion of the use of nuclear energy to the benefit of mankind. The objectives of the program are to provide competent professional personnel to meet the increasing demand for radiological health specialists in the various environmental protection agencies, AEC facilities, the military, universites, industries, and hospitals. This program is focused primarily on the physics of radiation protection. The general fields of radiobiology and public health are covered comprehensively. It is a cooperative venture between the two campuses: The University of North Carolina at Chapel Hill and the North Carolina State University in Raleigh. Students may enter through either campus. Individual project work in medical radiation physics can be done with the Department of Radiology of the School of Medicine at Chapel Hill.

ILLUSTRATIVE ONE-YEAR PROGRAM IN RADIOLOGICAL HYGIENE (MSPH)

Summer Alternate[1]

ENVR	118	Quantitative Studies for Environmental Sciences	5
ENVR	164	Field Operations in Radiological Hygiene	3
			8

Fall Semester

BIOS	105, or	Principles of Statistical Inference, or	3
BIOS	135	Probability and Statistics	4
EPID	160	Principles of Epidemiology	2
ENVR	162	Modern Physics for Environmental Sciences	3
ENVR	163	Radiation Instrumentation	3
ENVR	241	Mechanics of Aerosols	3
			14-15

Spring Semester

ENVR	261	Radiation Biophysics	3
ENVR	263	Radiation Hazards Evaluation 1	3
ENVR	160, 260	Reading or Problems	3
GEN	532 (NCSU)	Biological Effects of Radiation	3
PY	520 or	Physical Measurements in Radioactivity	3
NE	518 (NCSU)	Radiological Safety	3
			15

1. The assignment of the pre- or post-summer alternate depends on the undergraduate preparation of the student.

Summer Alternate[2]

ENVR	211	Environmental Management	3
ENVR	160, 260	Reading or Problems	6
ENVR	262	Health Physics	3
			12

ILLUSTRATIVE TWO-YEAR PROGRAM IN RADIOLOGICAL HYGIENE (MSPH)

1st Year—Fall Semester

BIOS	135, or	Probability and Statistics, or	4
BIOS	105	Principles of Statistical Inference	3
ENVR	162	Modern Physics for Environmental Science	3
ENVR	163	Radiation Instrumentation	3
ENVR	131, or	Environmental Biology, or	3
PHYS	191	Mathematical Methods of Theoretical Physics I	3
			12-13

Spring Semester

ENVR	261	Radiation Biophysics	3
ENVR	263	Radiation Hazards Evaluation 1	3
ENVR	160, 260	Reading or Problems	2
GEN	532 (NCSU)	Biological Effects of Radiation	3
PY	520 or	Physical Measurements of Radioactivity	3
NE	518 (NCSU)	Radiological Safety	3
			14

Summer

ENVR	160, 260	Reading or Problems	6
ENVR	164	Field Operations in Radiological Hygiene	3
ENVR	262	Health Physics	3
			12

2nd Year—Fall Semester

EPID	162	Epidemiology in Environmental Health	2
ENVR	241	Mechanics of Aerosols	3
ZOOL	108	Ecology	4
PHYS	160, or	Introduction to Quantum Mechanics, or	3
BOTN	242	Radiation Ecology	
			12

Spring Semester

ENVR	115	Applied Electron Microscopy	3
ENVR	160, 260	Reading or Problems	3
PHYS	161	Nuclear and Particle Physics	4
	——	Elective	3
			13

2. The assignment of the pre- or post-summer alternate depends on the undergraduate preparation of the student.

Students who extend the Master's program over a two-year period have an opportunity to do an investigation in depth and to take additional courses available at UNC and NCSU. Generally, a Master's candidate may expect to spend a good part of one semester course work at NCSU.

DOCTOR OF PHILOSOPHY

The Department of Environmental Sciences and Engineering offers the Ph.D. Degree in each of the program areas.

Applicants without Master's Degrees are required to pursue the Ph.D. via a Master's degree. Students already possessing Master's degrees from other schools may be admitted directly to the Ph.D. or may be required to enroll for a Master's Degree in this Department, depending upon a review of the student's background by the Department faculty. In the latter approach, the time required to complete the Ph.D. would be slightly longer than if the student had been admitted directly to that program.

The University requires a minimum of four semesters of graduate study, at least two of which must be continuous at the University. Based upon past experience, actual residence time for completion of a Ph.D. program may be considered a minimum of two years following a Master's degree, with a median of three years.

Other specific requirements include a major in one of the program areas and a supporting program of at least 15 semester hours, (excluding seminar or research units, but preferably 21 semester hours) selected to be of maximum benefit in conduct of the research and preparation of the dissertation. The Department and the University require knowledge of one research skill or one language for the Ph.D.

Doctoral written and oral examinations customarily are given upon completion of course work and prior to initiating research for the dissertation. The defense of the dissertation is the final oral examination for the Ph.D.

EPIDEMIOLOGY

JOHN CHARLES CASSEL, B.S., M.B.B.Ch., M.P.H., Professor of Epidemiology
CAROLINE BECKER, A.B., M.D., Assistant Professor of Epidemiology
FRANK CORDLE, B.S., M.S., M.P.H., Ph.D., Assistant Professor of Epidemiology
JOAN CLAIRE CORNONI, B.A., M.P.H., Ph.D., Assistant Professor of Epidemiology
JOHN THOMAS FULTON, D.D.S., Professor of Epidemiology, Emeritus

FELIX GRUBER, B.S., M.P.H., M.D., Dr.P.H., Instructor in Epidemiology
CARL GROOVER HAYES, B.S., M.P.H., Ph.D., Adjunct Assistant Professor of Epidemiology
BARBARA SORENSON HULKA, B.A., M.S., M.D., M.P.H., Associate Professor of Epidemiology
MICHEL A. IBRAHIM, M.D., M.P.H., Ph.D., Associate Professor of Epidemiology
BERTON H. KAPLAN, B.S., M.S., Ph.D., Professor of Epidemiology
DAVID G. KLEINBAUM, A.B., A.M., Ph.D., Joint Appointment os Assistant Professor of Biostatistics and Epidemiology
LAWRENCE L. KUPPER, B.S., M.S., Ph.D., Joint Appointment as Assistant Professor of Biostatistics and Epidemiology
ANTHONY McMICHAEL, B.S., Ph.D., M.D., Assistant Professor of Epidemiology
ABDEL R. OMRAN, M.D., D.P.H., M.P.H., Dr.P.H., Professor of Epidemiology
RALPH CLINTON PATRICK, JR., A.B., A.M., Ph.D., Associate Professor of Epidemiology
MARK SHUMAN, B.S., Ph.D., Visiting Assistant Professor in Epidemiology (Joint Appointment in Environmental Sciences and Epidemiology)
CARL M. SHY, M.D., Dr.P.H., Adjunct Assistant Professor of Epidemiology
CECIL SLOME, M.B., Ch.B., D.P.H., Associate Professor of Epidemiology
HERMAN ALFRED TYROLER, A.B., M.D., Professor of Epidemiology
A. WOUTER VOORS, M.D., M.P.H., Dr.P.H., Associate Professor of Epidemiology
EDWARD H. WAGNER, A.B., M.D., M.P.H., Assistant Professor of Epidemiology
CAROLYN A. WILLIAMS, B.S.N., M.S., Ph.D., Assistant Professor of Epidemiology (Joint Appointment in School of Nursing and Department of Epidemiology)

Research Associates

FRANK JONES, B.S., M.D., M.P.H., Research Associate in Epidemiology
JO EADDY MAREADY, B.A., Research Associate in Epidemiology
GERALDINE TALAREZYK, B.S.N., M.S.N., Research Associate in Epidemiology

MASTER OF PUBLIC HEALTH

This is an 11-month program designed to provide a foundation in the use of epidemiology method in the study of health and disease. It is designed primarily for medical and dental graduates, but consideration will be given to others who are particularly interested and whose background of training and experience is suitable.

The core curriculum required by the School of Public Health for this degree includes:

a) PUBH 100: Ecology of Human Health

b) One course in Epidemiology

c) One course in Biostatistics

d) One course in Health Administration (HADM 100 or 110) (HEED 130, 110, 133, 206) Health Education or in Environmental Sciences and Engineering (ENVR 101)

e) One further course outside the department in which the student is majoring.

Beyond this core the faculty adviser and the student design a curriculum to meet the needs of each student individually. This usually includes a sequence of Epidemiology courses and a number of courses in Biostatistics. Other courses are available either in the School of Public Health, other Schools in the Division of Health Sciences, or elsewhere in the University (e.g., Departments of Sociology, Psychology, and Information Science). In developing this curriculum, it is expected that each student should be able to identify the major issues in his field of interest, and that he and his adviser would then jointly determine the areas of competence needed to solve these issues. A final written examination and a master's thesis are also required by the Department of this degree. On one or two special days set aside during the summer session all master students present their completed work on the Master's Presentation Day.

MASTER OF SCIENCE IN PUBLIC HEALTH

The requirements for admission and for the degree are listed on page 41 of this catalogue.

The program of study usually requires a more extended period of residence, and is intended primarily for students without the usual professional background who wish to specialize in depth in a particular area. This program is more flexible than other master's programs both in terms of courses required by the School of Public Health and the length of time of residence.

Ecology of Human Health (PUBH 100) or Man and His Environment (ENVR 111), and at least two courses in the sciences of public health must be taken outside the Department of Epidemiology. M.S.P.H. students must complete the final written examination and present their completed work with other Masters students on Master's Presentation Day.

Required Courses

PUBH	100	Ecology of Human Health (3)
BIOS	103	Management of Public Health Data (2)
BIOS	105	Principles of Statistical Inference (3)
EPID	160	Principles of Epidemiology (3)
		or
EPID	161	Epidemiology in Population Dynamics and Family Planning (3)
EPID	162	Epidemiology in Environmental Health (3)
BIOS	287	Statistical Methods in Epidemiology (3)
EPID	230	Applied Methods in Epidemiology and Health Services Research (4)
[1]EPID	231	Epidemiologic Research in Personal Health Services (3)
[1]EPID	240	Alcohol Behavior and Health (2)
[1]EPID	241	Research Methodology in Alcoholic Usage (2)

1. Students will be encouraged to take any one of these courses. The choice will depend on the discipline of the student.

[2]EPID	260	Epidemiological Foundations for Disease Control Programs (3)
[2]EPID	262	Epidemiology of Program Acceptance (2)
[2]EPID	264	Culture and Health (3)
EPID	265	History of Epidemiology (3)
EPID	266	Epidemiology Investigation (3)
[2]EPID	368	Evaluative Research Methods (2)
HADM	110	Concepts of Health Administration (3)
		or
ENVR	101	Political, Economic, and Social Perspective on Health Administration (2)
HEED	130	Principles of Public Health Education (2)

Electives[3]

EPID	140	Problems in Epidemiology (1 or more)
	141	
EPID	168	Behavioral Science Measurement in Health Programs and Research (3)
EPID	211	Determinants of Communicable Disease (2)
HADM	212	Principles of Chronic Disease Control (2)
HADM	170	Personal Health Services Administration (2)
HADM	230	Dental Public Health Practice (3)
HADM	220	Veterinary Medicine and Public Health (2)
HADM	211	Control of Communicable Diseases (2)
MHCH	210	Maternal and Child Health I (3)
HADM	202	Seminar in Public Health Administration (1 each)
	203	
	204	
HADM	231	Seminar in Dental Public Health Practice (2)

DOCTOR OF PUBLIC HEALTH

This program, designed for those students interested in careers as professional epidemiologists, is available to physicians, dentists, social scientists, and biometricians. The program is entirely research oriented, and in additon to the admission requirements indicated on page 44 of this catalogue, each applicant has to satisfy the faculty as to his research interest and potentiality.

Each student's program is individually planned, centering around a major research project, and there are no fixed curriculum requirements. The Graduate School Handbook contains most of the rules and regulations adhered to by the Departments of Epidemiology.

DOCTOR OF PHILOSOPHY

This program is similar in many respects to the program leading to the degree of Doctor of Public Health. It is a more stringent program, however, in that in addition to the requirement for a research dissertation of high calibre, all the course requirements

2. Students will be encouraged to take any one of these courses. The choice will depend on the discipline of the student.

3. Additional elective courses can be arranged within the School of Public Health or in other schools within the University after consultation with the faculty members.

and language requirements specified by the Graduate School have to be met. (See Graduate School Catalogue and Graduate School Handbook).

HEALTH ADMINISTRATION

SAGAR C. JAIN, B.A., M.A., M.S., Ph.D., Professor of Health Administration and Department Head

MOYE WICKS FREYMANN, B.S., M.D., M.P.H., Dr.P.H., Professor of Health Administration and Director, Carolina Population Center

JOHN T. GENTRY, A.B., B.S., M.D., M.P.H., Professor of Health Administration

HERMAN E. HILLEBOE, B.S., B.M., M.D., M.P.H., Adjunct Professor of Health Administration

JOHN THOMAS HUGHES, B.S., D.D.S., M.P.H., Dr.P.H., Professor of Health Adminstration

FRANK E. LAW, D.D.S., M.P.H., Visiting Professor of Health Administration

WILLIAM FRED MAYES, B.S., M.D., M.P.H., Professor of Health Administration

KIRK T. MOSLEY, B.A., M.D., M.P.H., Dr.P.H., Adjunct Professor of Health Administration

HARRY T. PHILLIPS, M.D., D.P.H., Professor of Health Administration and Director of UNC Program in Health Planning

LEONARD S. ROSENFELD, B.S., M.D., M.P.H., Professor of Health Administration and Director, UNC Program in Health Services Evaluation

MORRIS SCHAEFER, B.S., M.A., D.P.A., Professor of Health Administration

JERRY ALAN SOLON, A.B., M.A., Ph.D., Visiting Professor of Health Administration

JOHN JOSEPH WRIGHT, A.B., M.D., M.P.H., Professor of Health Administration, Emeritus

JAMES ELMORE ALLEN, B.A., S.T.B., M.S.P.H., Ph.D., Associate Professor of Health Adminstration

B. J. CAMPBELL, B.A., M.A., Ph.D., Adjunct Associate Professor of Health Administration and Director, University of North Carolina Highway Safety Research Center

ABRAHAM S. DAVID, B.S., M.S., Ph.D., M.S.PH., Adjunct Associate Professor of Health Administration and Senior Population Economist RTI

WILLIAM SHOEMAKER FLASH, A.B., M.P.A., Ph.D., Associate Professor of Health Administration

O. DAVID GARVIN, M.D., M.P.H., Adjunct Associate Professor of Health Administration

THOMAS L. HALL, M.D., M.P.H., Dr.P.H., Associate Professor of Health Administration and Deputy Director, Carolina Population Center

MARTIN PATTERSON HINES, D.V.M., M.P.H., Adjunct Associate Professor of Health Administration and Director, Division of Epidemiology, North Carolina State Board of Health

LYDIA SAY HOLLEY, A.B., R.P.T., M.P.H., Associate Professor of Health Administration

ALBERT L. JOHNSON, B.A., M.A., M.P.H., Ph.D., Associate Professor of Health Adminstration

WILLIAM BURNS JONES, B.S., M.D., M.P.H., Adjunct Associate Professor of Health Adminstration and Assistant State Health Officer, North Carolina State Board

ARNOLD DANIEL KALUZNY, B.A., M.H.A., Ph.D., Associate Professor of Health Adminstration

FLORENCE KAVALER, B.A., M.D., M.S., M.P.H., Adjunct Associate Professor of Health Adminstration

JACOB KOOMEN, B.S., M.D., M.P.H., Adjunct Associate Professor of Health Administration and State Health Officer, N. C. State Board of Health

ERNEST A. PEARSON, JR., A.B., D.D.S., M.P.H., Adjunct Associate Professor of Health Adminstration and Director, Dental Health Division, North Carolina State Board of Health

ROBERT SMITH, B.A., B.A.O., B.Ch., M.A., M.D., Associate Professor of Health Administration and Professor of Family Medicine

JAMES E. VENEY, B.A., M.S., Ph.D., Associate Professor of Health Administration

PATRICIA F. WALLER, A.B., M.S., Ph.D., Associate Professor of Health Administration

DAVID G. WARREN, A.B., J.D., Adjunct Associate Professor of Health Administration and Associate Professor of Public Law and Government

JANICE R. WESTABY, B.S., M.P.H., Adjunct Professor of Health Administration

PATRICIA Z. BARRY, B.A., M.A., Dr.P.H., Assistant Professor of Health Administration

CHESTER W. DOUGLASS, D.D.S., M.P.H., Assistant Professor of Health Administration and Assistant Professor of Dental Ecology

GEORGE DUDNEY, B.S., D.D.S., M.P.H., Adjunct Assistant Professor of Health Adminstration and Assistant Director, Dental Health Divison, N. C. State Board of Health

ROBERT L. FREY, JR., B.A., M.A., Ph.D., Visiting Assistant Professor of Health Administration

JEROME B. HALLAN, B.S., M.S.P.H., Dr. P.H., Adjunct Assistant Professor of Health Administration

CHARLES L. HARPER, B.A., M.S.P.H., Ph.D., Assistant Professor of Health Administration and Associate Dean, School of Public Health

WILLIAM THEODORE HERZOG, B.A., M.S.P.H., Assistant Professor of Health Administration and Director of Continuing Education in Health Sciences

MARGARET L. MOORE, B.S., Cert.P.T., M.S., Ed.D., Assistant Professor of Health Administration and Director of Division of Phyiscal Therapy

ROBERT M. MORONEY, A.B., M.S.W., M.S.H., Ph.D., Assistant Professor of Health Administration and Asistant Professor of City and Regional Planning

DIRK J. SPRUYT, B.A., M.D., M.P.H., Assistant Professor of Health Administration

DAVID L. ZALKIND, B.A., M.S., Ph.D., Assistant Professor of Health Administration

DAN EDWARD BEAUCHAMP, B.A., M.A., Visiting Instructor in Health Administration

LAUREL FILES GOOCH, B.A., M.A., Intructor in Health Administration

ROBERT A. LODDENGAARD, B.E.E,. M.S.P.H., Instructor in Health Administration

ROBERT BURNS MOORHEAD, B.A., M.P.A., Instructor in Health Administration and Asistant Dean, School of Public Health

JOHN RODAK, JR., A.B., S.M., Instructor in Health Administration and Assistant Director, UNC Program in Health Services Evaluation

JANE B. SPRAGUE, B.A., M.A., Instructor in Health Administration

JEANNE B. STILLMAN, B.A., M.S.P.H., Instructor in Health Administration

EDWARD STONE TRAINER, A.B., M.S.P.H., Instructor in Health Administration

ELTON KESSEL, B.A., M.D., M.P.H., Lecturer in Health Administration

I. OSCAR WEISSMAN, M.D., M.P.H., Lecturer in Health Administration

The Department of Health Administration prepares graduate students for careers in health administration with emphasis on

planning, organizing and managing health services at the local, state and federal levels. Because the health services industry is growing rapidly in size and complexity, our study programs stress innovation and creativity in a flexible curriculum designed to build on each student's unique background.

MASTER'S DEGREES

The Department offers two master's degree programs — the Master of Public Health (MPH) and the Master of Science in Public Health (MSPH). Both are normally twenty-one month programs. In special cases individuals with prior relevant graduate training, such as M.D., D.D.S., M.B.A., etc., or at least three years' experience in a responsible administrative position in a health program may complete degree requirements in eleven months.

Programs of Study: Master's Level

The educational program at the master's level is designed to develop broadbased health administrators who have a sound understanding of issues in the delivery of health services, and who have abilities and skills to develop, organize, manage and evaluate health services. Realizing that students come with diverse backgrounds and career goals, opportunities and facilities are offered to permit them to design their learning experience to suit their special needs. To this end, required courses are kept to a minimum, and opportunities are provided for exemption of these courses through special examinations as well as through establishment of equivalency. Also, students are encouraged to take advantage of courses offered by other departments in the school, departments outside the school, as well as at Duke University at Durham and North Carolina State University at Raleigh.

The Department offers a wide variety of courses and a student, if he chooses, could gain depth in his learning in the following interest areas:

Organizational behavior
Systems analysis and operations research
Health policy
Health planning and evaluation
Research methods in health administration
Local health services administration
Comparative and international health systems
Community rehabilitation services administration

Medical care program administration
Family planning program administration
Accident and injury control program administration
Dental public health program administration

Through interdepartmental arrangements the student may focus on additonal areas, such as community psychiatry and mental health administration, maternal and child health services administration, environmental health program administration, hospital and institutional management.

To permit flexibility in the curriculum of its students, emphasis is not on requiring specific courses. Instead, emphasis is on ensuring balanced learning through establishing standards for content requirements. For this purpose, for the 21-months study program, students are required to take a minimum of 12 semester hours of courses in Administrative Theory and Methods, and 12 semester hours of courses in Health Delivery Systems. In addition, students are required to undergo a minimum period of field training (12 weeks during the summer) and write a scholarly research-based report. The training program for those who qualify to complete the master's degree in less than 21-months is developed individually.

It should be pointed out that all master's degree students have to take the following school required courses:

MPH Degree			**MSPH Degree**
PUBH	100	Ecology of Health (3)	One 3-credit course in ecology of health from the list of approved courses (PUBH 100, ENVR 101, HADM 111)
BIOS	100	Public Health Statistics (3)	
EPID	160	Principle of Epidemiology (2)	Two courses in sciences of public health
ENVR	101	Elements of Environment Health (2) or one approved course in Health Education	

DOCTOR OF PUBLIC HEALTH DEGREE

The doctoral program (Dr.P.H.) prepares academicians and high level health administrators. Open to individuals with an MPH or master's degree in related fields, the program normally requires two years of course work and a dissertation. Each doctoral student works under the guidance of his doctoral committee made up of at least five members of the faculty. These committees guide and supervise their respective students in selection of courses and research projects.

Special Curricula

The Department offers special curricula for masters level training in two specialized health career areas: health administrators (non-medical) for local health agencies, and comprehensive health planning. Both are designed to be 21-months programs of study. Details are available on request.

The Department also offers a part-time off-campus master's degree program designed for employees of state and local health and health related agencies.

ADMISSIONS

The Department encourages individuals with training and experience in the fields of health, administration, behavioral sciences, social sciences, humanities, law, engineering, and mathematics to apply. Each year approximately forty students enter the study programs. Details regarding school requirements for admission to the three degree programs are to be found in an earlier part of this Record (see pages 39-43). In addition, the Department requires GRE general aptitude scores, TOEFL scores (applies to only those students whose mother tongue is other than English, three references, and "supplementary information sheet" as a part of application for admission).

Applications must be received by March 15 for admission in the following fall semester. Midyear admissions are rare, made only as exceptions.

FELLOWSHIPS

Traineeships and other financial assistance are available to qualified applicants on a competitive basis, following admission.

COURSES OFFERED IN DEPARTMENT OF HEALTH ADMINISTRATION

HADM	100	Concepts of Health Administration (3)
HADM	101	Political Economic and Social Perspectives on Health Administration (2)
HADM	102	Legal Basis of Public Health Practice (2)
HADM	103	Introduction to Modeling (2)
HADM	110	Elements of Health Administration (2)

HADM	111	Human Ecology and Health Systems (3)
HADM	130	Dental Public Health (2)
HADM	140, 141 142, 143	Problems in Health Administration (1 or more)
HADM	160	Population Policy (2)
HADM	162	Ethical Issues in Health Policies in Contemporary Medicine (3)
HADM	170	Personal Health Services Administration I (2)
HADM	180	Health Planning Perspectives (2 or more)
HADM	200	Planning of Community Health Services I (3)
HADM	201	Planning of Community Health Services II (2)
HADM	202, 203, 204	Issues in Health Administration (1 or more)
HADM	205	Research Methodology in Health Administration (2)
HADM	206	Field Work in Community Health Administration (4 to 16)
HADM	207	Field Training in Health Administration (12)
HADM	208	Finance and Personnel Administration (2)
HADM	209	Rational Models for Decision Making in Health: A Social System View (2)
HADM	211	Control of Communicable Diseases (2)
HADM	212	Chronic Illness and Alternatives in Long Term Care (2)
HADM	214	Introduction to Occupational Health (2)
HADM	220	Administrative Epidemiology: Animal-Related Problems (2)
HADM	230	Dental Public Health Practice (3)
HADM	231	Issues in Dental Public Health Practice (2)
HADM	240	Trends in Community Rehabilitation Services (2)
HADM	241	Rehabilitation Services in Community Health (3)
HADM	250	Approaches to Injury Control (2)
HADM	251	Issues in Injury Control (3)
HADM	260	Family Planning Program Development (3)
HADM	264	Advanced Studies in Population Policy Development (2)
HADM	265	International Organization in Population Policy and Programs (2)
HADM	266	United States Health Policy (2-3)
HADM	270	Personal Health Services Administration II (2)
HADM	271	Health Facilities Administration (2)
HADM	272	Social Psychological Aspects of Health Care (2)
HADM	273	The Economics of Health Care (2)
HADM	275	Politics and Government in Health Administration (2)
HADM	280	Comprehensive Health Planning (2 or more)
HADM	289	Health Manpower Planning: Methods and Issues (2 or more)
HADM	300	Research in Community Health Administration (2 or more)
HADM	304	Seminar in Teaching of Health Administration (3)
HADM	305	Research in Medical Care Administration (2 or more)
HADM	312	Research in Chronic Disease Control Methods (2 or more)
HADM	314	Advanced Seminar on Organizational Behavior of Health Institutions (2)
HADM	315	Qualitative Analysis of Inter-Organizational Relations (3)
HADM	316	Organizational Effectiveness and Analysis (2)
HADM	330	Research in Dental Disease Control Methods (2 or more)
HADM	360	Research in Organization and Administration of Fertility Control Programs (2 or more)
HADM	373	Seminar in Health Services Administration (2)
HADM	380	Seminar in Comprehensive Health Planning (3)

HEALTH EDUCATION

GUY W. STEUART, M.A., M.Ed., M.P.H., Ph.D., Professor of Health Education
RALPH H. BOATMAN, JR., B.S. Ed.,M.P.H., Ph.D., Professor of Health Education
GODFREY M. HOCHBAUM, B.A., M.A., Ph.D., Professor of Health Education
LUCY SHIELDS MORGAN, A.B., M.A., M.S., Ph.D., Professor of Health Education, Emeritus
EUNICE NICKERSON TYLER, Ph.B., M.P.H., Ph.D., Professor of Health Education, Emeritus
PHILIP J. EPLING, B.A., M.A., Ph.D., Associate Professor of Health Education
[1]ROSEMARY MAY KENT, B.A., M.A., M.P.H., Ph.D., Associate Professor of Health Education
LOUIS JOSEPH NIDORF, B.A., M.A., Ph.D., Associate Professor of Health Education
[2]NORBERT LAWRENCE KELLY, JR., A.B., M.A., Ph.D., Adjunct Associate Professor of Health Education
K. V. RANGANATHAN, M.B.B.S., B.S.Sc., M.P.H., Adjunct Associate Professor of Health Education
NADINE H. RUND, B.A., Ph.D., Adjunct Associate Professor of Health Education
TAKEY CRIST, A.B., M.D., Assistant Professor of Health Education
LEONARD H. DAWSON, A.B., M.S.P.H., Assistant Professor of Health Education
JOHN C. KEY, B.S., M.S.P.H., M.S.W., Ph.D., Assistant Professor of Health Education
DONALD R. DANCY, B.S., M.P.H., Adjunct Assistant Professor of Health Education
GRACE H. DANIEL, A.B., M.S.P.H., Adjunct Assistant Professor of Health Education
ELMER M. JOHNSON, B.S., M.P.H., Adjunct Assistant Professor of Health Education
HARRIET HYLTON BARR, A.B., M.P.H., Instructor (part-time) in Health Education
JOHN WESLEY HATCH, B.A., M.S.W., Instructor in Health Education
ROBERT R. BLAKE, A.B., M.A. Lecturer in Health Education
GERALD W. GENTRY, B.A., M.P.H., Lecturer in Health Education
JANIS P. NEWTON, B.F.A., M.F.A., M.Ed., Lecturer in Health Education
JEROME KIRK, B.A., Ph.D., Adjunct Associate Professor of Health Education
FAY WALKER, A.B., M.S.W., Lecturer in Health Education
ERIC MICHAUX, LLB., Adjunct Professor of Health Education
WILLIAM DARITY, B.S., M.P.H., Ph.D., Visiting Professor in Health Education

The Department of Health Education is concerned with health related social and behavior change and with the health implications of community action, development and education programs with a special interest in cross-cultural and international settings.

Within certain general but well-defined constraints, the student is expected to take a major responsibility for his own program of studies, research and experience.

Besides the level of previous academic achievement, special consideration is given to members of U. S. minority groups, returned

1. Resigned September 15, 1972.
2. Died March 28, 1973.

Peace Corps volunteers, foreign nationals and others with special life or work experience.

There are four graduate programs:

1. The Master of Public Health: The basic qualification for the professional health education specialist. It prepares candidates for professional roles in community action, development and education programs of health and allied agencies both domestic and international.
2. The Doctor of Public Health: A professional and research degree. It prepares candidates for administrative, consultative and evaluative research roles in community health education and for faculty teaching and research positions in public health and other professional schools.
3. The Master of Science in Public Health: A more specialized degree with particular emphasis on evaluation and research. It may be a terminal degree but commonly will be a prelude to the Doctor of Philosophy program. As a terminal degree it prepares candidates for specialized roles (e.g., mass media, personnel development) in community health education and development programs.
4. The Doctor of Philosophy: A basic social science and research degree. It prepares candidates primarily for teaching and research careers in universities and professional schools and for consultative roles relevant to community health education and development.

MASTER OF PUBLIC HEALTH

The general requirements for admission are set forth on pages 39-41. Particular requirements of this department include a minimum of four courses in psychology, sociology, anthropology and/or political science, at least one of these to be an advanced course. The candidate would preferably have a minimum GPA of 3.0 for previous courses in the above areas.

The minimum period of study is three semesters and two summer sessions in continuous full-time residence, admissions being only in the fall of each academic year.

All students are required to have field work experience in a selected community which is continuous throughout the program.

In addition to the School requirements, the following program of study is the minimum departmental requirements:

HEED	130	Principles of Health Education
HEED	209	Units of Practice I: Individual, small group and network
HEED	210	Units of Practice II: The Community
HEED	240	Field Work: Introduction to Community Action
HEED	241	Field Work: Program Planning and Design
HEED	242	Field Work: Program Development and Community Action
HEED	243	Field Work: Advanced Community Health Development
HEED	244	Field Work: Evaluation
HEED	250	Evaluation in Health Education
HEED	254	Personnel Development
HEED	222	Professional Practice

DOCTOR OF PUBLIC HEALTH

The prerequisite is possession of the MPH degree or equivalent. Candidates for this program are normally expected, however, to have an outstanding academic record in their prior undergraduate and graduate programs.

The minimum period of study is full-time residence of two academic years (four semesters and four summer sessions).

In addition to certain generally required substantive areas of study to be selected in consultation with the adviser, emphasis is placed on methods of evaluative research in field settings.

MASTER OF SCIENCE IN PUBLIC HEALTH

The general requirements for admission are set forth on pages 41-43. The usual requirement is a prior major in the social sciences, but certain exceptions are acceptable.

The minimum period of study is three semesters and two summer sessions in full-time residence.

DOCTOR OF PHILOSOPHY

The prerequisite is normally the M.S.P.H., but candidates with Masters Degrees in the social sciences will also be considered.

Candidates are normally expected to have an outstanding academic record in their prior undergraduate and graduate programs.

The minimum period of study is full-time residence of two academic years (four semesters and four summer sessions).

This is a more specialized degree than the Dr.P.H. and besides advanced knowledge in selected substantive areas of the social sciences, emphasis is placed on basic research relevant to health related social and behavior change both planned and unplanned.

MATERNAL AND CHILD HEALTH

EARL SIEGEL, B.S., M.D., M.P.H., Professor of Maternal and Child Health
SIDNEY SHAW CHIPMAN, B.A., M.D., M.P.H., Professor Emeritus of Maternal and Child Health
C. ARDEN MILLER, M.D., Professor of Maternal and Child Health
[1]ROBERT W. NOYES, A.B., M.D., Professor of Maternal and Child Health
EARL SCHAEFER, B.S., M.A., Ph.D., Professor of Maternal and Child Health
J. RICHARD UDRY, B.S., M.A., Ph.D., Professor of Maternal and Child Health
KARL E. BAUMAN, A.B., M.A., Ph.D., Associate Professor of Maternal and Child Health
ELIZABETH M. EDMANDS, R.N., B.S.P.H., M.A., Associate Professor of Maternal and Child Health
GERALDINE GOURLEY, Ph.B., M.S.W., Associate Professor of Maternal and and Child Health
JAROSLAV FABIAN HULKA, B.S., M.D., Associate Professor of Obstetrics and Gynecology and Maternal and Child Health
NAOMI MINNER MORRIS, B.A., M.D., M.P.H., Associate Professor of Maternal and Child Health
E. BARBARA STOCKING, R.N., B.S., M.P.H., Associate Professor of Maternal and Child Health
ROBERT A. GREENBERG, A.B., M.D., Assistant Professor of Maternal and Child Health
LYNN K. KNAUFF, B.A., M.S.P.H., Assistant Professor of Maternal and Child Health
FRANZ WESTON ROSA, B.S., M.D., M.P.H., Adjunct Professor of Maternal and Child Health
SARAH TAYLOR MORROW, B.S., M.D., M.P.H., Adjunct Associate Professor of Maternal and Child Health
THEODORE D. SCURLETIS, B.A., M.D., Adjunct Associate Professor of Maternal and Child Health
SANDRA BERRY, B.S., M.S.N., M.S.P.H., Lecturer in Maternal and Child Health
PATRICIA GUSTAVESON, A.B., M.S.W., Lecturer in Maternal and Child Health
FRANK ALOYSIUS LODA, B.A., M.D., Lecturer in Maternal and Child Health
EVA SALBER, M.B., D.P.H., M.D., Lecturer in Maternal and Child Health
[1]CHARLES L. CHASE, B.S., M.S.P.H., Research Associate in Maternal and Child Health
[1]MARVIN I. LEVY, B.B.A., M.A., Research Associate in Maternal and Child Health

The Department of Maternal and Child Health is strongly committed to improve health care for mothers and children. The teaching program prepares physicians, nurses, social workers and others for a wide range of challenging career opportunities. Stimulating learning experiences are enhanced by the multidisciplinary make-up of faculty and students.

Courses of study and practice may be planned for those anticipating pursuing careers traditionally identified with the field: maternity services, child care and development, services for handicapped children and family services. Programs may also be plan-

1. Resigned May 31, 1973.

ned for careers that are based in precepts derived from maternal and child health. Examples include family planning, comprehensive health care, and some aspects of community development. Within recent years particular attention has been paid to mechanisms through which communities and consumer groups can be assisted in identifying and meeting their own needs.

Efforts are made to organize each student's program in terms of his previous experiences, special needs and professional goals. A student may elect to emphasize teaching, training, research or preparation for leadership roles in community service programs. Within these broad areas of interest, specialized skills may be developed for functions which include planning, program development, administration and evaluation.

PROGRAM DESIGN

All departmental programs utilize lectures and seminars together with carefully selected field assignments which provide opportunities to examine a variety of relevant community programs. These student-faculty seminars and small group tutorials are directed towards preparation of students to assume leadership roles. A favorable faculty-student ratio is maintained. Exposure to research methodology is provided for all students.

The major elements of each program are indicated below.

Core Courses—Courses in biostatistics, epidemiology and human ecology are required of all students in order to provide knowledge and skills in the sciences which are basic to public health. Foundation courses in maternal and child health and child health and child development and/or family planning are also required.

Elective Courses—Courses may be drawn from many departments of the University in designing individual programs of elective studies appropriate to career needs.

Field Work—Community based learning experiences are an internal part of the educational program. Field work assignments are individually tailored by the student and faculty advisor.

A rich variety of multi-disciplinary programs associated with the University of North Carolina provides opportunity for students to develop special interests. These include the Health Services Research Center, Carolina Population Center, Division for Disorders of Development and Learning, Frank Porter Graham Child De-

velopment Center, Area Health Education Centers, North Carolina State Board of Health, and a rural program of community development and comprehensive health services.

MASTER'S LEVEL DEGREES:

Students with major interest in the broad field of maternal and child health pursue a program leading to the Master of Public Health degree. Students having a special interest in family planning and population studies or in child care and development may follow a more specialized program which leads to the Master of Science in Public Health degree.

Programs usually cover two sixteen-week semesters and a twelve-week summer period. Students without prior health professional education are required to extend their program by an additional semester, thus providing for sixteen months of study leading to the masters degree. In selected instances, nurses with little professional nursing experience will pursue programs of study which are sixteen months in length. Course sequencing restrictions require students to enter the program in the fall semester.

A specially designed program is offered jointly by the Departments of Maternal and Child Health and Health Administration, involving substantial work in both departments. The program of study is designed to cover twenty-one months.

ADMISSION REQUIREMENTS

All students must meet the university requirements as outlined on page 39 for Master of Public Health and on page 41 for the Master of Science of Public Health. Additional departmental requirements are the following:

1. Medicine. The degree of Doctor of Medicine (or its equivalent) is required. Training in obstetrics or pediatrics is helpful although some physicians enter their work in public health directly after medical school or in conjunction with preventive medicine or community medical care residences.

2. Nursing. The bachelor's degree in nursing from a school of nursing accredited by the National League for Nursing is required. Graduate education in obstetric or pediatric nursing is a desirable prerequisite. In selected instances experiences in obstetrics, pediatrics or maternal and child health nursing may be accepted in lieu of advanced training. Well qualified students without education or experience beyond the basic professional degree will be admitted in selected instances for a sixteen month program of study.

3. Social Work. The master's degree in social work is ordinarily required, although in exceptional situations persons with social work experience but no master's degree will be considered. Experience but no master's degree will be considered. Experience dealing with mothers and children, family planning or child care and development is helpful. Students who enter the program without this experience will be assisted in acquiring it through field placements and a course of study that are more extended than usual.

4. Other professionals. Dentists, physical therapists, teachers and other professional people with a background of interest in children, mothers, or family life will be considered.

5. Well qualified students may be admitted with no prior academic preparation in the health professions provided their career motivations are firm; these students enroll for a somewhat longer period of study than those who have had previous professional preparation.

DOCTOR OF PUBLIC HEALTH DEGREE:

The Department of Maternal and Child Health offers a Dr.P.H. in Maternal and Child Health in the following areas:

1. Child care and development and service programs to affect child care and development.
2. Human reproduction and service programs to affect human reproduction.

For selected individuals, who have previously earned the M.P.H. degree or its equivalent, this program provides an opportunity for:

1. further study of the biologic, cultural and environmental factors influencing the health of mothers and children and their families;

2. the development of investigative skills;

3. the application of knowledge, skills and techniques to the improvement of the health of mothers and children.

All requirements for the degree, as stated in the description of the Doctor of Public Health program on page 44 of the School of Public Health Catalogue. It is expected that the student will indicate upon admission which substantive area he will emphasize from the two listed above.

First Summer Session

MHCH	214	Field Training in Maternal and Child Health	6-8

Second Summer Session

MHCH	315	Seminar in Maternal and Child Health	1
MHCH	142	Problems in Maternal and Child Health	2-6

Electives

MENH	255	Consultation: A Public Health Method	2

MENTAL HEALTH

DOROTHEA CROSS LEIGHTON, A.B., M.D., Professor of Mental Health
J. WILBERT EDGERTON, B.S., M.A., Ph.D., Professor of Mental Health
WILLIAM G. HOLLISTER, A.B., B.S., M.D., M.P.H., Professor of Mental Health
ROBERT NEAL WILSON, B.A., Ph.D., Professor of Mental Health
WILLARD KENNETH BENTZ, B.A., M.S., Ph.D., Associate Professor of Mental Health
NORA FRANCES CLINE, B.S., M.L., R.N. Associate Professor of Mental Health
JOHN PATON FILLEY, B.S., M.D., Associate Professor of Mental Health
ROLF PETER LYNTON, B.Sc. (Econ.), M.A., Ph.D., Associate Professor of Mental Health
BETTY EDENFIELD COGSWELL, A.B., M.S., Ph.D., Assistant Professor of Mental Health
MARIAN SMALLEGAN, A.B., M..A,, Ed.D., Assistant Porfessor of Mental Health

The Department of Mental Health offers programs designed to prepare students for practice, research, and teaching in public mental health. The Department requires that applicants have one full year of relevant work experience in order to be eligible for admission to the Mental Health Program of study. In the program, students are required to obtain firm grounding in the behavioral and biological sciences relevant to mental health, community organization, program development, and techniques of social psychiatric investigation. Supervised field experience and an acceptable thesis in community mental health are requisites for the degree. Individualized preparation is provided to meet the unique needs of students contemplating specific mental health careers in such areas as nursing, community mental health center direction, and social psychiatric research.

MASTER OF PUBLIC HEALTH

Required Courses

PUBH	100	Ecology of Human Health (3)
EPID	160	Principles of Epidemiology (2)
BIOS	100	Public Health Statistics (3)
MENH	210	Foundation for Mental Health Practice (3)
	211 (3)	
	212 (3)	

MENH	301	Mental Health Seminar I (2)
MENH	255	Consultation: A Public Health Method (2)
or		
MENH	257	Consultation with Large Systems (3)
MENH	302	Mental Health Seminar II (2)
MENH	393	Masters Theses (0-6)
HADM	100	Concepts of Health Administration (3)
or		
HADM	110	Elements of Health Administration (2)

Electives (Illustrative List)

EPID	264	Culture and Health (3)
SOCI	227	Theories of Personality (3)
EDUC	131	Adult Learning in Small Groups (3)
PHNU	197	Philosophy and Principles of Supervision (3)
EPID	266	Epidemiological Investigation (3)
HEED	130	Introduction to Communication and Group Dynamics (3)
HEED	210	Community Development for Health Education (3)
HEED	221	School Health Education (2)
MHCH	200	Introduction to Maternal and Child Health (2)
MENH	133	Working in Small Groups (3)
MENH	303	Mental Health Seminar III (2)
MENH	280	Community Mental Health Field Practice (credits arranged)
HADM	170	Personal Health Services Administration (2)
SOCI	153	Social Structure (3)
ANTH	121	Culture and Personality (3)

MASTER OF SCIENCE IN PUBLIC HEALTH

This program is intended to prepare students for specialized work in public mental health. Degree requirements are similar to those for the Master of Public Health but are designed to provide more flexibility in the curriculum and an opportunity to cultivate strong individual interests. Examples of such specialized programs are concentrations in family planning and population dynamics, and in social psychiatric epidemiology. In most instances, candidates for the M.S.P.H. will require two years to complete a specialized course of study.

DOCTOR OF PUBLIC HEALTH

This degree is offered to candidates already holding a Master's degree in an appropriate subject area such as Public Health, Social Work, Education, Psychology. In case public health is a new field for the student, certain core courses will be required. The program conforms in general to the description in the School of Public Health Catalogue, with the following exceptions:

1. The course program requires a minimum of 24 semester hour credits beyond the master's level; and

2. At least two of the five members of the doctoral committee are to be drawn from outside the Department of Mental Health.

Candidates will be expected to demonstrate basic competence in three broad areas of work before receiving the degree:

A. Psychiatric epidemiology and the logic of program evaluation

B. Mental health policy planning and administration

C. Mental health education and consultation

Ordinarily the candidate will select one of these three areas for his most intensive advanced study and dissertation research. In addition to the resources within the Department, a close working relationship with other departments within the School and in the larger University enables students to draw on other important resources for realizing these objectives.

PARASITOLOGY AND LABORATORY PRACTICE

JOHN EDGAR LARSH, JR., B.A., M.S., Sc.D., Professor of Parasitology and Laboratory Practice

HILTON THOMAS GOULSON, A.B., M.S.P.H., Ph.D., Professor of Parasitology and Laboratory Practice

ROBERT BRIGGS WATSON, B.S., M.D., M.P.H., Professor of Parasitology and Laboratory Practice

NORMAN FRED WEATHERLY, B.S., M.S., Ph.D., Professor of Parasitology and Laboratory Practice

ELMER F. CHAFFEE, B.S., M.S.P.H., Ph.D., Associate Professor of Parasitology and Laboratory Practice

JAMES RICHARD HENDRICKS, B.S., M.S., Ph.D., Associate Professor of Parasitology and Laboratory Practice

JOHN K. READ, B.S., M.S., Ph.D., Associate Professor of Parasitology and Laboratory Practice

JUDY ROBERTA CLEM, B.A., M.P.H., Instructor in Parasitology and Laboratory Practice

BETTYE L. OWENS, B.S., M.P.H., Research Assistant

NANCY ROBERTS PAGANO, B.A., Research Assistant

LIBERO AJELLO, A.B., M.A., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

MARION M. BROOKE, A.B., M.A., Sc.D., Adjunct Associate Professor of Laboratory Practice (field)

CHARLES H. CALISHER, B.S., M.D., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

WILLIAM BAILEY CHERRY, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

WALTER R. DOWDLE, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

VULUS RAYMOND DOWELL, JR., B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)

JOHN C. FEELEY, A.B., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
ANDREW R. FODOR, B.A., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
JOHN E. FORNEY, B.A., M.A., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
JOHN W. FOSTER, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
MICHAEL L. FURCOLOW, B.A., M.D., M.A., Adjunct Associate Professor of Laboratory Practice (field)
LUCILLE K. GEORG, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
WILLIAM KAPLAN, B.S., M.P.H., D.V.M., Adjunct Associate Professor of Laboratory Practice (field)
LEO KAUFMAN, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
EDNA H. KNOTT, B.S., M.P.H., Adjunct Instructor of Laboratory Practice
LYNN GRAY MADDRY, B.S., M.S.P.H., Ph.D., Adjunct Associate Professor of Laboratory Practice
MAX D. MOODY, A.B., M.A., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
CLAUDE WAYNE MOSS, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
G. BRIGGS PHILLIPS, B.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
LEO PINE, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
ROSLYN Q. ROBINSON, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
CHARLES C. SHEPARD, B.S., M.S., M.B., M.D., Adjunct Associate Professor of Laboratory Practice (field)
W. DANIEL SUDIA, B.S., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
CORRINA SHERON SUTTON, B.A., M.P.H., Ph.D., Adjunct Assistant Professor of Laboratory Practice
CLYDE THORNSBERRY, B.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
H. MAC VANDIVIERE, A.B., M.A., M.D., Adjunct Associate Professor of Laboratory Practice (field)
KENNETH W. WALLS, A.B., M.S., Ph.D., Adjunct Associate Professor of Laboratory Practice (field)
HAZEL W. WILKINSON, B.S., M.S., Ph.D., Adjunct Assistant Professor of Laboratory Practice (field)

Teaching Assistants

MARTIN L. HAMILTON, B.S., M.A., M.S.P.H.
JOHN KLAAS II, B.S., M.S.P.H.
BENJAMIN Z. NGWENYA, B.S., M.P.H.,
ROGER S. STASIAK, B.A., M.S., M.S.P.H.
LESTER S. WHITLEY, B.S., M.S., M.S.P.H.

Graduate Assistants (Research)

MICHAEL W. KIMBERLY, B.S., M.P.H.,
DONALD R. STALONS, B.S., M.P.H.
REDOLFO ROMERO, B.S., M.P.H.

The Department of Parasitology and Laboratory Practice offers the following degree programs.

MASTER OF PUBLIC HEALTH

The requirements for admission and for the degree are listed on pages 39-41 of this catalogue. The program of study is intended primarily for those with experience in public health laboratory practice and requires a minimum of one academic year (nine months).

Required Courses

PUBH	100	Ecology of Human Health (3)
BIOS	100	Public Health Statistics (3)
EPID	160	Principles of Epidemiology (3)
ENVR	101	Elements of Environmental Hygiene (2)
HADM	220	Administrative Epidemiology: Animal-Related Problems (2)
PALP	134	Human Parasitology (4)
PALP	142	Problems in Public Health Laboratory Practice (2)
PALP	150	Public Health Bacteriology (3)
PALP	151	Public Health Virology (3)
PALP	333	Seminar in Public Health Laboratory Practice (1)

Electives

PALP	131	Parasitism and Human Disease (2)
PALP	232	Parasitological Methods (4)
PALP	234	Medical Entomology (3)
PALP	233	Malariology (3)
PALP	250	Public Health Laboratory Methods I (2)
PALP	251	Public Health Laboratory Methods II (5)
BIOS	105	Principles of Statistical Inference (3)
BIOS	287	Statistical Methods in Epidemiology (3)

MASTER OF SCIENCE IN PUBLIC HEALTH

The requirements for admission and for the degree are listed on pages 41-43 of this catalogue. The program of study requires a minimum of one academic year (nine months), and is intended primarily for those who plan to pursue a career in some phase of laboratory practice or who plan to proceed in a Doctor of Philosophy degree program.

Required Courses

BIOS	100	Public Health Statistics (3)
ENVR	111	Man and His Environment (3)
HADM	220	Administrative Epidemiology: Animal-Related Problems (2)
PALP	131	Parasitism and Human Disease (2)
PALP	134	Human Parasitology (4)
PALP	140	Problems in Parasitology (2)
PALP	232	Parasitological Methods (4)
PALP	233	Malariology (3)
PALP	230	The Nature of Parasitism (3)
PALP	234	Medical Entomology (3)
PALP	331	Seminar in Parasitology (1)

Electives

EPID	160	Principles of Epidemiology (3)
BIOC	100	Biochemistry for Students of Biology and Chemistry (4)
BIOS	287	Statistical Methods in Epidemiology (3)

DOCTOR OF PUBLIC HEALTH

The requirements for admission and for the degree are listed on pages 44-47 of this catalogue. The program of study in Public Health Laboratory Practice is planned individually for each student based on previous academic preparation, laboratory experience, future plans and personal interests. However, all students are required to take the following courses, and to gain research competence all must perform research activities on a one-half time basis for at least two semesters.

Required Courses

BIOC	101a, b	Biochemistry for Dental Students (4)
PALP	235	Problems in Public Health Laboratory Methodology (3)
PALP	250	Public Health Laboratory Methods I (2)
PALP	251	Public Health Laboratory Methods II (5)
PALP	260	Public Health Laboratory Management I (2)
PALP	261	Public Health Laboratory Management II (3)
PALP	333	Seminar in Public Health Laboratory Practice (1)
PALP	336	Research in Public Health Laboratory Methodology (3)

DOCTOR OF PHILOSOPHY

The course program leading to the Ph.D. degree may be taken on a major-minor basis between the Department of Parasitology and Laboratory Practice and one or more departments within the University. An applicant may elect to minor in Zoology, Botany, Bacteriology, or any other areas approved by his study committee. Under certain conditions, a student may be permitted to omit a formal program in a minor field. Each student's program is planned individually in terms of his previous preparation and experience, his future plans, and his interests.

Teaching experience is an essential part of professional training in this Department. Therefore, laboratory instruction equivalent to six contact hours a week for two semesters, or until teaching competence is acquired, is required of all Ph.D. candidates.

PUBLIC HEALTH NURSING

MARGARET BAGGETT DOLAN, B.S.P.H.N., R.N., M.A., LL.D. (Hon.), Professor of Public Health Nursing

MARGARET BLEE, R.N., B.S., M.Ed., Professor of Public Health Nursing, Emeritus

[1]RUTH WARWICK HAY, R.N., B.A., M.S., Professor of Public Health Nursing, Emeritus
ELIZABETH M. EDMANDS, R.N., B.S.P.H.N., M.A., Associate Professor of Public Health Nursing
MARION E. HIGHRITER, B.A., M.N., M.P.H., S.D. in Hyg., Associate Professor of Public Health Nursing
MARIE J. McINTYRE, R.N., B.S., M.S., M.S. Hyg., Associate Professor of Public Health Nursing
VIRGINIA MARGARET NELSON, B.A., R.N., B.S., M.P.H., Associate Professor of Public Health Nursing
E. BARBARA STOCKING, R.N., B.S., M.P.H., Associate Professor of Maternal and Child Health (Nursing)
JULIA DAY WATKINS, B.A., R.N., M.P.H., Associate Professor of Public Health Nursing
ANN CATON HANSEN, B.S., M.P.H., Associate Professor of Public Health Nursing, Emeritus
ELIZABETH STEPHENS HOLLEY, B.A., R.N., M.A., Adjunct Associate Professor of Public Health Nursing
IRENE D. COURTENAY, R.N., B.S., M.P.H.(I.H.), Assistant Professor of Public Health Nursing
ROSE GERALDINE GEORGE, R.N., B.S., M.S., Assistant Professor of Public Health Nursing
MARIE LOUISE LOWE, R.N., B.S., M.A., Ph.D., Assistant Professor of Public Health Nursing
MICHELINE F. BOYER, B.A., R.N., B.S., M.P.H., Instructor of Public Health Nursing
BEATRICE BELL MONGEAU, B.S.P.H.N., M.P.H., Instructor of Public Health Nursing
NANCY MARGARET WATSON, B.S., M.S., Instructor of Public Health Nursing

The programs in the Department of Public Health Nursing provide graduate study in public health nursing or occupational health nursing with the opportunity for each student to choose an area of concentration in one of the following: advanced practice, supervision, administration, teaching.

The curricula offered lead to the Master of Public Health degree or the Master of Science degree. The latter curriculum is offered jointly with the School of Nursing.

MASTER OF PUBLIC HEALTH

The curricula are designed to prepare the professional nurse for the scientific practice of public health. Contributory objectives to this primary purpose are (1) to deepen and strengthen the student's knowledge of the public health sciences, e.g., epidemiology, biostatistics, ecology of health, and administration; (2) to develop skill in the supervisory process by deepening and strengthening the student's knowledge of human behavior through supervised public health nursing practice; (3) to develop skill as a multidisciplinary team member in identifying and solving health prob-

1. Died June 3, 1972.

lems of individuals, group and communities; (4) to develop understanding and skill in scientific investigation; (5) to develop understanding and skill in administrative processes; (6) to assist the student in developing a philosophy of public health.

In addition to the requirements listed on pages 39-41 of this catalogue, an applicant must have completed appropriate undergraduate courses in public health nursing or graduated from a collegiate school of nursing accredited for preparation for public health nursing.

Students are admitted at the beginning of the fall semester. A minimum of two semesters and two summer sessions is required to complete the requirements for the degree.

The program of study for each student is planned in consultation with the student's faculty adviser dependent upon the student's choice of area of concentration, previous education, experience and career goals.

There are six (17-18 semester hours) required courses forming the public health and the nursing core of the curriculum. They are the following:

BIOS	100	Public Health Statistics (3)
EPID	160	Principles of Epidemiology (3)
PUBH	100	Ecology of Human Health (3)
PHNU	291	Planning Community Nursing Services I (3)
PHNU	292	Planning Community Nursing Services II (3)
		and one of the following:
HADM	100	Concepts of Health Administration (3)
HADM	110	Elements of Administration (2)
ENVR	101	Elements of Environmental Hygiene (2)
HEED	130	Principles of Health Education (2)
HEED	108	The Black Experience and Health Services (2)
HEED	133	Interpersonal and Group Relations (2)
HEED	206	Education and Social Change in Population Planning (2)

Students choosing supervision or advanced practice as an area of concentration must complete a minimum of one course in supervision and one course in advanced public health nursing practice. Those choosing administration of community nursing services must complete two of three courses including administrative theory and its application in public health nursing.

Students must complete a minimum of 35 semester hours. These hours include credit hours for an independent study which fulfills the degree requirement of a written report that deals with a subject relevant to public health.

The electives may be chosen from courses offered by any department in the School of Public Health, and departments and schools of the University. Courses frequently selected by students include the following:

Public Health Nursing: 140, 197, 198, 240, 296, 298, 299, 340, 396, 398
Health Administration: 100, 101, 102, 170, 200.
Health Education: 130, 133, 206.
Maternal and Child Health: 212, 215, 216, 217.
Mental Health: 255, 257.
Epidemiology: 262, 264, 266, 368.

MASTER OF SCIENCE

This curriculum is offered jointly by the School of Public Health and the School of Nursing. It is designed to prepare qualified candidates for advanced practice in public health nursing and teaching of public health nursing in colleges and universites.

The program is two academic years in length. Students must meet the Graduate School requirements for the Master of Science degree, including the preparation of an acceptable thesis. A total of 45 semester credit hours is required. Individual needs, professional background and career goals are considered in planning a program of study with each student.

The curriculum is organized around the following areas. The courses listed are illustrative of the program:

Nursing

PHNU 291—PLANNING COMMUNITY NURSING SERVICES I—3 credits
PHNU 292—PLANNING COMMUNITY NURSING SERVICES II—3 credits
Clinical electives—6 credits

Public Health

EPID 160—PRINCIPLES OF EPIDEMIOLOGY—2 credits
BIOS 100—PUBLIC HEALTH STATISTICS—3 credits
PUBH 100—ECOLOGY OF HUMAN HEALTH—3 credits

Research

NURS 275—METHODS OF NURSING RESEARCH—3 credits
NURS 393—MASTER'S THESIS—3-6 credits

Teaching

NURS 291—PRINCIPLES OF NURSING EDUCATION—3 credits
or
Other Curriculum Course
NURS 391—SEMINAR IN TEACHING IN NURSING—4 credits

Electives

Chosen to meet individual needs and interests—12 credits

MASTER OF PUBLIC HEALTH OR MASTER OF SCIENCE

In 1972-73 programs of study were first offered to prepare experienced occupational health nurses for leadership positions of administrator, consultant, supervisor or teacher in occupational health nursing and to prepare nurses for occupational health nurse practitioner positions. These provide specialization in occupational health nursing within the context of the Master of Public Health and Master of Science degrees. Flexible curricula permit the students to pursue specific areas of study based on educational needs and career goals in occupational health nursing while obtaining a broad background in public health, occupational health and occupational health nursing.

DEPARTMENT OF PUBLIC HEALTH NUTRITION

JOSEPH C. EDOZIEN, D.Sc., M.D., F.R.C.P. (Ed.), F.R.C. Path, Professor and Head
REBECCA B. BRYAN, M.S., M.P.H., Associate Professor
JOHN J. B. ANDERSON, M.A., Ph.D., Associate Professor
BOYD R. SWITZER, Ph.D., Assistant Professor
MARION ELIZABETH BRANNON, M.S., Assistant Professor
BRENDA M. CINES, M.A., Instructor
ELIZABETH W. JUKES, M.S., Adjunct Associate Professor
MARY HELEN McLACHLAN, M.A., Visiting Lecturer
CAROL JOAN FRITZ, M.A., Ed.D., Adjunct Assistant Professor

Field Counselors

LOIS EARL, Chief, Nutrition Services Division, Department of Human Resources, Government of the District of Columbia, Washington, D. C.
FRANCES HOFFMAN, Coordinator of Education, Division of Nutrition, Florida Department of Health, Jacksonville, Florida
DOROTHY WOODCOCK, Nutrition Consultant, Maine Department of Health and Welfare, Augusta, Maine
PATRICIA PLUMMER, Coordinator of Education, The Frances Stern Nutriton Center, Tufts University, New England Medical Center, Boston, Massachusetts
MARIA VIRGINIA CRUZ de LARA, Director, Division of Nutrition, Puerto Rico Department of Health, San Juan, Puerto Rico
JUDITH SYLVESTER, Coordinator of Education, Nutrition Section, Louisiana State Department of Health, New Orleans, Louisiana
CATHERINE COWELL, Director, The Bureau of Nutrition, New York City Department of Health, New York, N. Y.
ELIZABETH JUKES, Chief, Nutrition Section, N. C. State Board of Health, Raleigh, N. C.

1. **MPH Degree:** The program of study in the department of nutrition is designed to prepare students for careers in public health nutrition.

The academic and experience prerequisites are:

a. Completion with a satisfactory scholastic performance of

the bachelor's degree with a major in foods and nutrition or its equivalent from a college or university of recognized standing.

b. Experience (usually not less than 2 years) in nutrition or a field closely related to nutrition such as: public health or welfare (staff nutritionists), hospital dietetics, home economics education or child development.

A previous master's degree in Nutrition and/or experience in therapeutic nutrition including a dietetic internship are additional qualifications which are given favorable consideration in the selection of candidates for admission.

Graduates in medicine and dentistry are also eligible for admission.

The program requires two semesters and two summer sessions or an eleven-months period of study. It includes a six to eight weeks block of field training (NUTR 251).

Selected graduates having a bachelor's degree with a major in areas such as foods and nutrition, home economics education, biological sciences, social sciences or nursing may be admitted without work experience for training over an extended period of time. Such students can complete the requirements for the MPH degree in 18-24 months depending on previous training and background. This extended program includes clinical instruction and provides students with opportunites, through the offering of several departmental and non-departmental electives, to make up deficiencies in their previous background. Those students who have not received instruction in the basic courses in foods and nutrition, i.e. meal planning and preparation, food composition, family nutrition, experimental foods, and related subjects can obtain such training at the University of North Carolina at Greensboro either during the summer of the first year or during the summer prior to admission.

2. **Other Degree Programs:** Arrangements are in progress for courses leading to the Master of Science, Doctor of Philosophy and Doctor of Public Health degrees with a major in Nutrition. Inquiries for further information may be directed to the department.

Required Courses

PUBH	100	Ecology of Human Health (3)
BIOS	100	Public Health Statistics (3)
EPID	160	Principles of Epidemiology (2)
MHCH	200	Introduction of Maternal and Child Health I (2)
NUTR	200	Cell Biology (3)

NUTR	204	Nutrition and Human Health (3)
NUTR	206	Food Habits: Determinants and Techniques for Modification (3)
NUTR	208	Nutrition Programs and Services (3)
NUTR	251	Field Experience (8)
NUTR	393	Master's Thesis (3-6)

Elective Courses

HADM	100	Concepts of Health Administration (3)
HADM	110	Elements of Health Administration (2)
HEED	130	Principles of Public Health Education (2)
MENH	255	Consultation: A Public Health Method (2)
NUTR	140	Reading in Nutrition (1 or more)
NUTR	202	Nutritional Biochemistry (3)
NUTR	203	Food Science and Technology (2)
NUTR	207	Therapeutic Nutrition (3)
NUTR	240	Problem in Nutrition (1 or more)
NUTR	250	Clinical Nutrition Practice (1 or more)
NUTR	340	Seminar in Nutrition (1 or more)
NUTR	390	Nutrition Research (2 or more)
NUTR	394	Doctoral Dissertation
MHCH	212	Social Problems and Social Services
MENH	257	Cross Cultural Consultation (2-4)
MHCH	140	Problems in Maternal and Child Health (1 or more)
EPID	262	Epidemiology of Program Acceptance (2)
EDUC	285	Multi-Disciplinary Approach to Problems of Mental Retardation (2)

Note:

This Department is presently undergoing reorganization and expansion of its curriculum. In addition to the professional M.P.H. degree program, described above, plans are underway toward the development and approval of academic degree programs leading to the M.S.P.H. and the Ph.D., degrees. Inquiries for further information may be directed to this Department. A brochure describing the proposed curriculum will be provided upon request.

POSTGRADUATE PROGRAM IN PUBLIC HEALTH NUTRITION

The Postgraduate Program is offered for public health nutritionists who wish to pursue the graduate study of public health beyond the Master's degree in order to attain greater professional competence.

Students with a Master's degree in Public Health or Community Nutrition are offered the opportunity of one semester (15 semester hours) of intermediate or advanced courses in public health. An individual curriculum is planned for each student on the basis of her background, special interests and needs from the more advanced offerings in public health administration, epidemiology, public health, and public health nutrition.

Candidates may enroll for any semester with dates of enrollment and completion coinciding with beginning and closing dates

of the semester as established by the School of Public Health. The introductory courses in public health administration, epidemiology and public health statistics will be required of students in the Postgraduate Program who have not had equivalent courses.

The Postgraduate Program does not lead to a degree, but the student will receive graduate credit for the courses satisfactorily completed which can be applied towards an advanced academic degree in accordance with the rules governing the award of such degrees.

Admission to the Postgraduate Program

Student who apply must meet all the requirements of the Graduate School, The University of North Carolina at Chapel Hill, for admission to graduate study. In addition they must have previously earned the M.P.H. or M.S. degree with specialization in public health of community nutrition, or an equivalent degree. Since the number of students who can be admitted to the Postgraduate Program in a given academic year is small, and the number of scholarships available for this purpose will be limited, additional criteria will be used in selecting candidates. These will include substantial experience as a nutritionists in a public health agency with a record of performance at a satisfactory level of professional competence, and evidence that the proposed course of graduate study in public health would enhance the professional performance of the applicant in her present position or would assist her in preparing for a position with increased professional or administrative responsibilities.

COURSES OF INSTRUCTION

Note: Courses numbered 100 through 199 are for Advanced Undergraduates and Graduates and those numbered from 200 to 399 are for Graduates only.

Biostatistics—BIOS
Environmental Sciences and Engineering—ENVR
Epidemiology—EPID
Health Administration—HADM
Health Education—HEED
Maternal and Child Health—MHCH
Mental Health—MENH
Parasitology and Laboratory Practice—PALP
Public Health—PUBH
Public Health Nursing—PHNU
Public Health Nutrition—NUTR

DEPARTMENT OF BIOSTATISTICS

BIOS 100 **PUBLIC HEALTH STATISTICS** (3). An introduction ta fundamental procedures in the collection, summarization presentation, and analysis of public health data: vital statistics, including rates and ratios; demographic data; community diagnosis; observations in research studies and construction of questionnaires. Elements of statistical inference: probability distributions, sampling, confidence interval estimation of means and rates, the t-test, the chi-square test. **Two lecture and two laboratory hours a week, fall.** Williams, Greenberg.

BIOS 103 **MANAGEMENT OF PUBLIC HEALTH DATA** (2). This course is interıded for students who take more extensive courses in statistical inference than BIOS 100 (for example, BIOS 105, BIOS 135, BIOS 150). The course comprises the topics given in the description of BIOS 100 with the omission of elements of statistical inference. **Two lecture and two laboratory hours a week for ten weeks, fall.** Williams, Greenberg.

BIOS 105 **PRINCIPLES OF STATISTICAL INFERENCE** (3). An introduction to the methods of modern statistical analysis and their use in drawing conclusions from data collected in surveys and in the laboratory. Topics cover probability distributions, confidence interval estimation of population parameters, tests of significance, analysis of variance, corelation and regression. **Three lecture hours a week, fall and spring.** Staff.

BIOS 108 **INTRODUCTION TO STATISTICAL DATA PROCESSING** (2). Brief introduction to digital computers. Characteristics, design, construction, and maintenance of machine-stored data sets. Statistical analysis with generally available

computer programs. No previous knowledge of computers or programming is required. **One lecture and two laboratory hours a week, fall, spring and summer.** Sorant.

BIOS 109 **INTRODUCTION TO STATISTICAL DATA PROCESSING AND COMPUTER PROGRAMMING** (3). Encompasses all the material of BIOS 108, and also basic computer programming skills using the FORTRAN language. No previous knowledge of computers or programming is required. **Two lecture and two laboratory hours a week, fall and summer.** Sorant.

BIOS 135 **PROBABILITY AND STATISTICS** (4). Prerequisite, integral calculus. Basics of probability; random variables and their probability distributions; special distributions, including the binomial, Poisson, normal, gamma; expectation and moments; combined random variables. Elements of estimation and hypothesis testing; analysis of variance; multiple regression; analysis of categorical data; some nonparametric methods. Particular attention is given to the statistical treatment of environmental science, and engineering problems. **Four lecture hours a week, fall.** Kupper.

BIOS 140, 141, 142 **PROBLEMS IN BIOSTATISTICS** (1 or more). Prerequisites to be arranged with the faculty in each case. A course for students of public health who wish to make a study of some special problems in the statistics of the life sciences and public health. **Two or more hours a week, fall, spring and summer.** Staff.

BIOS 145 **PRINCIPLES OF EXPERIMENTAL ANALYSIS** (3). Prerequisite, BIOS 105 or equivalent. Continuation of BIOS 105; Multiple regression, design and analysis of simple experiments, nonparametric and other procedures. **Three lecture hours a week, spring.** Staff.

BIOS 150 **ELEMENTS OF PROBABILITY AND STATISTICAL INFERENCE** (Statistics 101) (3). Prerequisite, integral calculus or permission of the instructor. Fundamentals of probability theory; descriptive statistics; fundamentals of statistical inference, including estimation and hypothesis testing. **Three lecture hours a week, fall.** Elandt-Johnson.

BIOS 151 **ELEMENTS OF STATISTICAL ANALYSIS** (Statistics 102) (3). Prerequisite, BIOS 150 or equivalent. Various topics in statistical methods, including applied regression analysis, analysis of simple experimental designs, data analysis. **Three lecture hours a week, spring.** Elandt-Johnson.

BIOS 160 **PROBABILITY AND STATISTICAL INFERENCE** (Statistics 126-7) (6). Prerequisite, integral calculus. Introduction to the theory of probability: random variables, probability distributions, generating functions, sums and sequences of random variables. Distributions of functions of random sample; introductory theory of estimation hypothesis testing. **Six lecture hours a week, fall.** Kuebler.

BIOS 161 **INTERMEDIATE STATISTICAL ANALYSIS** (6). Prerequisite, BIOS 150 or equivalent. Application of normal-theory and nonparametric methods to various topics in statistical analysis, including: descriptive statistics, goodness of fit, correlation and regression, independent and matched samples and other simple experimental designs, categorical data, and elementary multivariate problems. **Six lecture hours a week, spring.** Symons, Quade.

BIOS 164 **SAMPLE SURVEY METHODOLOGY** (3). Prerequisite, BIOS 105 or equivalent. Fundamental principles and methods associated with survey sampling, giving primary attention to as non-mathematical as possible a treatment of simple random sampling, stratified sampling, and cluster sampling. Also; techniques of questionnaire design; the problems of non-response, and sources of nonsampling errors. Practical experience in the applied aspects of sampling is provided by student participation in the design, execution, and analysis of an actual survey. **Three lecture hours a week, spring.** Imrey.

BIOS 165 **ANALYSIS OF CATEGORICAL DATA** (3). Prerequisite, BIOS 105 or equivalent. Statistical methods for analyzing categorized data, including: multi-factor, multi-response models for contingency tables; measures and tests of association; interpretation of interactions. **Nine lecture hours a week, first summer session.** Koch.

BIOS 221 **THE ROLE OF HEALTH STATISTICS IN ADMINISTRATION** (2). Prerequisite, BIOS 100. A study is made of the administrative applications of vital statistics and health data. The statistical organizations in the state departments are surveyed and evaluated. Emphasis is placed on the role which statistical services can offer in the administration and evaluation of medical care programs. **Two lecture hours a week, spring.** Coulter.

BIOS 224 **STATISTICAL METHODS IN HEALTH SERVICES RESEARCH** (2). Prerequisite, permission of the instructor. A variety of case studies concerned with current research problems in Health Services are presented and the underlying statistical methodology is highlighted. Class participation in the discussion of these problems is encouraged. **One lecture and two seminars a week, spring.** Gillings.

BIOS 230 **INFORMATION SYSTEMS IN MENTAL HEALTH** (MENH 230) (3). History and current status of mental health information systems on federal, state, and local level, with emphasis on comprehensive mental health centers. National, regional and state organizations active in the field of mental health statistics. History and current status of classificatory schemata for mental disorders. Review of DSM-11 and some other frameworks of classification. Some statistical techniques in classification problems. **Three lecture hours a week, fall.** Stewart.

BIOS 234 **EVALUATION AND PROGRAMMING ELEMENTS IN MENTAL HEALTH** (3). Evaluation literature in the area of (1) community and individual assessment and (2) mental health program evaluation on an individual and community level. Some useful statistical methods, e.g., cohort analysis use of control groups, before and after assessment. etc. Class attempt to evaluate an existing mental health program. Validity and reliability of various mental health measurements. **Three lecture hours a week, spring.** Stewart.

BIOS 240, 241, 242 **SPECIALIZED METHODS IN HEALTH STATISTICS** (1 or more). Prerequisite, permission of the instructor. Statistical theory applied to a special problem area of timely importance in the life sciences and public health. Lectures, seminars and/or laboratory work, according to the special area under study. **One or more hours a week, fall, spring, and summer.** Members of the Graduate Faculty.

BIOS 250 **ADVANCED TECHNIQUES IN BIOMETRY** (3). Prerequisites, BIOS 109, BIOS 160, and 161, or equivalents. Design of experiments, bioassay, sequential analysis, Bayesian analysis, and other topics. **Three lecture hours a week, fall.** Symons.

BIOS 254 **ORDER STATISTICS** (Statistics 170) (3). Prerequisite, STAT 127 or BIOS 161. Distribution and moments of order statistics. Estimation of location and scale parameters, censoring. Robust estimation. Short-cut procedures. Treatment of outliers. Extreme-value theory. **Three lecture hours a week, spring, 1972 and alternate years.**

BIOS 256 **INTRODUCTION TO NONPARAMETRIC STATISTICS** (Statistics 179) (3). Prerequisite, BIOS 160 or equivalent. Theory and application of nonparametric methods for various problems in statistical analysis. Includes procedures based on randomization, ranks, and U-statistics. A knowledge of elementary computer programming is assumed. **Three lecture hours a week, fall.** Quade.

BIOS 257 **NONPARAMETRIC PROCEDURES IN BIOMETRIC RESEARCH** (3). Prerequisite, BIOS 256 or equivalent. Nonparametric point and interval estimation in linear models useful in biometric research. Robust procedures, including those based on ranks, for analyzing designed experiments and bioassays. **Three lecture hours a week, spring, 1973 and alternate years.** Sen.

BIOS 260 **LARGE SAMPLE THEORY** (3). Prerequisite, BIOS 160; corequisite, MATH 121. An introduction to limit theorems and laws of large numbers in probability, statistics, and stochastic processes. **Three lecture hours a week, fall.** Sen.

BIOS 266 **LINEAR MODELS I** (4). Prerequisites, Linear Algebra; and BIOS 109, 160 and 161, or equivalents. Multivariate normal and related distributions; basic univariate and multi-

variate linear models; computational aspects **Four lecture hours a week, fall.** Helms.

BIOS 267 **LINEAR MODELS II** (4). Prerequisite, BIOS 266. Principal components, discriminant functions, canonical variates, repeated measurements experiments, analysis of longitudinal data, components of variance. **Four lecture hours a week, spring.** Grizzle, Koch.

BIOS 270 **DEMOGRAPHIC TECHNIQUES I** (3). Prerequisite, BIOS 100 or equivalent. Fundamental principles and methods employed in the study of population. Attention is given to providing the student with a basic understanding of the characteristics of censuses, vital statistics registration systems, and other sources of demographic data, and the problems involved in the interpretation of the available data on population structure and change. The topics covered include rates and ratios, standardization, complete and abridged life tables, estimation and projection of fertility, mortality, migration and geographic distribution, population composition, and population projection and estimation. **Three lecture hours a week, fall.** Wells.

BIOS 271 **DEMOGRAPHIC TECHNIQUES II** (3). Prerequisites, BIOS 270 and integral calculus. Methods of analysis when data are deficient; population projection methods; stable and quasi-stable methods; interrelations among demographic variables; migration analysis; uses of population models. **Three lecture hours a week, spring.** Suchindran.

BIOS 275 **STATISTICS IN POPULATION PROGRAMS** (2). Prerequisite, permission of instructor. Covers applications of statistical and demographic methods in population programs with special emphasis on their use in planning, operation and evaluation of programs. Topics include data needs, and systems for data acquisition through operation sources and special studies, methods for obtaining estimates when data are inadequate, evaluation of effectiveness of birth control methods, target setting in program planning, and evaluation techniques useful in population programs. **Two lecture hours a week, spring.** Lingner.

BIOS 277 **MATHEMATICAL MODELS IN DEMOGRAPHY** (3). Prerequisite, permission of the instructor. A detailed presentation of natality models, including necessary mathematical methods, and applications; deterministic and stochastic models for population growth, migration, etc. **Three lecture hours a week, spring, 1973 and alternate years.** Suchindran.

BIOS 281 **STATISTICAL METHODS IN HUMAN GENETICS** (Genetics 281) (3). Prerequisite, permission of the instructor. An introduction to statistical procedures for testing genetic hypotheses and estimating genetic parameters, with emphasis on the special methods required for human data. Topics covered include maximum likelihood estimation,

statistical models for the effects of mutation, selection, Bayes' theorem and its genetic applications, segregation ratios and linkage under incomplete ascertainment, quantitative inheritance, and twin data. **Three lecture hours a week, spring, 1973 and alternate years.** Elston.

BIOS 287 **STATISTICAL METHODS IN EPIDEMIOLOGY** (Epidemiology 287) (3). Prerequisites, BIOS 100 and EPID 160, or equivalents. Lectures, discussions, and laboratory work on the principles and methods of epidemiology investigation, with laboratory work in assembling and analyzing crude data resulting from field investigations of epidemics. Consideration of the theory of epidemics, and models that have been used to demonstrate the effects of varying factors which influence the course of epidemics. **Two lecture and two laboratory hours a week, spring.** Kuebler.

BIOS 301 **FIELD OBSERVATION IN NATIONAL HEALTH STATISTICS** (0) Orientation to the organization and operation of the major national agencies concerned with demographic and health statistics. Supervised visits to the U. S. Bureau of the Census, National Center for Health Statistics, and the National Institutes of Health, lectures and demonstrations by administrative and research personnel. **Field Fee $150. Spring.** Coulter, agency counselors.

BIOS 302 **FIELD TRAINING IN PUBLIC HEALTH STATISTICS** (8). This course is designed to offer students majoring in biostatistics an opportunity for supervised experience in all phases of the statistical programs in selected health departments. Open only to students majoring in biostatistics. **Field Fee $450. Summer.** Coulter, field counselors.

BIOS 304 **SEMINAR IN BIOLOGICAL MODELS** (1). Prerequisite, permission of the instructor. Basic biological principles; and appropriate chemical, physical, and mathematical models for them. **Two seminar hours a week, spring.** Elston.

BIOS 340, 341, 342 **STATISTICAL CONSULTING IN THE HEALTH SCIENCES** (2 or more). Prerequisite, a minimum of one year of graduate work in statistics. By actual participation in current projects, the advanced student will be given instruction in the processes of statistical consulting service for the health sciences; initial and continuing conference with the research worker in a health science, definition of the problem in statistical terms, design of experiment with reference to statistical implications, analysis of data, and report writing. **Four or more laboratory hours a week, fall, spring, and summer.** Staff.

BIOS 350, 351, 352 **TRAINING IN STATISTICAL TEACHING IN THE HEALTH SCIENCES** (2 or more). Prerequisite, a master's degree or equivalent. Principles of statistical pedagogy. Students will be responsible for assistance in teaching elementary statistics to students in the health sciences. Stu-

dents work under the supervision of the faculty with whom they have regular discussions of methods, content, and evaluation of performance. **Four or more laboratory hours a week, fall, spring and summer.** Staff.

BIOS 374 **SEMINAR IN POPULATION STATISTICS** (3). Prerequisite, permission of the instructor. Problems in design and administration of statistical programs; techniques for analysis and use of data from service programs. Special consideration of planning and evaluation of population programs, including: design and execution of special follow-up surveys; contraceptive knowledge, attitude, and practice studies: population growth estimation surveys; and other relevant topics. Primarily for majors in Biostatistics. **Two lecture and two seminar hours a week, spring.** Wells.

BIOS 390, 391, 392 **RESEARCH IN BIOSTATISTICS** (2 or more). Indivdual arrangements may be made by the advanced student to spend part or all of his time in supervised investigation of selected problems in statistics. **Four or more laboratory hours a week, fall, spring and summer.** Staff.

BIOS 393 **MASTERS THESIS** (3-6). **Fall, spring, and summer.** Staff.

BIOS 394 **DOCTORAL DISSERTATION** (3-9). **Fall, spring, and summer.** Staff.

BIOS 400 **GENERAL REGISTRATION.**

DEPARTMENT OF ENVIRONMENTAL SCIENCES AND ENGINEERING

ENVR 100 **READING IN ENVIRONMENTAL SCIENCES AND ENGINEERING** (1 or more). Prerequisite departmental permission. For students outside the Department who desire to conduct extensive library study of a specific subject in environmental sciences and engineering. The subject and requirements of the project are arranged with the faculty in each individual instance. **Two or more hours a week, fall, spring, summer.** Staff.

ENVR 101 **ELEMENTS OF ENVIRONMENTAL HEALTH** (2). The study of environmental pollution, its sources, public health significance, and methods of control. Air, water, food, housing, waste disposal, insects, rodents, accidents, and the physical sources of heat, light, noise, and ionizing radiation are considered. **Two lecture hours a week, spring and summer.** Weidenkopf, Turner; staff.

ENVR 111 **MAN AND HIS ENVIRONMENT** (3). Current issues in environmental protection. Analysis of environmental problems and decisions from the viewpoints of the various disciplines concerned with the assessment of risk, policy development and environmental management. **Spring.** Shiffman.

ENVR 115 **APPLIED ELECTRON MICROSCOPY** (3). Prerequisites, college physics and permission of instructor. The use of the electron microscope as a research tool. Theory of operation and image formation and interpretation are discussed. Current applications on the instrument are reviewed with particular emphasis on the study of the environment, contamination and associated phenomena. Techniques for the preparation of biological, thin sections, powder, replica, and electron diffraction specimens are presented in the laboratory. **Two lecture and two laboratory hours a week, spring. This course is also presented in the first summer session in an intensive two-week sequence.** Fraser.

ENVR 118 **QUANTITATIVE STUDIES FOR ENVIRONMENTAL SCIENCES** (5). Prerequisite, MATH 15. Applied mathematics from the viewpoint of the needs of those studying environmental science. Specific aspects of differential and integral calculus are developed as needed in environmental hygiene. **Ten lecture and eight laboratory hours a week, second summer session.** Staff.

ENVR 120 **READING IN ENVIRONMENTAL CHEMISTRY AND BIOLOGY** (1 or more). Selected readings for orientation of students to environmental problems with particular emphasis on chemical and biological aspects. **Fall, spring and summer.** Staff.

ENVR 122 **WATER CHEMISTRY** (4). Prerequisites, CHEM 11 and CHEM 21. Principles and applications of water chemistry. Consideration of equilibrium relationships in aqueous solutions such as natural waters. Proton transfer, solubility, complex formation, and redox reactions in natural waters are discussed; examples in natural systems include alkalinity, hardness, chemistry of iron, manganese, aluminum, and the oxidation of organic carbon. Thermodynamic background for equilibrium calculations, including free energy and activity relationships, is presented. Laboratory includes examples of titrimetric, colorimetric and electrometric methods of water analysis. **Three lecture and two laboratory hours a week, fall.** Johnson, O'Melia.

ENVR 124 **ANALYTICAL METHODS IN ENVIRONMENTAL AND FOOD SANITATION** (3). Prerequisites, general chemistry and biology. Principles, procedures, purposes and interpretation of field and laboratory tests for the evaluation and control of environmental sanitation and for evaluation of the sanitary quality of food and water. **Two lecture and two laboratory hours a week, fall.** Staff.

ENVR 126 **SOLS AND SURFACES** (3). Prerequisites, Chemistry 180 or equivalent. The physical chemistry of interfaces. The quantitative and qualitative description of equilibrium and mass transport processes between phases with appli-

cations to aqueous and gaseous sols and natural colloids. **Two lecture and two laboratory hours a week, fall, 1973 and alternate years.** Johnson.

ENVR 127 **OCEANOGRAPHY** (3) (ZOOL 126, MASC 101). Prerequisite, ZOOL 11 or BOTN 11. **Three lecture hours a week, fall.** Kuenzler.

ENVR 128 **CHEMICAL OCEANOGRAPHY** (MASC 105) (3). Prerequisites, one semester of physical chemistry or ENVR 122, CHEM 180 or equivalent. Presentation and interpretation of the complex chemistry of the oceans, the variation and abundance of the sea water constituents, and the chemical, physical and biological processes contributing to the distribution of the chemical species. The special problems relating to the introduction and dispersion of conservative and non-conservative substances will also be considered. **Three lecture hours a week, spring.** Johnson, Kuenzler, Lyman.

ENVR 128L **CHEMICAL OCEANOGRAPHY LAB** (MASC 105L) (1).

ENVR 131 **BIOLOGY IN ENVIRONMENTAL SCIENCE** (3). Prerequisite, general chemistry. An introduction to biology, including principles of bio-chemistry, cell structure, classification, and ecology. Application to public health, including biology of waste treatment systems, biological indices of pollution, and water and airborne diseases. Laboratory emphasizes techniques utilized in measurement and control of environmental pollution. **Two lecture and two laboratory hours a week, spring.** Little, Pfaender.

ENVR 132 **LIMNOLOGY AND WATER POLLUTION** (3). Prerequisites, two semesters of chemistry or ENVR 122. The principles of limnology as they apply to water supply and waste disposal. Emphasis is placed on the physical, chemical and biological factors of the aquatic environment in order to define the ecology of nonpolluted and polluted water, including lakes, streams and estuaries. **Two lecture and two laboratory hours a week, fall and spring.** Weiss.

ENVR 133 **ENVIRONMENTAL BIOLOGY** (3). Prerequisites, general and organic chemistry, ENVR 131 or equivalent. An overview of environmental biology with emphasis on ecological theory as it related to applied biological problems. Topics for discussion include the metabolism of individuals, the reaction of populations and communities to environmental stress and ecosystem responses to perturbations. The laboratory emphasizes techniques widely used in aquatic biology and pollution control. **Three lecture hours a week, fall.** Staff.

ENVR 134 **ENVIRONMENTAL MICROBIOLOGY** (3). Prerequisites, organic chemistry and ENVR 131 or ENVR 133, and permission of instructor. Principles of general microbiology: an examination of the microbial world with emphasis on nonpathogenic bacteria, their cytology, growth, physiology,

and significance in the environment with special attention given to treatment processes. **Two lecture and three laboratory hours a week, spring.** Pfaender.

ENVR 135 **ECOLOGY** (3) (BIOL 102, ZOOL 108, BOTN 141). Prerequisites, BOTN 11 or ZOOL 11 or BIOL 21, 22. **Three lecture hours a week, fall and spring.** Lieth, McCormick, Stiven, Kuenzler, Carl.

ENVR 135L **ECOLOGY LABORATORY** (1) (BIOL 102L, BOTN 141L, ZOOL 108L). Corequisite, ENVR 135. **Three laboratory hours a week, fall and spring.** Lieth, McCormick, Stiven, Kuenzler, Carl.

ENVR 136 **BIOLOGICAL OCEANOGRAPHY** (6) (ZOOL 140S, MASC 104S). Prerequisites, ZOOL 106 and 108 or permission of instructor. Offered at Morehead City, N. C. **Five lecture and 25 laboratory hours a week, summer.** Kuenzler, Wood and Staff of Institute of Marine Sciences.

ENVR 140 **READING IN AIR AND INDUSTRIAL HYGIENE** (1 or more). Prerequisite, permission of the instructor. Reading and tutorial guidance in the fields of industrial hygiene and community air pollution. **Fall, spring and summer.** Staff.

ENVR 141 **ELEMENTS OF AIR HYGIENE** (2). Prerequisite, admission to graduate standing or permission of the instructor. The health aspects of the air are covered from the standpoint of community air pollution. The chemical and physical behaviors and the biological effects of air contaminants are discussed. Means of controlling air pollution are reviewed. **Four lecture hours a week, first summer session.** Staff.

ENVR 142 **ELEMENTS OF INDUSTRIAL HYGIENE** (2). Prerequisite, admission to graduate standing or permission of instructor. The problems and control of exposure to occupational diseases and industrial accident hazards, the organization and function of industrial and governmental services dealing with these problems, the industrial aspects of communicable and noncommunicable diseases, the procedures of workmen's compensation plans, and the integration of occupational health services with local health department activities are presented. **Four lecture hours a week, second summer session.** Staff.

ENVR 143 **APPLIED PHYSIOLOGY AND TOXICOLOGY** (3). Prerequisite, admission to graduate standing or permission of instructor. The physiologic response of the various organs and organ systems of the body to the physical and chemical stresses of the industrial environment are considered. The methods of industrial toxicology and the toxicological basis for the Threshold Limit Values will be discussed. Concentration-Time equivalence, routes of entry, synergism will be investigated in the laboratory. **Two lecture and two laboratory hours a week, fall.** Battigelli, Fraser.

ENVR 144 **AIR POLLUTION MEASURING, MONITORING AND SURVEY** (3). Course will cover theory and application of the analysis of samples; review of manual methods, calibration of manual and automatic sensors; site selections; design and operation of monitoring stations, networks and programs, and of air pollution surveys including stack sampling and source testing. **One lecture and four laboratory hours a week, spring.** Ripperton, Jeffries.

ENVR 145 **INSTRUMENTAION AND DATA ACQUISITION** (3). Prerequisite, graduate standing or permission of the instructor. Concepts and principles employed in electronic-aided measurements of air quality including acquisition of measurements, principles of input transduction, and on-line minicomputers. **Three lecture hours a week, fall.** Jeffries.

ENVR 146 **INDUSTRIAL HYGIENE ENGINEERING CONTROL DESIGN** (3). Prerequisite, engineering degree or permission of the instructor. Design of industrial exhaust systems and control of heat exposures in occupied spaces. **Three lecture hours a week, fall.** Harris.

ENVR 150 **READING IN ENVIRONMENTAL MANAGEMENT AND PROTECTION** (1 or more). Readings in basic works throughout the field of environmental management and protection. Critical analysis of these works by students and faculty. **Fall, spring and summer.** Staff.

ENVR 152 **MICROBIOLOGY OF THE INSTITUTIONAL ENVIRONMENT** (3). Prerequisite, permission of the instructor. Study of microbial contaminants in the hospital environment and their relationships to the infectious disease process. Routes of transmission and epidemiology of noscomial infection will be stressed. **Three lecture hours a week, fall.** Turner, Craddock.

ENVR 154 **MANAGEMENT OF THE INSTITUTIONAL ENVIRONMENT** (3). Prerequisites, General chemistry and biology. The study of the particular environment of hospitals, nursing homes, schools, and related institutions. The application of biological and chemical methods to the identification of problems; and the epidemiology and management of environmental factors influencing health in the institutional setting. **Three lecture hours a week, spring.** Turner.

ENVR 160 **READING IN RADIOLOGICAL HYGIENE** (1 or more). Prerequisite, permission of the instructor. A search of the literature on a topic in evaluation and judgment of the subject matter. **Fall, spring and summer.** Chanlett, Underwood, Wilhoit.

ENVR 161 **ELEMENTS OF RADIOLOGICAL HYGIENE** (2). Prerequisite, ENVR 118. The physics of ionizing radiations, their interactions with matter, and the biological effects are discussed. The basic principles of radiation protection and public health aspects of nuclear radiations are em-

phasized. Laboratory exercises deal with the detection and measurement of ionizing radiation from sources of concern in public health. **One lecture and two laboratory hours a week, spring, and second summer session.** Willhoit, Chanlett.

ENVR 162 **MODERN PHYSICS FOR ENVIRONMENTAL SCIENCE** (3). Prerequisite, ENVR 118. Modern physics with the emphasis on radioactivity and ionizing radiations. **Three lecture hours a week, fall.** Underwood.

ENVR 163 **RADIATION INSTRUMENTATION** (3). Prerequisite, ENVR 162. A laboratory study of measurements of radioactivity with emphasis on the principles of operation of the instruments. **One lecture and four laboratory hours a week, fall.** Underwood.

ENVR 164 **FIELD OBSERVATIONS IN RADIOLOGICAL HYGIENE** (3). Prerequisites, ENVR 118. Field observations of modern public health practice in state and local agencies and of health physics practice at the Oak Ridge National Laboratory and associated facilities. Field fee, $350.00. **Instruction is conducted during summer-fall and fall-spring intersession periods in the field.** Chanlett, Willhoit.

ENVR 170 **READING IN SANITARY ENGINEERING AND WATER RESOURCES** (1 or more). For students desiring to conduct extensive library study of some special subject in sanitary enginering or water resources. The subject and requirements of the project are arranged with the faculty in each individual instance. **Two or more hours a week, fall, spring, and summer.** Staff.

ENVR 171 **PRINCIPLES OF WATER QUALITY MANAGEMENT** (2). The lectures and seminar discussions are designed to develop a basic understanding of the importance of water resources, past development of the field, its current status, and trends for the future. Topics covered include; water resources and uses, health aspects of water resources, stream pollution, elements of water handling and treatment systems, rationale of regulatory standards and their limitations, drinking water standards, other quality requirements for water and wastewater, and economic considerations. **One lecture and two seminar hours a week, fall.** Lamb; staff.

ENVR 173 **DESIGN OF HYDRAULIC STRUCTURES** (3). Prerequisites, undergraduate degree and permission of instructor. Hydraulic design for waterworks and sewerage projects; open channels; blackwater curves; siphons; transition sections; dams and outlet works; stilling basins; networks; centrifugal pumps; transients in unsteady flow. **Three lecture hours a week, fall.** Cole.

ENVR 174 **WATER AND WASTES TREATMENT PROCESSES** (4). Prerequisites, ENVR 122, corequisite, ENVR 131 or permission of instructor. A study of unit processes for water

and wastewater treatment. Processes discussed include gas transfer, coagulation, disinfection, demineralization, sedimentation, filtration, and aerobic and anaerobic biological treatment. Techniques for selecting treatment processes to be used under various circumstances are reviewed. Laboratory exercises include experimental studies of the unit processes. **Three lecture and two laboratory hours a week, spring.** O'Melia, Cole.

ENVR 175 **SANITARY ENGINEERING DESIGN IN DEVELOPING COUNTRIES** (3). Prerequisite, permission of instructor. Design of public water and sewerage facilities including intakes, pumping stations, treatment plants, distribution systems and sewage collections works. Design criteria, equipment, and systems for use in developing countries are stressed. Process, mechanical, electrical, and control aspects of design are included. Students prepare complete designs. **Two lecture and two summer hours a week, fall.** Cole.

ENVR 181 **GROUND WATER HYDROLOGY** (2) Prerequisite, permission of instructor. Ground water occurrence and exploration; design, hydraulics, drilling construction, and testing of water wells; operation and maintenance of ground water supply systems. **Two lecture hours a week, fall.** Brown.

ENVR 182 **WATER RESOURCES PLANNING IN DEVELOPING COUNTRIES** (3). Prerequisite, permission of instructor. Preliminary planning of public water supply and sewerage facilities. Planning objectives and design criteria for developing countries are considered. Course topics include collection and analyses of data, decisions on water quantity, quality, needs for sewage treatment, location and size of facilities and financing. Preliminary plans, cost estimates and planning reports are prepared by students. **Two lecture and two seminar hours a week, fall.** McJunkin, Lauria.

ENVR 183 **SPECIAL TOPICS IN WATER RESOURCES** (1). Prerequisite, permission of instructor. Interdisciplinary exploration of the principal issues involved in water resource planning, conservation, development and management. Includes the nature of water resource, principal water uses and conflicts, public objectives and policy issues, institutional arrangements, legal framework, planning and governmental agency programs. **Two seminar hours a week, spring.** Howells.

ENVR 200 **PROBLEMS IN ENVIRONMENTAL SCIENCES AND ENGINEERING** (1 or more). Departmental permission required. For students outside the Department who desire to undertake individual study of a specific problem in environmental sciences and engineering. The subject and requirements of the project are arranged with the faculty in each individual instance. **Two or more hours a week, fall, spring, summer.** Staff.

ENVR 211 **ENVIRONMENTAL MANAGEMENT** (3). Permission of the instructor required. An analysis of decision-making for environmental protection programs including policy development, program implementation and management approaches. Case studies of specific environmental protection problems emphasizing public policy and actions, organizational structure and institutional arrangements. **Three lecture hours a week, first summer session.** Shiffman.

ENVR 212 **PLANNING AND DEVELOPMENT OF ENVIRONMENTAL HYGIENE PROGRAMS** (3). Prerequisite, ENVR 111 or equivalent or permission of the instructor. Concepts and techniques in planning, organization and management. Covers program development, decision making, methods for achieving administrative ends, field supervision, criteria establishment and evaluation procedures with reference to environmental hygiene programs. **Two lecture and two seminars hours a week, spring.** Shiffman.

ENVR 214 **ENVIRONMENTAL ISSUES AND DECISIONS** (2). Prerequisite, a background in environmental biology and chemistry, or ENVR 132, or permission of instructor. The concept of environmental impact will be examined by study of contemporary as well as developed projects which may or have caused significant ecological changes. **Fall.** Weiss.

ENVR 215 **ENVIRONMENTAL ASSESSMENT** (2). Prerequisite, ENVR 111 or equivalent or permission of instructor. Concepts and methodologies for assessing the environmental consequences of technological development. Procedures and approaches for the preparation of environmental impact statements will be considered as well as case studies at the state, national and international levels. **One lecture, two seminar hours a week, spring.** McJunkin, Shiffman.

ENVR 217 **SYSTEMS ANALYSIS IN ENVIRONMENTAL PLANNING** (PLAN 217) (3). Prerequisite, calculus. Systems approach and scientific method. Various approaches to system design. Mathematical models. Production, benefit, loss and cost functions. Constrained optimization. Marginal analysis. Linear programming. Application of techniques to systems for the management of environmental quality. **Three lecture hours a week, fall.** Sherwani.

ENVR 218 **ENVIRONMENTAL SYSTEMS ANALYSIS I: DETERMINISTIC MODELS** (3) (PLAN 218). Prerequisite, calculus. Concepts of systems analysis. Modeling of environmental and urban systems. Elements of linear algebra. Classical optimization techniques. Marginal analysis models in economics. Mathematical programming models. Selected topics in linear, nonlinear, and dynamic programming. **Three lecture hours a week, spring.** Sherwani.

ENVR 219 **ENVIRONMENTAL SYSTEMS ANALYSIS II: PROBABILISTIC MODELS** (3) (PLAN 219). Prerequisites, BIOS 135 or 150 (STAT 101), ENVR 218 or equivalent and permission of instructor. Model construction and analysis in an uncer-

tain environment. Elements of Markov processes, stochastic programming, simulation, and response surface techniques. **Three lecture hours a week, spring.** Moreau.

ENVR 220 **PROBLEMS IN ENVIRONMENTAL CHEMISTRY AND BIOLOGY** (1 or more). The technical report requirement for the MSPH is usually met by experimental study of a selected problem in environmental chemistry or biology. This investigation may extend for more than one semester and credit is carried accordingly. **Fall, spring, and summer.** Staff.

ENVR 221 **INSTRUMENTAL METHODS OF ANALYSIS** (4). Prerequisites, inorganic and analytical chemistry or permission of the instructor. Principles and techniques of instrumental chemical analysis, including optical, electrical and separation methods. Laboratory sessions include absorption and emission spectrophotometry, polarography, potentiometry, amperometry, coulometry, and gas ion exchange and paper chromatography. **Two lecture and four laboratory hours a week, fall.** Johnson, Shuman.

ENVR 222 **SPECIAL TOPICS IN AQUATIC CHEMISTRY** (2). Prerequisite, ENVR 122. Modern topics in aquatic chemistry, application of chemical concepts to the understanding and control of man's aquatic environment. This course may be taken for credit more than once, as the special topics change. **Two lecture hours a week, fall, spring.** Johnson, O'Melia.

ENVR 223 **TRACE ANALYSIS** (3). Prerequisite, ENVR 221 or permission of the instructor. Sampling and sample preparation; electrochemical, spectrophotometric, and nuclear techniques; chemical speciation; precision and validation of results. Laboratory will deal with local environmental samples. **Two lecture and two laboratory hours a week, spring.** Shuman.

ENVR 226 **ECOLOGICAL AND GENERAL SYSTEMS THEORY** (3) (ZOOL 226). Prerequisites, calculus or permission of instructor. Study of systems ecology including languages, theoretic formulations and models for the design, synthesis and prediction of systems of man and nature. **Three lecture hours a week, spring.** Staff.

ENVR 232 **SPECIAL TOPICS IN AQUATIC BIOLOGY** (2). Prerequisite, ENVR 132 or permission of instructor. Topics of contemporary concern to the management of the aquatic environment, e.g., movement of pesticides through aquatic food chains; growth of algal and nutrient levels, etc., will be discussed in depth. Course may be taken more than once as new topics are offered. **Two lecture hours a week, spring.** Weiss, Kuenzler.

ENVR 233 **MICROBIAL ECOLOGY** (4). Prerequisite, ENVR 134 or permission of instructor. A consideration of the factors which influence the distribution and inter-relationships

of microorganisms in their natural habitat, with emphasis on the non-pathogenic bacteria including enrichment principles and techniques for evaluation of the contribution of individual types to a selected environment. **Two lecture and four laboratory hours a week, fall, 1972 and alternate years.** Pfaender.

ENVR 235 **ECOLOGY OF PHYTOPLANKTON** (BOTN 245) (4). Prerequisites, ENVR 232 or general ecology or acquatic biology. Experience in water chemistry is recommended. The relationships of fresh-water and marine productivity and nutrition. The laboratory will utilize algal cultures to demonstrate modern techniques in phytoplankton research. **Three lecture and two laboratory hours a week, fall.** Kuenzler.

ENVR 240 **PROBLEMS IN AIR AND INDUSTRIAL HYGIENE** (1 or more). Prerequisite, graduate standing and permission of the instructor. A problem in the aspect of industrial hygiene or community air pollution is chosen and solved by the student under supervision. **Fall, spring and summer.** Staff.

ENVR 241 **MECHANICS OF AEROSOLS** (3). Prerequisites, admission to the Department of Environmental Sciences and Engineering or permission of the instructor. The nature of airborne particles and the laws which govern the production and behavior of dusts, fumes and mists are studied. Techniques and instrumentation for sampling and evaluating aerosols and the mechanisms involved in the collection and control of industrial dusts are discussed. **Three lecture hours a week, fall.** Fraser, Reist.

ENVR 242 **INDUSTRIAL HYGIENE PRACTICES** (3). Prerequisites, ENVR 241 and ENVR 143. The methodology and philosophy of evaluating the industrial environment for stresses and toxic substances which affect the health of the worker. The following topics are included: gases, vapors, fumes and dusts; radioactivity hazards; occupational diseases; thermal stress; illumination and exhaust ventilation. The laboratory periods are designed to provide practical experience in the use of the specialized instruments and techniques of this field. **Two lecture and two laboratory hours a week, spring.** Fraser.

ENVR 243 **AIR AND ITS CONTAMINANTS** (3). Corequisite, ENVR 241. Behavior of atmospheric contaminants and the principles of making measurements in the air environmental are studied. Fundamental concepts of meteorology are discussed. **Three lecture hours a week, fall.** Stern, Ripperton.

ENVR 244 **INDUSTRIAL HYGIENE LABORATORY** (3). Prerequisite, ENVR 241; corequisite, ENVR 242. An advanced laboratory course designed to demonstrate the principles of applying physical and chemical techniques to measure en-

vironmental exposures. Practical experiments and field studies will illustrate techniques applicable to the industrial hygiene survey. **One lecture and four laboratory hours a week, spring.** Fraser, Ripperton.

ENVR 245 **AIR POLLUTION CONTROL** (3). Prerequisite, ENVR 243. Sources of air pollution and their control are studied. Regulatory aspects and air pollution standards are discussed. **Three lecture hours a week, spring.** Stern.

ENVR 246 **BIOLOGICAL EFFECTS OF AIR POLLUTION** (3). Prerequisites, ENVR 143, ENVR 243 or graduate standing in one of the biological sciences. The effects of community air pollutants on man, other animals, plants and microorganisms will be studied. The "whole organism" response, the data relating to the biochemical response and the physiological mechanisms of responses will be discussed. **Three lecture hours a week, fall, 1974 and alternate years.** Ripperton.

ENVR 247 **CHEMISTRY OF THE TROPOSPHERE** (3). Prerequisites, physical chemistry and permission of instructor. Sampling methods and reported concentration are critically reviewed. Photochemical and other chemical aspects of the atmosphere are studied. Aspects of both "meteorological" and "air pollution" chemistry are covered. **Three lecture hours a week, fall, 1973 and alternate years.** Ripperton.

ENVR 248 **INDUSTRIAL MEDICINE—PRACTICE AND MANAGEMENT** (3). Prerequisites, ENVR 143 or equivalent. The technical factors to be considered in decision making and the roles and responsibilities of the industrial physician, nurse and industrial hygenist in the management of the work force are considered. The etiology, diagnosis, treatment and prevention of diseases and stresses found in modern industry are discussed with applications for the use of general practitioners, health administrators, public health nurses and industrial professionals. **Three lecture hours a week, spring.** Battigelli, Goldwater.

ENVR 249 **AIR POLLUTION METEOROLOGY** (3). Prerequisite, GEOG 110 or equivalent. Course will cover theory of transport and diffusion of air pollutants and its application to practical problems and computations involving both single sources and multiple sources, including urban communities; modeling of transport and diffusion, both in wind tunnels and computers; stack design from the meteorological point of view; the organization of meteorological network and field studies; the measurement, monitoring and equipment requirements of pertinent meteorological parameters, air pollution climatology; meteorological management of air pollution. **Three lecture hours a week, spring.** Peterson.

ENVR 250 **PROBLEMS IN ENVIRONMENTAL MANAGEMENT AND PROTECTION** (1 or more). The technical report is satisfied by the completion of an extensive study of a problem in environmental management and protection. This study may extend over one or more semesters and credit is assigned accordingly. **Fall, spring, and summer.** Staff.

ENVR 251 **ENVIRONMENTAL SANITATION I** (3). Prerequisites, ENVR 118 or equivalent. The scientific rationale and technology of the control of semi-public and private water supplies, liquid and solid waste disposal and swimming and recreational facilities are presented. First order reactions, the electromagnetic spectrum and fluid mechanics are applied to a series of environmental hygiene problems. **Two lecture and three lab/field hours a week, fall.** Chanlett.

ENVR 252 **FOOD PROTECTION** (3). Prerequisite, ENVR 124 or equivalent. The sanitation control of food production, processing and distribution. Chemical and biological hazards from foods are discussed as well as toxicological aspects. The development and operation of food protection programs are also discussed. Offered in alternate years beginning in 1973. **Spring.** Shiffman, Chanlett.

ENVR 253 **ENVIRONMENTAL SANITATION II** (3). Prerequisites, ENVR 118 and 124 or equivalent. The scientific rationale and technology of the control of insect and rodent vectors, lighting, the thermal environmental, ventilation, noise and accidents are presented. The principles of environmental hygiene are applied to housing, transportation and medical care institutions. **Two lecture and three lab/field hours a week, spring.** Chanlett.

ENVR 260 **PROBLEMS IN RADIOLOGICAL HYGIENE** (1 or more). Prerequisite, admission to the Radiological Hygiene Program. A laboratory or field problem requiring indivdual acquisition of data, its analysis and the preparation of a paper. **Fall, spring, and summer.** Chanlett, Underwood, Willhoit.

ENVR 261 **RADIATION BIOPHYSICS** (3). Prerequisites, ENVR 162 or equivalent. The biophysical factors of radiation quality and the response of cell populations are discussed. Current models of the mechanisms of radiation action on biological systems are reviewed. Microdosimetry and dosimetry at interfaces are also covered. **Three lecture hours a week, spring.** Willhoit.

ENVR 262 **HEALTH PHYSICS** (3). Prerequisites, ENVR 163, ENVR 261, and ENVR 263. The principles of radiation protection are discussed and illustrated by laboratory and field exercises involving shielding, contamination control, waste disposal, radiation and contamination survey techniques, and legal and administrative procedures. The various isotope, x-ray, and other radiation facilities of the University are utilized in collaboration with the University Radiation

Safety Office. **Six lecture and six laboratory hours a week, second summer session, 1973 and alternate years.** Willhoit.

ENVR 263 **RADIATION HAZARDS EVALUATION I** (3). Prerequisite, ENVR 162. The fundamentals of dosimetry are presented. The interaction of radiation with biological material is studied. Internal and external radiological hazards are **evaluated. Three lecture hours a week, spring.** Underwood.

ENVR 264 **RADIATION HAZARDS EVALUATION II** (3). Prerequiste, ENVR 263. The interaction of radiation with biological materials is studied. Internal and external hazards are evaluated. Laboratory experience in precise and low level radioactivity measurements is acquired. **One lecture and four laboratory hours a week, spring.** Underwood.

ENVR 270 **PROBLEMS IN SANITARY ENGINEERING AND WATER RESOURCES** (1 or more). For students desiring to undertake individual study of a specific problem in sanitary engineering or water resources. The subject and requirements of the project are arranged with the faculty in each individual instance. **Two or more hours a week, fall, spring, summer.** Staff.

ENVR 271 **MODELING IN NATURAL AQUATIC SYSTEMS** (3). Prerequisite, permission of the instructor. Examination of selected physical, chemical and biological phenomena in natural aquatic systems. Use of mathematical models for water quality control. **Spring.** O'Melia, Lauria.

ENVR 272 **WATER SUPPLY AND WASTEWATER DISPOSAL SYSTEMS** (3). Prerequisite, B.S. in Civil, Chemical or Sanitary Engineering. The study of water resources and hydrology; municipal water requirements; analysis of hydrologic data; design of reservoirs, transmission and distribution systems; wastewater disposal and storm water systems. The course includes the preparation of a comprehensive engineering report encompassing all aspects of a municipal water supply system. **Two lecture and two seminar hours a week, fall.** Okun.

ENVR 273 **WATER AND WASTEWATER TREATMENT PLANT DESIGN** (3). Corequisite, ENVR 174 and prerequisite, ENVR 272. The application of the theory of water and wastewater treatment to the design of municipal treatment facilities. The course includes the principles of design and modern design practices. The seminar is devoted to the design and analysis of design of specific works for water and wastewater treatment. **Two lecture and two seminar hours a week, spring.** Okun.

ENVR 274 **CHEMICAL REACTION ENGINEERING** (4). Prerequisites, ENVR 122, ENVR 174 or permission of instructor. A study of chemical reactor engineering. Chemical equilibria and

the limits which thermodynamics place on reactor performance. Flow models, reaction kinetics, and their influence on reactor design and performance. Present and potential applications of these theories in treatment processes and natural systems. **Three lecture and two laboratory hours a week, fall.** O'Melia.

ENVR 275 **INDUSTRIAL WATER QUALITY MANAGEMENT** (3). Prerequisite, ENVR 171 and ENVR 174, or equivalent. Water supply and wastes disposal problems of industries. Special water quality requirements and treatment methods are reviewed in a comprehensive fashion. The nature of industrial wastes, pollutional difficulties resulting from their discharge, and methods of attacking wastes problems are discussed, including technical, administrative and regulatory aspects. Emphasis is placed on the diverse nature of these problems and the methodology employed in their solution. **Two lecture and two seminar hours a week, spring.** Lamb.

ENVR 276 **ADVANCED TREATMENT PROCESSES** (2). Prerequisite, ENVR 174. The study of new processes for water and wastewater treatment, including processes in developmental stages which have significant potential for future application in practice. **Two lecture hours a week, first summer session.** Lamb, O'Melia.

ENVR 277 **ENGINEERING PROJECT DESIGN** (3). Prerequisites, ENVR 217 and BIOS 135. Decision model approach to project design. Demand analysis. Dynamic aspects: flexibility, sequence and timing. Water distribution systems. Waste management systems. Application of analog and digital computers to sanitary engineering design. **Six lecture hours a week, first summer session.** Sherwani.

ENVR 281 **TOPICS IN ADVANCED HYDROLOGY** (3). Prerequisites, ENVR 272 and BIOS 135 or equivalent. Urban hydrology, hydrological frequency analysis, extreme value theory, analysis of low flows, problem of storage synthetic hydrology. **Three lecture hours a week, spring.** Sherwani.

ENVR 282 **PUBLIC INVESTMENT THEORY AND TECHNIQUES** (3). (PLAN 232). Prerequisite, permission of the instructor. A study of new methods of economic, engineering, and governmental analysis in public investment planning. Techniques include those for converting broad community objectives into specific criteria to design public projects, with special emphasis on water resources. **Three lecture hours a week, fall.** Hufschmidt.

ENVR 283 **NATURAL RESOURCE LAW AND POLICY** (3). (PLAN 233). Prerequisite, permission of instructor. An examination of the law of resource use and development, its administration and underlying polices. Particular attention to water rights law, regulatory law, and natural resource administration. Regulatory aspects of pollution control programs will be covered. **Three lecture hours a week, spring.** Heath.

ENVR 284 **PLANNING OF WATER RESOURCES SYSTEMS** (3). Prerequisites, ENVR 217 and ENVR 282 and permission of instructor. Application of systems analysis techniques to the planning at field level of multi-unit, multi-purpose water resource developments. Integrated treatment of the theory, process, and techniques of water resource system design. River-system simulation will be emphasized. **Three lecture hours a week, spring.** Hufschmidt.

ENVR 285 **SPECIAL PROJECT IN WATER QUALITY PLANNING** (3). Prerequisites, a master's degree or two semesters residence in the Department of Environmental Sciences and Engineering. The course is built around a specific real project. The project will integrate the many elements that affect water quality and the decision that must be made in water management. Examples include: water planning for a new city, regional development in coastal and estuarine areas, industrial site developments, etc. **Three lecture hours a week, second summer session.** Staff.

ENVR 300 **RESEARCH IN ENVIRONMENTAL SCIENCES AND ENGINEERING** (2 or more). Prerequisite, consultation with the faculty and approval of subject and proposed program. Research in environmental sciences and engineering for students outside the Department. **Four or more hours a week, fall, spring, summer.** Staff.

ENVR 301 **SEMINAR IN ENVIRONMENTAL SCIENCES AND ENGINEERING** (1 or more). Readings and discussions in Environmental Sciences and Engineering to provide opportunity to develop new concepts and topics in various aspects of Environmental Sciences and Engineering. **Fall, spring, and summer.** Staff.

ENVR 311 **SEMINAR IN ENVIRONMENTAL HEALTH** (1). Open by special arrangement to students doing advanced graduate work. Directed readings and reports on recent advances concerned with environmental health. Reports of current research and review of principal journals in environmental health, sanitary engineering and sanitary sciences. **Two seminar hours a week, fall and spring.** Weiss; staff.

ENVR 313 **ENVIRONMENTAL HEALTH PROBLEMS IN DEVELOPING COUNTRIES** (1). Selected problems relating to achievement of social, economic and technologic benefits in developing countries through improvement of the environment. Seminar topics: technical processes and innovation, institutions, modification of values and attitudes, planning and administration (general applications and specific case studies of environmental change). **Offered in alternate years beginning Fall, 1972**. Shiffman.

ENVR 320 **RESEARCH IN ENVIRONMENTAL CHEMISTRY** (2 or more). Research problems in environmental chemistry such as analytical methodology of inorganic and organic

substances in water and wastewater, the chemical aspects of water and wastewater treatment. **Fall, spring, and summer.** Staff.

ENVR 330 **RESEARCH IN ENVIRONMENTAL BIOLOGY** (2 or more). Research problems in environmental biology such as the ecology of natural and polluted waters, the macro-and microbiology of waste treatment. **Fall, spring, and summer.** Staff.

ENVR 340 **RESEARCH IN AIR AND INDUSTRIAL HYGIENE** (2 or more). Prerequisites, graduate standing and permission of instructor. **Fall, spring, and summer.** Staff.

ENVR 350 **RESEARCH IN ENVIRONMENTAL MANAGEMENT AND PROTECTION** (2 or more). Independent study and research in environmental management and protection. **Fall, spring, and summer.** Staff.

ENVR 360 **RESEARCH IN RADIOLOGICAL HYGIENE** (2 or more). Prerequisite, advanced standing in the Radiological Hygiene Program. The execution of independent investigation and the preparation of a paper. **Fall, spring, and summer.** Staff.

ENVR 370 **RESEARCH IN SANITARY ENGINEERING** (2 or more). Prerequisite, consultation with the faculty and approval of subject and proposed program. Research in the engineering phases of problems relating to water supply, purification, wastes, waste treatment, and stream pollution. **Four or more hours a week, fall, spring, and summer.** Staff.

ENVR 380 **RESEARCH IN WATER RESOURCES** (2 or more). Prerequisite, consultation with the faculty and approval of subject and proposed program. Research relating to engineering aspects of water resources and their development. **Four or more hours a week, fall, spring, and summer.** Staff.

ENVR 393 **MASTERS THESIS** (3-9).

ENVR 394 **DOCTORAL DISSERTATION** (3-9).

ENVR 400 **GENERAL REGISTRATION** (0).

DEPARTMENT OF EPIDEMIOLOGY

EPID 140, 141 **PROBLEMS IN EPIDEMIOLOGY** (1 or more). A course for students who wish to make an intensive study of some special problem in epidemiology. **Two or more hours a week, fall and spring.** Staff.

EPID 160 **PRINCIPLES OF EPIDEMIOLOGY** (3). An introductory course in which the meaning and scope of epidemiology are considered, having particular regard to its use in the scientific appraisal of community health and in elucidating various processes involved in determining the health of

people. Lectures, seminars, and laboratory exercises are directed towards developing an appreciation of the relationships between health of a group, along with other characteristics of the group and its habitat. **One lecture and two laboratory hours a week, fall.** Cassel; staff.

EPID 161 **EPIDEMIOLOGY IN POPULATION DYNAMICS AND FAMILY PLANNING PROGRAMS** (3). Alternative to EPID 160 satisfying core requirements. The course includes four units. (1) Basic principles and methods of epidemiology as they apply to population dynamics and family planning programs. (2) The epidemiology transition: the dynamics of changing patterns of health and disease with social and economic development. (3) Epidemiology in family health practice including the impact of family planning programs on the family itself. (4) Epidemiology of pregnancy outcome abortion and of the consequences of prolonged use of various contraceptive methods. **Two lectures and two laboratory hours a week, fall.** Omran.

EPID 162 **EPIDEMIOLOGY IN ENIRONMENTAL HEALTH** (3). Prerequisite, permission of instructor. Alternative to EPID 160 satisfying core requirements. This is an introductory course in the history, principles, and uses of epidemiology for the understanding and control of population health and disease in relation to man's environment. Illustrations will be presented of the use of epidemiology as a research technique (the identification of health and disease determinants in the environment), and the use of epidemiology for administrative purposes (surveillance, planning and evaluation for environment health programs). **One lecture and two laboratory hours a week, fall.** Tyroler, Voors; staff.

EPID 168 **BEHAVORIAL SCIENCE MEASUREMENT IN HEALTH PROGRAMS AND RESEARCH** (3). Prerequisite, basic course in epidemiology and statistics, or permission of instructor. Reviews relation of psychological and social factors to health. Illustrates construction and evaluation of behavioral measures. **Fall.**

EPID 211 **DETERMINANTS OF COMMUNICABLE DISEASE** (2). Biological determinants, changing patterns of communicable diseases, definition of high-risk sub-populations, methods of control. **Two lecture hours a week, fall.** Becker.

EPID 230 **APPLIED METHODS IN EPIDEMIOLOGY AND HEALTH SERVICES RESEARCH** (4). Prerequisites, EPID 160 and BIOS 105. The application of epidemiologic and statistical methods integrated with health and other information systems in the design and operation and analysis of epidemiologic and health services research. **Spring.** Cornoni, Cordle.

EPID 231 **EPIDEMIOLOGIC RESEARCH IN PERSONAL HEALTH SERVICES** (3). Prerequisite, EPID 160. To acquaint students with techniques available for measurement of quality in

health care. Emphasis placed on literature review. Participation will include discussion of methods and studies presented. **Fall.** Hulka.

EPID 240 **ALCOHOL, BEHAVIOR AND HEALTH** (2). Major objective of this course is to acquaint the student with the variety of problems associated with alcohol usage. It is an interdisciplinary course providing lectures and discussions of many aspects related to alcohol abuse and alcoholism. **Fall.** Cornoni.

EPID 241 **RESEARCH METHODOLOGY IN ALCOHOL USAGE** (2). Emphasis of this seminar will be on research skills, particularly applicable to epidemiology studies of alcohol usage. It will involve illustrations, design and planning of studies and analysis of data. Tutorial methods based on individual interests will be employed. **Spring.** Cornoni.

EPID 260 **EPIDEMIOLOGICAL FOUNDATIONS AND DISEASE CONTROL PROGRAMS** (3). This course covers issues surrounding selected health problems, with emphasis on the current knowledge of the epidemiology and the related clinical aspects of the disorders. The implications of this knowledge for health programs, and further research endeavors are covered. **Spring.** Slome.

EPID 262 **EPIDEMIOLOGY OF PROGRAM ACCEPTANCE** (2). Prerequisite, EPID 160 or equivalent. This course uses the epidemiological method to consider problems of the social (including familial) cultural and psychological determinants of the response to health programs. Emphasis is placed on the concepts and methods useful in predicting the patterns of acceptance or rejection of health programs. **Two lecture hours a week, spring.** Patrick.

EPID 264 **CULTURE AND HEALTH** (3). Prerequisite, EPID 160 or equivalent. This course considers the role of social, cultural and psychological factors in the etiology of various disorders. Emphasis is placed upon the development of useful frameworks and on the methods required to investigate these correlates of health. **Three seminar hours a week, spring.** Kaplan.

EPID 265 **HISTORY OF EPIDEMIOLOGY** (3). Prerequisite, EPID 260 or 262 or 264. This course considers the historical development of epidemiological knowledge and method in relation to changing patterns of health and the existing scientific "climate." **Six lecture hours a week, first session, summer.** Fulton.

EPID 266 **EPIDEMIOLOGICAL INVESTIGATION** (3). Prerequisite, EPID 160 or equivalent. This course is designed to familiarize the student with the application of contemporary epidemiologic methods. Emphasis will be placed on original problem formulation and solution using records of field investigation on file in the Department of Epidemiology.

Formal lectures will be supplemented by laboratory periods for data processing and seminars for analysis and interpretation. **Three lecture hours a week, spring.** Tyroler.

EPID 287 **STATISTICAL METHODS IN EPIDEMIOLOGY** (Biostatistics 287) (3). Prerequisites, BIOS 100 and EPID 160, or equivalents. Lectures, discussions, and laboratory work on the principles and methods of epidemiological investigation, with laboratory work in assembling and analyzing crude data resulting from field investigations of epidemics. Consideration of the theory of epidemics, and models that have been used to demonstrate the effects of varying factors which influence the course of epidemics. **Two lecture and two laboratory hours a week, spring.**

EPID 300 **SEMINAR IN EPIDEMIOLOGY** (2). Prerequisites, advanced standing. Review assignments and individual reports of current literature in population health research. **Four hours a week, fall and spring.** Cassel.

EPID 315 **FIELD TRAINING IN EPIDEMIOLOGY** (6-10). Prerequisite, advanced standing. This course is designed to give epidemiology majors a supervised field experience in population health research. Field fee $450.00. **Summer.** Cassel.

EPID 360, 361 **RESEARCH IN EPIDEMIOLOGY** (2 or more). A research course for those qualified to do independent investigation under supervision. Admission to this course is granted only for consultation with the instructor who must assign or approve the subject of research. A student may spend part or all of his time in research. **Four or more laboratory hours a week, fall and spring.** Graduate faculty.

EPID 362 **ENVIRONMENTAL EPIDEMIOLOGY SEMINAR** (3). Prerequisite, EPID 160 or equivalent and a course in BIOS or equivalent. Detailed and critical reviews of selected topics in environmental epidemiology are carried out by students working collaboratively with faculty members who are doing research in these areas. Diseases are studied for their environmental determinants, and alternatively the health consequences of selected environmental conditions are analyzed. **Three seminar hours a week, spring.** Tyroler.

EPID 368 **EVALUATIVE RESEARCH METHODS** (2). Prerequisites, basis course in epidemiology and biostatistics; preference to students with practical experience in a public health agency. An introduction to principles, research methods and indexes of program evaluation. The natural history encompassing identification of a health problem, the epidemiological foundation of planning and evaluation of a program and implementation of research findings. Review of ethical considerations. Examples will be drawn from ongoing evaluative studies. **Two seminar hours a week, spring.** Ibrahim.

EPID 393 **MASTERS THESIS** (3-6). **Fall, spring, and summer.** Staff.

EPID 394 **DOCTORAL DISSERTATION** (3-9). **Fall, spring, and summer.** Staff.

EPID 400 **GENERAL REGISTRATION** (0).

DEPARTMENT OF HEALTH ADMINISTRATION

HADM 100 **CONCEPTS OF HEALTH ADMINISTRATION** (3). The theory and management of organized health systems, at the macro and micro levels, with emphasis on elements of adminstrative process. **Two lecture and two seminar hours a week, fall.** Schaefer; staff.

HADM 101 **POLITICAL ECONOMIC, AND SOCIAL PERSPECTIVES ON HEALTH ADMINISTRATION** (2). In this course social system behavior is examined for its influence upon health needs, their perception and transformation into social, political, and economic demands for utilization of manpower, facilites, and other resources in the provision of health services comprehensively viewed at various levels of community. **One lecture and two seminar hours a week, fall.** Staff.

HADM 102 **LEGAL BASIS OF PUBLIC HEALTH PRACTICE** (2). Considers the development of various systems of law with particular emphasis on administrative law; police power and its applications in public health; preparation of laws and ordinances; court procedures and liability. **One lecture and two seminar hours a week, spring.** Ratliff.

HADM 103 **INTRODUCTION TO MODELING** ((2). Prerequisite, high school algebra. Introduction to theory and practice of model building, including dimensional analysis and logical inference, with materials from health and non-health sciences. Elementary introduction to model solving techniques. **Spring.** Zalkind.

HADM 110 **ELEMENTS OF HEALTH ADMINISTRATION** (2). A survey of the theory and practice of health administration within the context of the American health system. **Fall.** Barry.

HADM 111 **HUMAN ECOLOGY AND HEALTH SYSTEMS** (3). Prerequisite, permission of instructor. An examination of factors in man's physical and social environment that affect health states and individual and community health actions, with emphasis on variables that affect community health needs, plans and services. **Spring, summer.** Staff.

HADM 130 **DENTAL PUBLIC HEALTH** (2). Survey of the theory and practice of dental public health, including a description of the natural history of dental diseases and the current methods of prevention and control in population groups. **Two lecture hours a week, fall.** Hughes.

HADM 140 141, 142, 143 **PROBLEMS IN HEALTH ADMINISTRATION** (1 ormore). Prerequisites to be arranged with the faculty in each case. A course for students of community health administration

who wish to make an intensive study of some special problem. Hours to be arranged. **Fall. spring, and summer.** Staff.

HADM 160 **POPULATION POLICY** (2). Prerequisite, permission of instructor. The objective of this course is to introduce students interested in population problems to the substantive and process aspects of policy development for fertility control. **Two lecture hours a week, fall.**

HADM 162 **ETHICAL ISSUES IN HEALTH POLICIES IN CONTEMPORARY MEDICINE** (Religion 191). (3). Examination of ethical dimensions of such issues as the dying patient, organ transplants, abortion, prolongation of life, and experimentation on human subjects in light of national health policy, drawing on theory from the social sciences and the traditional western religions. **Fall.** Allen.

HADM 170 **PERSONAL HEALTH SERVICES ADMINISTRATION I** (2). No prerequisites. The objective of this course is to introduce health workers to the broad field of medical care and personal health services administration. Control areas include financing the purchase of services, organizing the delivery of health services, regulating and improving standards of care, developing and allocating resources, and planning and coordinating relationships. **Four seminar hours a week, fall.** Gentry.

HADM 180 **HEALTH PLANNING PERSPECTIVES** (2 or more). Introductory exploration of major health planning issues and their settings, their derivations and dynamics. **Fall.** Phillips.

HADM 200 **PLANNING OF COMMUNITY HEALTH SERVICES I** (3). Prerequisites, HADM 100 or equivalent and permission of instructor. The course is based on a simulation exercise in community health planning, supported by lecture and reading inputs, as a continuing workshop culminating in the preparation of plans for technical and political review. **Two lecture and two seminar hours a week, spring.** Moroney, Douglass, Phillips, Schaefer; staff.

HADM 201 **PLANNING OF COMMUNITY HEALTH SERVICES II** (2). A learning simulation conducted through problem-solving group work, in the development of comprehensive health plans under technical, political, social and economic constraints. **Spring and summer.** Schaefer; staff.

HADM 202, 203, 204 **ISSUES IN HEALTH ADMINISTRATION** (1 or more) Directed readings, reports and discussion related to problems and programs in community health administration. **One or more hours a week, fall, spring, and summer.** Staff.

HADM 205 **RESEARCH METHODOLOGY IN HEALTH ADMINISTRATION** (2). The purpose of this course is to examine available social science methodology in terms of its application to health administration. Focus will be on the use of the scientific method for understanding social phenomena, with

emphasis placed upon specific techniques, and substantive and logistical problems involved in research design. **Two hours a week, spring.** Sprague, Kaluzny, Veney.

HADM 206 **FIELD WORK IN COMMUNITY HEALTH ADMINISTRATION** (4 to 16). Prerequisites HADM 100 and 200 or equivalent. This course provides an opportunity for supervised field observation and experience in selected community health agencies. Field fee, $450. Seminar. Staff, field preceptors in community health agencies.

HADM 207 **FIELD TRAINING IN HEALTH ADMINISTRATION** (12). Through extended involvement in work situations each student has the opportunity to apply his academic learnings and study some aspects of health administration in a service setting. **Fall, spring, and summer.** Staff and field preceptors.

HADM 208 **FINANCE AND PERSONNEL ADMINISTRATION** (2). Prerequisite, HADM 100 and permission of instructor. Structural process and functional aspects of finance and personnel administration related to health. **Spring.** Harper, Moorhead.

HADM 209 **RATIONAL MODELS FOR DECISION MAKING IN HEALTH: A SOCIAL SYSTEM VIEW** (2). Prerequisites, HADM 100, HADM 101. Deals with health decision making within a total social system. **Spring**. Veney.

HADM 211 **CONTROL OF COMMUNICABLE DISEASES** (2). This course is designed to acquaint the physician and administrator with contemporary concepts in the control of communicable disease, both in the individual and in the community. **Two lecture hours a week, spring.** Staff.

HADM 212 **PRINCIPLES OF CHRONIC DISEASE CONTROL** (2). Study of the impact of chronic illness and disability on society, and societal responses to this evolving health problem. Emphasis on technological, social and programmatic alternatives and their administrative implications. Current legislative issues explored. **Two hours per week, spring.** Holley, Phillips.

HADM 214 **INTRODUCTION TO OCCUPATIONAL HEALTH** (2). The background and development of occupational health services presented: programs and activities for the promotion, protection and conservation of the health of the working population are discussed. Field visits are made to selected occupational health programs. **One lecture and two seminar hours a week, spring.** Staff.

HADM 220 **ADMINISTRATIVE EPIDEMIOLOGY: ANIMAL-RELATED PROBLEMS** (2). Emphasis is placed on the zoonoses, food hygiene and production, radio-biology and comparative medicine. **One lecture and two seminar hours a week, spring.** Hines.

HADM 230 **DENTAL PUBLIC HEALTH PRACTICE** (3). The application of administrative principles and techniques in dental public health programs. Dental health education, fluoridation, dental health economics and preventive dentistry are discussed as components of dental public health programs. **Three lecture hours a week, spring.** Hughes.

HADM 231 **ISSUES IN DENTAL PUBLIC HEALTH PRACTICE** (2). Open only to dental public health majors in the School of Public Health. Considers dental public health programs in a variety of cummunity settings. **One lecture and two seminar hours a week, spring.** Hughes.

HADM 240 **TRENDS IN COMMUNITY REHABILITATION SERVICES** (2). Study of community rehabilitation service system for physically disabled and chronically ill. Community needs, social programs and trends in evolution of rehabilitation system are analyzed. Economic social and political factors influencing this system are identified. **Two hours a week, fall.** Holley.

HADM 241 **REHABILITATION SERVICES IN COMMUNITY HEALTH** (3). Community aspects of the planning, delivery and evaluation of rehabilitation services for the chronically ill and disabled. **Two lecture and two seminar hours a week, spring.** Holley.

HADM 250 **APPROACHES TO INJURY CONTROL** (2). An introduction to accident prevention and other approaches to injury reduction. Biological, psychological, and social factors associated with injury are discussed within the framework of injury control models. **Fall.** Barry, Waller.

HADM 251 **ISSUES IN INJURY CONTROL** (3). Social, economic, and political issues in injury control. Emphasis on consumer protection through product safety and occupational safety. **Spring.** Barry, Waller.

HADM 260 **FAMILY PLANNING PROGRAM DEVELOPMENT** (3). Problems of administration in the population field, the factors underlying such problems, and possible means of solution under different conditions, using information and experience from family planning programs in various countries. **Three lecture hours a week, spring.** Jain, Freymann, Allen.

HADM 264 **ADVANCED STUDIES IN POPULATION POLICY DEVELOPMENT** (2). Studies of problems, concepts and methods in population policy development. Interdisciplinary approaches to overall goal identification, analyzing policy content alternatives for achieving goals and facilitating relevant processes at different organizational levels. **Fall and spring.** Freymann.

HADM 265 **INTERNATIONAL ORGANIZATIONS IN POPULATION POLICY AND PROGRAMS** (2). Studies roles, problems, opportunities of international organizations in the population field. Reference to international development assist-

ance, organizational development, technical assistance; special concern, interdisciplinary and interorganizational aspects; emphasis on developing countries. **Fall and spring.** Freymann.

HADM 266 **UNITED STATES HEALTH POLICY** (Maternal and Child Health 266) (2). An examination of policy issues pertaining to delivery of health services in the United States. Evolution and current developments are examined in an effort to evaluate the administrative implications of current and proposed systems of health delivery in the U. S. Miller, Allen.

HADM 270 **PERSONAL HEALTH SERVICES ADMINISTRATION II** (2). Prerequisite, premission of instructor. Advanced work in Medical Care and Personal Health Services Administration. Major emphasis is directed to the planning and evaluation of health service delivery systems. Analytical models and various assessment criteria are used for equating health problems with necessary services and service resources, assuring quality of health service outcomes, and enhancing the effective and efficient use of scarce and costly resources. **Four seminar hours a week, spring.** Gentry.

HADM 271 **HEALTH FACILITIES ADMINISTRATION** (2). Prerequisite, permission of instructor. Introduction to the structure, functions and administration of health services facilities. The hospital will be used as a model with inclusion of nursing homes, and other long-term care facilities. Attention will be directed to cost, financing, utilization, external relations, administration and patient care organization, quality controls, computer applications, area-wide planning and related items. **One lecture and two seminar hours a week, spring.** Smith.

HADM 272 **SOCIAL PSYCHOLOGICAL ASPECTS OF HEALTH CARE** (2). Prerequisite, permission of instructor. The aim of the course is to provide future administrators, planners and researchers in the health field with an introduction to social theory and relevant findings useful for planning and delivery of health services. Major foci involve the role of cultural, social and psychological factors involved in structuring, maintaining and utilizing the health care system. Among special topics covered are: the organization of medical practice, problems of bureaucracy in medicine and the dynamics of social change. **Four seminar hours a week, fall, spring, and summer.** Kaluzny, Veney.

HADM 273 **THE ECONOMICS OF HEALTH CARE** (2). Prerequisite, HADM 170, or permission of instructor. Introduction to the economics of health care. Attention is directed to the demand for health services, supply, and costs of services, economics implications of the distribution and alternative uses of health care resources, and insurance and other methods of paying for health care. Consideration is given to applicable tools of economic analysis and relationships

of health care expenditures to the total economy of an area. **One lecture and two seminar hours a week, spring.** Coulter.

HADM 275 **POLITICS AND GOVERNMENT IN HEALTH ADMINISTRATION** (2). The purpose of this course is to examine the political dynamics and processs through which health policy issues are generated, legislated, adjudicated, and administered at local, state, national, and international levels of governance. **Spring and summer.** Flash, Schaefer.

HADM 280 **COMPREHENSIVE HEALTH PLANNING** (2 or more). Prerequisites, HADM 180 and permission of instructor. Insights into Comprehensive Health Planning Problems through interaction with prominent health planners. Designed for students interested in comprehensive health planning. Covers administrative, economic, legal and political aspects of planning. **Spring.** Phillips.

HADM 289 **HEALTH MANPOWER PLANNING: METHODS AND ISSUES** (2 or more). Prerequisite HADM 100 or equivalent and permission of instructor. Introduces health workers to health manpower planning and to principal issues confronting planners and administrators. Specific topics include supply and demand, training needs, manpower utilization and distribution; utilizes examples from USA and less developed countries. **Spring.** Hall.

HADM 300 **RESEARCH IN COMMUNITY HEALTH ADMINISTRATION** (2 or more). Open only to advanced students. Provides an opportunity to the student for supervised research in problems related to community health administration. Hours to be arranged. **Fall, spring, and summer.** Staff.

HADM 304 **SEMINAR IN TEACHING OF HEALTH ADMINISTRATION** (3). Problems and processes of teaching health administration, including supervised practicum experience. **Six hours a week, fall, spring, and summer.** Schaefer; staff.

HADM 305 **RESEARCH IN MEDICAL CARE ADMINISTRATION** (2 or more). Open only to advanced students. Provides an opportunity for the student to engage in supervised research in the organization and administration of medical care programs. Hours to be arranged. **Fall, spring, and summer.** Gentry, Kaluzny; staff.

HADM 312 **RESEARCH IN CHRONIC DISEASE CONTROL METHODS** (2 or more). Open only to advanced students. Provides an opportunity for the student to engage in supervised research in the organization and administration of programs for the control of long-term illness. Hours to be arranged. **Fall, spring, and summer.** Staff.

HADM 314 **ADVANCED SEMINAR ON ORGANIZATIONAL BEHAVIOR OF HEALTH INSTITUTIONS** (2). Prerequisite, permission of instructor. Assesses organizational behavior as it relates to health care institutions. Includes theoretical and

methodological issues and provides a systematic assessment of various administrative structures and processes. Evaluates available empirical research. **Fall and spring.** Kaluzny.

HADM 315 **QUALITATIVE ANALYSIS OF INTER-ORGNIZATIONAL RELATIONS** (3). Prerequisites, HADM 100 and 101 or permission of instructor. An advanced course in exploration of inter-organizational relationships from several perspectives and settings in search of factors influencing interdependencies as service organizations attempt to assure their survival, growth and development. **Spring.** Jain, Frey.

HADM 316 **ORGANIZATIONAL EFFECTIVENESS AND ANALYSIS** (2). Prerequisites, HADM 100 or permission of instructor. Course designed to give students insights into the evaluation of the effectiveness of organizational methods of analysis of organizations, and initiation of change in them. **Spring.** Jain.

HADM 330 **RESEARCH IN DENTAL DISEASE CONTROL METHODS** (2 or more). Open only to advanced students. Provides an opportunity for the student to engage in supervised research in the organization and administration of programs for the control of oral disease and conditions. Hours to be arranged. Hughes.

HADM 360 **RESEARCH IN ORGANIZATION AND ADMINISTRATION OF FERTILITY CONTROL PROGRAMS** (2 or more). Prerequisites, permission of instructor. Open only to advanced students. Provides an opportunity for the student to engage in supervised research in the organization and administration of programs for fertility control. **Two or more hours a week, fall, spring, and summer.** Jain, Freymann; staff.

HADM 373 **SEMINAR IN HEALTH SERVICES ADMINISTRATION** (2). Post-field training seminar sequence which will include assessment of planning, management and evaluation practices of health service agencies examined during field training assignments. **Four seminar hours a week, spring and second summer session.** Staff.

HADM 380 **SEMINAR IN COMPREHENSIVE HEALTH PLANNING** (2 or more). Seminar to provide opportunities for gaining insights into problems, issues and solutions in comprehensive health planning. Students make presentations on their field experience and use the presentations as opportunities for discussion by the class prior to preparation of term papers. **Fall.** Moroney, Phillips.

HADM 393 **MASTERS THESIS** (3-6) **Fall, spring, and summer.** Staff.

HADM 394 **DOCTORAL DISSERTATION** (3-9) **Fall, spring, and summer.** Staff.

HADM 400 **GENERAL REGISTRATION** (0).

DEPARTMENT OF HEALTH EDUCATION

HEED 33 **TOPICS IN HUMAN SEXUALITY** (3). Open to undergraduates and graduates by permission of instructor. Interpersonal relationships, abortion and contraception; psychosexual development, marriage and responsibility; legal aspects of contraception, sex, and abortion. **Three hours a week, fall and spring.** Hochbaum, Gourley, Stocking.

HEED 104 **SCHOOL AND COMMUNITY ORGANIZATION FOR HEALTH EDUCATION** (4). The influence of school administration and the curriculum upon the evolution and development of school health programs, factors in the total school health program, community health agencies and organizations, school-community relationships, representative programs, and the organization and administration of health education in communities and schools. Required for undergraduate majors in health education. **Three lecture and two laboratory hours a week, spring.** Barr.

HEED 105 **METHODS AND MATERIALS IN TEACHING PUBLIC HEALTH EDUCATION** (EDUC 93) (6). The description for this course is the same as that for the other methods and materials courses in the School of Education in the 61 through 95 series. **Two lecture and two laboratory hours a week, spring.** Barr.

HEED 106 **STUDENT TEACHING IN COMMUNITY HEALTH EDUCATION** (EDUC 94) (6). The description for this course is the same as that for other student teaching courses in the School of Education in the 62 through 94 series. **Spring.** Staff.

HEED 108 **THE BLACK EXPERIENCE AND HEALTH SERVICES** (2). Prerequisite, permission of instructor. The life experience of black Americans with special reference to the implications for their participation in health programs. **Two hours a week, spring.** Steuart; staff.

HEED 120 **SCHOOL-COMMUNITY HEALTH PROBLEMS AND PROGRAMS: THE YOUNGER GENERATION** (3). Special attention to health problems clustered around four developmental levels - prepuberty, puberty, early adolescence, and late adolescence - and community efforts to meet the associated health education needs of youth. **Two lecture and two laboratory hours a week, to be arranged, spring, even years.** Staff.

HEED 121 **COMMUNITY RESOURCES AND EDUCATIONAL ASPECTS OF THE SCHOOL HEALTH PROGRAM** (3). Both recommended and actual school health programs are examined. Community resources for assisting and enriching the edu-

cational aspects of these programs are explored. **Two lecture and two laboratory hours a week, to be arranged, spring odd years.** Staff.

HEED 130 **PRINCIPLES OF HEALTH EDUCATION** (2). Prerequisite, permission of instructor. The relationship between human behavior and health; natural and planned change in health-related behavior in the individual, small group and community; principles of program design and evaluation; the role of the client in planning and implementation of health programs. **One lecture and two seminar hours a week, spring.** Steuart.

HEED 133 **INTERPERSONAL AND GROUP RELATIONS** (2). Prerequisite, permission of instructor. An experimental study of human relations with emphasis on analysis of interpersonal and group interaction, the effective use of intervention in group problem solving, leadership styles and team building, inter-group cooperation and conflict. **Six hours a week for ten weeks, fall and spring.** Staff.

HEED 140, 141, 142 **PROBLEMS IN HEALTH EDUCATION** (1 or more). Prerequisites to be arranged with the faculty in each individual case, depending upon the problem that is to be studied. A course for students of public health who wish to make an intensive study of some special problem in public health education. **Fall, spring, and summer.** Staff.

HEED 200 201, 202, 203, 204 **SPECIAL STUDIES IN BEHAVIOR CHANGE** (1 or more). Prerequisite, permission of instructor. HEED 200 - natural change process in health-related behavior; HEED 201 - planned change; personal and non-personal methods; HEED 202 - program design and evaluation; HEED 203 - personnel development and community action; HEED 204 - social class and culture variations in planned change. **Fall, spring, and summer.** Staff.

HEED 206 **EDUCATION AND SOCIAL CHANGE IN POPULATION PLANNING** (2). Prerequisite, permission of instructor. The study of social and behavioral factors in the adoption of new practices; cross-cultural analyses and planning for the educational aspects of population control programs including implementation, evaluation, and training of personnel. **One lecture and two laboratory hours a week, spring.** Dawson, Epling.

HEED 209 **UNITS OF PRACTICE I: INDIVIDUAL, SMALL GROUP AND NETWORK** (3). Corequisite, enrollment in HEED 241 or permission of instructor. Behavior systems in the individual, small group, family and other styles for planned change in personal health-related behavior; interpersonal and non-personal methods. **Three hours a week, spring.** Staff.

HEED 210 **UNITS OF PRACTICE II: THE COMMUNITY** (3). Corequisite, enrollment in HEED 241 or permission of instructor. The nature and delineation of communities as social systems; theories, principles and practices relevant to health-related community development processes; the identification of formal and informal leadership and power structures and the coordination and development of community and agency resources essential to the educational components of community health. **Two lecture and two seminar hours a week, spring.** Dawson.

HEED 222, 223 **PROFESSIONAL PRACTICE** (1 or 2). Corequisite, enrollment in HEED 242 or permission of instructor. Studies in the professional role of the change agent and consultant with special reference to cross-cultural settings; the development of the professional and sources of innovation in practice. **One or two hours a week, summer.** Steuart; staff.

HEED 234 **TEAM PROBLEM SOLVING** (1 or more). Prerequisites, HEED 133 or permission of instructor. An experimental study of interpersonal relations in professional team settings; intra- and inter-team relationship processes; task organization; extension of these processes to large social systems with emphasis on intervention techniques. **Two or more hours a week, spring.** Staff.

HEED 240 **FIELD WORK: INTRODUCTION TO COMMUNITY ACTION** (2 or more). Corequisite, HEED 130, HEED 133 or permission of instructor. Establishing client-professional relations; community group development and participation in planning; preliminary analysis of selected demographic, social, cultural and epidemiological features of the community; the diagnosis of community needs. Field fee: $450.00. **Fall.** Dawson; staff.

HEED 241 **FIELD WORK: PROGRAM PLANNING AND DESIGN** (2 or more). Prerequisite, HEED 240 or permission of instructor. Data-collection and analysis relevant to program objectives, methods and evaluative research with associated community group participation in planning and implementation. **Spring.** Dawson; staff.

HEED 242 **FIELD WORK: PROGRAM DEVELOPMENT AND COMMUNITY ACTION** (2 or more). Prerequisite, HEED 241 or permission of instructor. Client-professional partnership in community action in selection and design of techniques for health related behavior change and in program evaluation. **Summer.** Dawson; staff.

HEED 243 **FIELD WORK: ADVANCED COMMUNITY HEALTH DEVELOPMENT** (2 or more). Prerequisite, HEED 242 or permission of instructor. Client and professional consultation in community health development, in personnel development and supervision of non-professional and professional community health workers. **Summer.** Dawson; staff.

HEED 244 **FIELD WORK: EVALUATION** (2 or more). Prerequisite, HEED 243 or permission of instructor. Studies of change processes in the community setting and evaluation of the effectiveness of the role of the change agent. **Fall.** Dawson; staff.

HEED 250, 251 **EVALUATION IN HEALTH EDUCATION** (1-2). Prerequisite/corequisite, enrollment in HEED 241, 242, or permission of the instructor. Program design and evaluation; theoretical and methodological considerations in the evaluation of planned attempts to change health-related behavior. **Three hours a week, spring and summer.** Hochbaum.

HEED 252 **NATURAL CHANGE DETERMINANTS IN HEALTH-RELATED BEHAVOR** (3). Prerequisite, HEED 209, HEED 210, or permission of instructor. An integrated behavioral science approach to unplanned determinants of change in the health-related behavior systems of the individual, small group and community. **Three hours a week, fall.** Epling.

HEED 254 **PERSONNEL DEVELOPMENT** (2). Corequisite, enrollment in HEED 244 or premission of instructor. The study of training and supervision as processes for personnel development in programs of planned change; training system strategies, design, teaching styles, methods and evaluation; the personnel development role in supervision, effects of organizational climate, communication networks, etc., with special attention to implications for interaction with clients. **Two or more hours a week, fall.** Staff.

HEED 300 **DEVELOPMENTS CURRENT TO PUBLIC HEALTH EDUCATION** (2). Prerequisite, Master of Public Health degree or equivalent. This course will consider current developments in public health education. **One lecture and two laboratory hours a week, fall.** Staff.

HEED 310 311, 312, 313, 314, 315, 316, 317 **SEMINAR IN BEHAVIOR CHANGE** (2 or more). Prerequisite permission of instructor. HEED 310 - Social epidemiology and health education; HEED 311 - the behavioral science foundations of health education; HEED 312 - cultural change processes and health; HEED 313 - behavior change processes in the individual and small network; HEED 314 - power structure, leadership and community action; HEED 315 - the dynamics of planned change; HEED 316 - health personnel and the client; HEED 317 - cross-cultural and international aspects of health programs. **Four or more hours a week, fall, spring, and summer.** Staff.

HEED 340 **ADVANCED FIELD TRAINING IN HEALTH EDUCATION** (8). Under the guidance of faculty and field counselors, students in this course may assume major responsibility in field centers for a special phase of public health education - program planning and development, intensive studies and surveys of problem situations, evaluations, inservice training, etc. - or for a community-wide program on a temporary basis. Open only to advanced graduate students

who have been engaged in public health education at least two years beyond completion of the master's program. Field fee, $450.00. **Fall and spring.** Staff.

HEED 350 **RESEARCH IN HEALTH EDUCATION** (2 or more). Individual arrangements may be made by the advanced student to spend all or part of his time in supervised investigation of selected problems in Community Development. **Four or more laboratory hours a week, fall, spring, and summer.** Staff.

HEED 351 **RESEARCH IN HEALTH EDUCATION** (2 or more). Individual arrangements may be made by the advanced student to spend all or part of his time in supervised investigation of selected problems in Communication Process and Media. **Four or more laboratory hours a week, fall, spring, and summer.** Staff.

HEED 352 **RESEARCH IN HEALTH EDUCATION** (2 or more). Individual arrangements may be made by the advanced student to spend all or part of his time in supervised investigation of selected problems in Practice and Evaluation. **Four or more laboratory hours a week, fall, spring, and summer.** Staff.

HEED 353 **RESEARCH IN HEALTH EDUCATION** (2 or more). Individual arrangements may be made by the advanced student to spend all or part of his time in supervised investigation of selected problems in Education and Training. **Four or more laboratory hours a week, fall, spring, and summer.** Staff.

HEED 354 **RESEARCH IN HEALTH EDUCATION** (2 or more). Individual arrangements may be made by the advanced student to spend all or part of his time in supervised investigation of selected problems. **Four or more laboratory hours a week, fall, spring, and summer.** Staff.

HEED 393 **MASTERS THESIS** (3-6). **Fall, spring, and summer.** Staff.

HEED 394 **DOCTORAL DISSERTATION** (3-9). **Fall, spring, and summer.** Staff.

HEED 400 **GENERAL REGISTRATION** (0).

DEPARTMENT OF MATERNAL AND CHILD HEALTH

MHCH 33 **TOPICS IN HUMAN SEXUALITY** (3). Open to undergraduates and graduates by permission of instructor. Interpersonal relationships, abortion and contraception; psychosexual development, marriage and responsibility; legal aspects of contraception, sex, and abortion. **Three hours a week, fall and spring.** Hochbaum, Gourley, Stocking.

MHCH 103 **REPRODUCTIVE PHYSIOLOGY AND CONCEPTION CONTROL** (2). No prerequisite. Male and female reproductive physiology and methods of regulating these processes will be presented in detail. Other aspects of the repro-

ductive process; pregnancy, fetal wastage, infertility, sterilization, abortion and community responsibilities will also be discussed, with case histories, field trips and clinical illustration utilized when applicable. **Two lecture hours a week, fall.** Hulka.

MHCH 105 **DISORDERS OF DEVELOPMENT AND LEARNING IN CHILDHOOD** (2). Interdisciplinary approach to developmental problems in children. Overview of etiological factors, diagnostic and management techniques. Lecture and discussion. Individual and group projects. **Two lecture hours a week, fall, spring, summer.** C. Knobeloch and DDDL Staff.

MHCH 140, 141, 142 **PROBLEMS IN MATERNAL AND CHILD HEALTH** (1 or more). Prerequisites to be arranged with the faculty in each individual case, depending upon the problem that is to be studied. A course for students in public health who wish to make an intensive study of some special problem in public health. **Two or more hours a week, fall, spring, and summer.** Staff.

MHCH 200 **ISSUES AND TRENDS IN MCH AND FAMILY PLANNING** (2). For students outside the department of MCH who desire an overview of content and programs in maternal and child health and family planning. Emphasis will be on current developments and trends in providing services for families. **Four seminar hours a week, spring.** Edmands, Miller.

MHCH 210 **MATERNAL AND CHILD HEALTH I** (3). For students whose major is maternal and child health. Nonmajors require permission of instructor to enroll. Course covers: (1) maternal and infant needs and problems; (2) socioeconomic and cultural factors; (3) planning, administration and evaluation of community services. **Two lecture and two seminar hours a week, fall.** Seigel, Gourley, Noyes.

MHCH 211 **MATERNAL AND CHILD HEALTH II** (3). Continuation of MHCH 210 and is concerned with a review of basic factors related to development and health of children from infancy through adolescence. The organization and program planning of community health services for children are emphasized. **Two lecture and two seminar hours a week, spring.** Miller, Gourley, Siegel.

MHCH 212 **SOCIAL PROBLEMS AND SERVICES FOR CHILDREN AND THEIR FAMILIES** (2). This course is concerned with the needs of children, the role of the family in child development, and community services and suports required by the family to fulfill its function. The Child Care system in the U.S. and in other countries will be studied. Evaluation of current programs and proposals will be considered, along with innovative approaches to strengthening family functioning. **Two lecture hours a week, spring.** Gourley, Schaefer.

MHCH 213 **ADVANCED PROBLEMS IN MATERNAL AND CHILD HEALTH** (2). This course is designed to provide each student with major interest in maternal and child health an opportunity to study, investigate and prepare a comprehensive report on a selected topic within the maternal and child health field. **Two lecture hours a week, spring and summer.** Bauman, Schaefer, Udry.

MHCH 214 **FIELD TRAINING IN MATERNAL AND CHILD HEALTH** (2-8). Field experience in community maternal and child health services will be required of selected students in terms of their background of experience, special interests, and future professional plans. An additional field fee of $450.00 will be assessed for this supervised field training. **Summer,** 6-10 weeks. Staff.

MHCH 215 **CHILD HEALTH ASSESSMENT** (2-3). Permission of instructor required. Designed primarily for nurses with community health orientation and career goals; also for physicians, physical therapists, and others with appropriate professional background and professional objectives. Focuses upon wellness care. Emphasizes development of assessment knowledge and skills within the framework of normal individual and family growth and development. Four seminar hours a week; nurses who elect additional credit hour will be provided opportunities for clinical practice in area of developmental assessment. **Variable number of hours a week, spring.** Stocking.

MHCH 216 **NURSING AND FAMILY PLANNING** (PHNU 216) (3). This course for nurses is designed to provide the student with knowledge of current developments, trends, and content in maternal health and family planning. Emphasis is on the opportunities and responsibilities of nurses in these particular areas. Content will include discussion and exploration of many factors which will affect utilization of maternal health and family planning services. **Three hours a week, spring or summer.** Edmands.

MHCH 217 **CHILD HEALTH: NURSING INTERVENTION** (3-6). Course designed primarily for nurses with community health nursing orientation and career goals. Builds upon content developed in MHCH 215. Course emphasis is upon nursing practice with infants, young children and their families in a variety of cummunity settings throughout North Carolina. Provides opportunity for synthesis of knowledge and skills in child health assessment, appropriate decision making regarding care and application of this knowledge to planping for nursing services in community settings. Permission of instructor required. **Variable number of hours weekly, summer (other times by special arrangement).** Stocking.

MHCH 266 **UNITED STATES HEALTH POLICY** (Health Administration 266) 2-3. An examination of policy issues pertaining to delivery of health services in the United States. Evolution and current developments are examined in an effort to

evaluate the administrative implications of current and proposed systems of health delivery in the U. S. **Two hours a week, spring.** Allen, Miller.

MHCH 300 **RESEARCH IN MATERNAL AND CHILD HEALTH** (2 or more). Open by special arrangement to students desiring to initiate and pursue an original investigation of a selected problem. **Four or more hours a week, fall, spring, or summer.** Udry, Staff.

MHCH 307 **SEMINAR IN DISORDERS OF DEVELOPMENT AND LEARNING IN CHILDHOOD** (2). Seminar for students with prior background in child development or related areas on interdisciplinary diagnosis and management of developmental problems in childhood. Focus on staff and student prepared case material. **Two seminar hours a week, spring.** C. Knobeloch and DDDL Staff.

MHCH 315 **SEMINAR IN MATERNAL AND CHILD HEALTH** (1). Prerequisite, MHCH 210. This seminar provides an opportunity for students and faculty to explore in greater depth selected subjects within the field of maternal and child health. **Two seminars a week, summer.** Siegel, Staff.

MHCH 320 **SEMINAR IN PROGRAMS TO AFFECT HUMAN REPRODUCTION** (2). Application of health services research and behavioral, biological, epidemiological, and clinical studies in human reproduction to the design of programs to affect patterns of reproduction and reproductive outcomes. **Four hours a week, fall.** Udry, Noyes.

MHCH 321 **SEMINAR IN PROGRAMS TO AFFECT CHILD CARE AND DEVELOPMENT** (2). Analysis of programmatic research and behavioral and biological studies in child care and development; its contribution to the design and to the research and evaluation of programs affecting child care and development. **Four hours a week, spring.** Schaefer, Siegel.

MHCH 393 **MASTERS THESIS** (3-6). **Fall, spring, and summer.** Staff.

MHCH 394 **DOCTORAL DISSERTATION** (3-9). **Fall, spring, and summer.** Staff.

MHCH 400 **GENERAL REGISTRATION** (0).

DEPARTMENT OF MENTAL HEALTH

MENH 133 **WORKING IN SMALL GROUPS** (3). Prerequisite, permission of instructor. An experiential course which provides live data for immediate understanding about basic group processes, like team-building, group leadership and membership, managing conflict and cooperation, problem-solving and intervention. **Two weekends and two weekly sessions for eight weeks, spring.** Lynton, Smallegan.

MENH 140, 141, 142 **PROBLEMS IN MENTAL HEALTH** (2-4). Consent of instructor. **Fall, spring, and summer.** Staff.

MENH 150 **SURVEY OF MENTAL HEALTH PROGRAMS** (2). A survey of the development and organization of mental health services available to the public. Selected reading and field observations. **One lecture and two seminar hours a week, fall.** Edgerton.

MENH 210 **FOUNDATIONS FOR MENTAL HEALTH PRACTICE** (3). For mental health degree students and others by permission of instructor. Exploration of major problems and needs in the field of mental health; implications for mental health education roles. Field observation. **Two seminar hours, four laboratory hours, fall.** Cline, Leighton.

MENH 211 **FOUNDATIONS FOR MENTAL HEALTH PRACTICE** (3). This course is a continuation of MENH 210, with participation in community mental health programs, and in developing evaluation skills. Selected reading and content. **Two seminar hours, four laboratory hours, spring.** Leighton, Cline.

MENH 212 **FOUNDATIONS FOR MENTAL HEALTH PRACTICE** (3). This course is a continuation of MENH 211. Continued involvement in community mental health activities, emphasis on evaluation with critiques and recommendations. Consideration of special interests and needs. **Two seminar hours, four laboratory hours, summer.** Leighton, Cline.

MENH 230 **INFORMATION SYSTEMS IN MENTAL HEALTH** (BIOS 230) (3). History and current status of mental health information systems on federal, state, and local level, with emphasis on comprehensive mental health centers. National, regional and state organizations active in the field of mental health statistics. History and current status of classificatory schemata for mental disorders. Review of DSM-11 and some other frameworks of classification. Some statistical techniques in classification problems. **Three lecture hours a week, fall.** Stewart, Filley, Edgerton.

MENH 234 **EVALUATION OF MENTAL HEALTH PROBLEMS** (BIOS 234) (3). Prerequisite, permission of instructor. Discussion of vital statistics and the tools of community diagnosis, validity and reliability of the various criteria which are used for contemporaneous assessment of mental health and for assessment of change in mental health, e.g., self-assessment, clinical assessment, performance test scores. Methods of evaluating mental health problems, e.g., before and after assessment, use of control groups, cohort studies. Invited speakers will discuss current topics in mental health assessment and evaluation. **Three lecture hours a week, spring.** Stewart, Filley, Edgerton.

MENH 237 **MENTAL HEALTH AND PUBLIC HEALTH NURSING** (2). Mental health and other behavioral concepts are utilized with family case material for the study of health maintenance; prevention and treatment of emotional-social dysfunction. **Fall and spring.** Cline.

MENH 240, 241, 242 **ADVANCED PROBLEMS IN MENTAL HEALTH** (2 or more). A course for students who wish to make an extensive study of some special problem. **Two or more hours a week, fall, spring, and summer.** Staff.

MENH 255 **CONSULTATION: A PUBLIC HEALTH METHOD** (2). Prerequisite, permission of instructor. Delineates skills, problems and potentialities of consultation. Role, function, process, behaviors in consultation are analyzed with attention to utilization of this knowledge in special fields of interest. **Two seminar hours, two laboratory hours a week, summer.** Cline; staff.

MENH 257 **CONSULTATION WITH LARGE SYSTEMS** (3). Prerequisite, permission of instructor. Inter-disciplinary, inter-group and agency focus provides sequential practice of understanding and handling consultation situations and builds conceptual scheme of consultation processes adequate for consulting in institutional and community settings. **Four laboratory hours a week plus two week-ends laboratories, spring.** Lynton, Smallegan.

MENH 280 **FIELD PRACTICE IN COMMUNITY MENTAL HEALTH** (credits arranged). Prerequisite, permsision of instructor. Supervised field work in mental health centers and other settings and systems. Field fee $450. **Fall, spring, and summer.** Staff.

MENH 281 **ADVANCED FIELD PRACTICE IN COMMUNITY MENTAL HEALTH** (2-4). Prerequisites, MENH 280, consent of instructor. A continuation of MENH 280. **Fall, spring, and summer.** Staff.

MENH 301 **MENTAL HEALTH SEMINAR I** (2). Prerequisite, permission of instructor. Designed to address basic conceptual issues in mental health and illness, and relate these to a broad spectrum of human problems. **Four hours a week, fall.** Wilson, Filley.

MENH 302 **MENTAL HEALTH SEMINAR II** (2). For Mental Health degree students and others by permission of instructor. Utilizing experience and supplementary literature, the interrelationships between mental health and social problems are explored; the range of functions of mental health personnel and their interaction with other community agencies will be emphasized. **Spring.** Wilson, Filley.

MENH 303 **MENTAL HEALTH SEMINAR III** (2). Intensive study of topics of special interest. **Summer.** Wilson, Filley.

MENH 304, 305 **SEMINAR IN MENTAL HEALTH PROGRAM LEADERSHIP** (2). Prerequisite, permission of instructor. Explores knowledge, skills, materials for planning and operating community phychiatry programs and community mental health centers. **Four hours a week, fall and spring.** Hollister.

MENH 393 **MASTERS THESIS** (3-6). **Fall, spring, and summer.** Staff.

MENH 394 **DOCTORAL DISSERTATION** (3-9). **Fall, spring and summer.** Staff.

MENH 399 **RESEARCH IN MENTAL HEALTH** (2 or more).

MENH 400 **GENERAL REGISTRATION** (0).

DEPARTMENT OF PARASITOLOGY AND LABORATORY PRACTICE

PALP 131 **PARASITISM AND HUMAN DISEASE** (2). A course consisting of lectures, demonstrations, and laboratory work given as an introduction to the principles of infectious diseases. **One lecture and two laboratory hours a week, fall.** Larsh, Goulson, Clem.

PALP 134 **HUMAN PARASITOLOGY** (4). Prerequisite, permission of the instructor. Lectures, demonstrations, and laboratory work on the most common animal parasites of man with special emphasis on their life cycles, host responses, and laboratory diagnosis. **Two lecture and four laboratory hours a week, fall.** Larsh, Weatherly, Goulson.

PALP 140, 141 **PROBLEMS IN PARASITOLOGY** (1 or more). A course for students who wish to make an intensive study of some special problem in human parasitology. **Two or more hours a week, fall and spring.** Staff.

PALP 142, 143 **PROBLEMS IN PUBLIC HEALTH LABORATORY PRACTICE** (1 or more). A course for students who wish to make an intensive study of some special problem in the laboratory field. **Two or more hours a week, fall and spring.** Staff.

PALP 150 **PUBLIC HEALTH BACTERIOLOGY** (3). Prerequisite, permission of the instructor. Lectures and laboratory studies of the human pathogenic bacteria and fungi with particular emphasis on those submitted to public health laboratories for complete identification. **One lecture and four laboratory hours a week, fall.** Read.

PALP 151 **PUBLIC HEALTH VIROLOGY** (3). Prerequisites, PALP 150 and permission of the instructor. Lectures and laboratory studies on isolation and identification techniques. **Two lecture and two laboratory hours a week, spring.** Read.

PALP 230 **THE NATURE OF PARASITISM** (3). Prerequisite, permission of instructor. A consideration of such factors as the influence of external and internal environments on parasites, effects of parasites on their hosts, parasite functional morphology, nutrition, reproduction, and development. **Three lecture hours a week, spring.** Weatherly.

PALP 232 **PARASITOLOGICAL METHODS** (4). Prerequisite, PALP 134. A consideration of the methods employed in field and laboratory studies of various human parasites. **Two lecture and four laboratory hours a week, spring.** Goulson, Weatherly.

PALP 233 **MALARIOLOGY** (3). Prerequisite, permission of instructor. Lectures, demonstrations, and laboratory devoted to the study of malaria in man and mosquito. The biology and classification of mosquitos are also considered. **Two lecture and two laboratory hours a week, fall.** Watson, Hendricks.

PALP 234 **MEDICAL ENTOMOLOGY** (3). Prerequisites, Zoology 11 and PALP 134, or equivalents. Lectures, demonstrations, and laboratory studies on the insects, ticks, mites, and other arthropods that transmit and/or cause diseases of man. Methods of identifying these forms are emphasized in the laboratory. **Two lecture and two laboratory hours a week, spring.** Hendricks.

PALP 235, 236 **PROBLEMS IN PUBLIC HEALTH LABORATORY METHODOLOGY** (1 or more). Prerequisites, PALP 142 or 143, and permission of the instructor. **Two or more hours a week, fall, and spring.** Larsh, Watson.

PALP 250 **PUBLIC HEALTH LABORATORY METHODS I** (2). Prerequisite, permission of the instructor. Lectures and seminars pertaining to current diagnostic techniques in Public Health Bacteriology and Mycology. **One lecture and two seminar hours a week, fall.** Chaffee.

PALP 251 **PUBLIC HEALTH LABORATORY METHODS II** (5). Prerequisite, permission of the instructor. Lectures, demonstration and laboratory work on the most important microbiological diagnostic procedures, e.g., immunoserology, used in the modern public health laboratory. **Two lecture and six laboratory hours a week, spring.** Chaffee, Clem.

PALP 260 **PUBLIC HEALTH LABORATORY MANAGEMENT I** (2). Prerequisite, permission of instructor. A study of the broad responsibilities and activities of the public health laboratory, its relations to other divisions of the Health Department and its role in comprehensive health planning. **One lecture and two seminar hours a week, fall.** Maddry.

PALP 261 **PUBLIC HEALTH LABORATORY MANAGEMENT II** (3). Prerequisite, permission of the instructor. A continuing study in depth of the responsibilities and activities of the public health laboratory. **Two lectures and two seminar hours per week, spring.** Maddry.

PALP 330, 331 **SEMINAR IN PARASITOLOGY** (1). Prerequisite, permission of staff. Discussion of selected topics in Parasitology. **One seminar hour a week, fall and spring.** Staff.

PALP 332, 333 **SEMINAR IN PUBLIC HEALTH LABORATORY PRACTICE** (1). Prerequisite, permission of staff. Discussion of selected topics in the public health laboratory field. **One seminar hour a week, fall and spring.** Staff.

PALP 334, 335 **RESEARCH IN PARASITOLOGY** (2 or more). Open to advanced students only. **Four or more laboratory hours a week, to be arranged, fall and spring.** Larsh, Goulson, Hendricks, Weatherly, Chaffee.

PALP 336, 337 **RESEARCH IN PUBLIC HEALTH LABORATORY METHODOLOGY** (2 or more). Open to advanced students only. **Four or more laboratory hours a week to be arranged, fall and spring.** Larsh, Weatherly, Chaffee, Read.

PALP 393 **MASTERS THESIS** (3-6). **Fall and spring.** Staff.

PALP 394 **DOCTORAL DISSERTATION** (3-9). **Fall and spring.** Staff.

PALP 400 **GENERAL REGISTRATION** (0).

PUBLIC HEALTH

PUBH 100 **ECOLOGY OF HUMAN HEALTH** (3). Prerequisite, (except for School of Public Health students) permission of course instructor. Examination of health related aspects of current socio-political issues, e.g., poverty, pollution and environmental protection, drug and alcohol problems, fertility control, and governance. Analysis of nature and magnitude of problem, impact on health, casual factors, and alternate approaches to prevention or reduction. **Six seminar hours a week, fall.** Gentry.

PUBH 102 **DETERMINANTS AND CONSEQUENCES OF POPULATION CHANGE** (1). Historical and contemporary levels, differentials and trends in: population growth, geographic distribution, natality, mortality and migration. The factors affecting each of these forces and their interrelationships. The importance of population composition (by age, sex, social and economic factors) and its determinants. Theories of population change and of the demographic transition. Issues in the formulation of population policy and evaluation of relevent historical information. **Two seminar hours a week, fall.** Lingner.

PUBH 160 **COMMUNITY AND PUBLIC HEALTH** (3). For advanced pharmacy students. It includes the history and philosophy of public health, organization of health agencies and services, current community health problems, issues affecting health services delivery, trends in health services and medical care in the U.S., and consideration of the pharmacist's role in community health agencies. **Spring.** Key.

PUBH 300 **SEMINAR: CONCEPTS AND PERSPECTIVES IN HEALTH PROGRAM EVALUATION** (2). Prerequisite, permission of instructor. Examination and exploration of basic concepts in program evaluation; the contributions, leading concepts and "states-of-the-art" of related disciplines; and major problem areas in this field. **Fall.** Schaefer; staff.

PUBH 301 **SEMINAR: PROBLEMS AND CASES IN HEALTH PROGRAM EVALUATION** (2). Prerequisites, PUBH 300 and permission of instructor. Analysis and exploration of cases in health program evaluation, dealing with theoretical, contextual and methodological problems involved in evaluation practice. **Spring.** Schaefer; staff.

PUBH 310 **SEMINAR IN POPULATION AND FAMILY PLANNING** (1). Interdisciplinary lecture-discussion approach to understanding population patterns and problems in the world, community, and family. Viewpoints of different basic sciences and professional groups on population dynamics and population policies and programs. Monday evenings. **Fall, spring.** Thompson, Freymann.

DEPARTMENT OF PUBLIC HEALTH NURSING

PHNU 140, 141, 142 **READING IN PUBLIC HEALTH NURSING** (1 or more). Prerequisites to be arranged with the faculty. A course for students in public health nursing. Reading and tutorial guidance in a selected area of public health nursing. **Fall, spring, and summer.** Staff.

PHNU 180 **READINGS IN OCCUPATIONAL HEALTH NURSING** (1 or more). A course for students in occupational health nursing. Reading and tutorial guidance in a selected area of occupational health nursing. **Hours to be arranged. Fall, spring, and summer.** Courtenay, staff.

PHNU 181 **OCCUPATIONAL HEALTH NURSING I** (3). Prerequisite, experience in occupational health nursing or permission of instructor. This course is concerned with factors influencing the development of occupational health nursing programs on a full-time, part-time, or selective service basis. Consideration will be given to the general and special health services required because of potential health problems within the work environment or inherent health problems in the employed population. An opportunity will be provided to identify areas requiring greater in-depth study and to explore the expanding role of the occupational health nurse. **Six hours a week, fall and spring.** Courtenay; staff.

PHNU 197 **PHILOSOPHY AND PRINCIPLES OF SUPERVISION** (3). For public health nursing students or permission of instructor. Consideration is given to the philosophy, principles and methods of supervision in the field of public health nursing with emphasis on the supervisor's responsibility for improving nursing service through the professional development of the individual nurse. **Two lectures and two seminar hours a week, spring.** Dolan, Cline.

PHNU 198 **COMMUNITY NURSING SERVICE ADMINISTRATION I** (3). Prerequisite, permission of instructor. Analysis of patterns of organization of public health nursing services and relationships to the medical care system. Consideration of the role of nursing administrator in various types of organizations. Special emphasis on relationships with other disciplines, lay groups, and other organizations, official, voluntary, and combination agencies at local, state and federal level. Analysis of role in various organizations. Consideration of above in context of social change. **Two lecture and two seminar hours a week, spring.** Lowe.

PHNU 240, 241, 242 **PROBLEMS IN PUBLIC HEALTH NURSING** (1 or more). Prerequisites, PHNU 299 or the equivalent or permission of the instructor. A course for students in public health nursing. Students will make an intensive study of some special problem in public health relevant to public health nursing. The study will result in a paper which demonstrates the application of research principles. **Fall, spring and summer.** Highriter, Mongeau, Lowe, Nelson.

PHNU 281 **OCCUPATIONAL HEALTH NURSING II** (3). Prerequisite, PHNU 181. Continuation of Occupational Health Nursing I. During this course consideration will be given to the leadership roles in occupational health nursing and to factors influencing the organization, implementation and evaluation of occupational health nursing programs. **Six hours a week, spring and summer.** Courtenay; staff.

PHNU 282 **PROBLEMS IN OCCUPATIONAL HEALTH NURSING** (3 or more). Prerequisites, PHNU 181 and BIOS 100 or the equivalent. A course for students majoring in occupational health nursing. Students will make an intensive study of some special problems in occupational health relevant to occupational health nursing. The study will result in a paper which demonstrates the application of research principles. **Hours to be arranged. Fall, spring, and summer.** Courtenay, Highriter, Mongeau.

PHNU 290 **PUBLIC HEALTH NURSING SERVICES** (1). For non-nurse graduate students in public health. The course provides an introduction and orientation to the philosophy and principles of public health nursing. Emphasis is given to supervision and administration of public health nursing services. Current practices, trends and problems in public health nursing are explored in light of the multidiscipline approach to community health program. **Two seminar hours a week, spring and summer.**

PHNU 291 **PLANNING COMMUNITY NURSING SERVICES I** (3). Corequisites, EPID 160, BIOS 100, or permission of the instructor. Methods of assessment of community nursing needs including collection and analysis of existing data, identification of additional data needed for community nursing diagnosis and collection of these data. **Six hours a week, fall.** Nelson, Lowe, Mongeau.

PHNU 292 **PLANNING COMMUNITY NURSING SERVICES II** (3). Prerequisite, PHNU 291. Continuation of PHNU 291. Identification of community nursing needs based on data collected and analyzed in PHNU 291. Consideration will be given to the processes involved in the solution of identified needs. **Six hours a week, spring.** Nelson, Lowe.

PHNU 296 **ADVANCED PUBLIC HEALTH NURSING PRACTICE I** (3). Exploration of concepts of family and group behavior in relation to family health and illness. Selected experiences with families or other groups. Analysis of case

material and the nursing process. **Six hours a week, spring.** Watkins, George, Cline.

PHNU 297 **ADVANCED SUPERVISION IN PUBLIC HEALTH NURSING** (3). Prerequisite, PHNU 197 or equivalent. For graduate students in public health nursing. This course includes the administrative functions of the supervisor, concepts, theories and principles of administration as related to public health nursing services. Program planning and evaluation, consultation and current trends in public health nursing are included. **One lecture and four seminar hours a week, summer.** Dolan.

PHNU 298 **COMMUNITY NURSING SERVICE ADMINISTRATION II** (3). Prerequisite, permission of instructor. Concepts and methods of administering public health nursing services. Consideration will be given to community structure, assessment, program planning, priorities, evaluation of services, fiscal management, personnel management, work measurement, time and cost studies, control measures, records and reports. This course coordinated with PHNU 398 and field experience. **Two lecture and two seminar hours a week, summer.** Lowe.

PHNU 299 **RESEARCH METHODS IN PUBLIC HEALTH NURSING** (3). Prerequisites, BIOS 100 or the equivalent. Primarily for graduate students in public health nursing. Selection of the research problem, development of the research design, collection and analysis of data and interpretation of results. Students will develop a problem, collect and analyze data and interpret the results. **Two lecture and two laboratory hours a week, spring.** Mongeau, Highriter.

PHNU 300 **SEMINAR IN PUBLIC HEALTH NURSING** (1). Prerequisite, permission of staff. Discussion of selected topics in public health nursing. **Two hours a week, fall.** Dolan; staff.

PHNU 340, 341, 342 **RESEARCH IN PUBLIC HEALTH NURSING** (3 or more). Prerequisites, PHNU 299 or the equivalent and permission of the instructor. A course for students in public health nursing. Independent research under supervision. **Hours to be arranged, fall, spring, summer.** Mongeau, Highriter.

PHNU 381 **ADVANCED PRACTICE IN OCCUPATIONAL HEALTH NURSING** (3-6). Prerequisites, PHNU 181, PHNU 281. A combination seminar and field course designed to meet the career needs and interests of each student. An opportunity will be provided to study occupational health nursing administration at the national or corporate level; or occupational health nursing consultation at the local, state, regional or national level as provided by governmental or insurance agencies. (Field fee pending.) **Hours to be arranged. Summer.** Courtenay; staff.

PHNU 393 **MASTERS THESIS** (3-9). **Fall, spring, and summer.** Staff.

PHNU 396 **ADVANCED PUBLIC HEALTH NURSING PRACTICE II** (3). Prerequisite, PHNU 296. Use and evaluation of various approaches and methods in relation to the nurse's role in maintaining and promoting family health. Field fee, $450.00. **Six hours a week, first and second summer terms.** Watkins.

PHNU 398 **PROBLEMS IN COMMUNITY NURSING ADMINISTRATION** (3). Prerequisite, permission of instructor. Study and observation of a problem(s) related to the administration of public health nursing services to be carried out in a selected agency under faculty guidance. Field fee $450.00. **Six hours a week, summer.** Lowe.

PHNU 400 **GENERAL REGISTRATION** (0).

DEPARTMENT OF PUBLIC HEALTH NUTRITION

NUTR 100 **FOOD AND MAN** (2). A nutrition course designed for the non-specialist. History of nutrition. The biochemical and physiological foundations of modern nutrition science. Human nutritional requirements. Biological, psychological, social, cultural and economic determinants of food habits. Nutritional aspects of human health and disease. Food, politics and human welfare. National and international nutrition problems. Food, family planning and population growth. Nutrition of the future. **One lecture and two seminar hours per week, fall.** Edozien.

NUTR 140 **READING IN NUTRITION** (1 or more). Reading and tutorial guidance in a special area of nutrition. Prerequisite, permission of instructor. **Fall, spring, and summer.** Staff.

NUTR 200 **CELL BIOLOGY** (3). A review of the general structure and function of the cell. Chemistry of compounds of biological interest including carbohydrates, protein, lipids, and vitamins. Intermediary metabolism. Integrated cellular and organismic function including the action of hormones and nervous integration. Topics of special interest to the nutritionist will be emphasized. **Two lecture hours and two seminar hours per week, fall.** Anderson, Switzer.

NUTR 201 **CELL BIOLOGY LAB** (3). A laboratory course designed to acquaint students with the equipment and modern biochemical and biophysical methods used in nutrition research. Prerequisite, concurrent registration in NUTR 200 or the equivalent graduate course (biochemistry and physiology). **Six laboratory hours per week, fall.** Anderson, Switzer.

NUTR 202 **NUTRITIONAL BIOCHEMISTRY** (3). A review of recent developments in nutritional science. The laboratory component is designed to acquaint students with standard pro-

cedures in nutritional biochemistry and physiology including the identification and estimation of nutrients and their metabolites in foods, tissues and body fulids. Human and animal experiments in nutrition. **One lecture hour and four laboratory hours per week, spring.** Edozien, Anderson, Switzer.

NUTR 203 **FOOD SCIENCE AND TECHNOLOGY** (2). The sources and properties of nutrients for man and factors affecting their supply and availability will be studied. Mehods of handling, procuring, storing and preserving food and the changes in the values and/or characteristics of their nutrients resulting from these processes will be emphasized. **One lecture hour and two seminar or demonstration hours per week, spring.** Staff.

NUTR 204 **NUTRITION AND HUMAN HEALTH** (3). A critical review of human nutritional requirements and the relation of diet to human health and well being. Topics for discussion will include dietary requirements, food habits and their determiinants, the politics of food, national and international nutrition problems, the food-people equation, nutrition of the future, nutrition in relation to regulation of metabolism, reproduction, growth and development, morbidity and mortality, deficiency diseases, obesity, dental health, and chronic degenerative diseases. **Two lecture hours and two seminar hours per week, spring.** Edozien.

NUTR 205 **COMMUNITY NUTRITION** (2). This course is designed to acquaint students with the roles and functions of the nutritionist in community health and to assist her, through classroom work and practical experience in the community, to acquire the basic knowledge and skills required to perform these functions. **Two seminar hours and concurrent field work per week, fall.** Staff.

NUTR 206 **FOOD HABITS: DETERMINANTS AND TECHNIQUES FOR MODIFICATION** (3). This course will review the psychologica,l, socialogical and cultural determinants of food habits including both normal and abnormal patterns. Attention will be paid to those attitudes towards food actually encountered in the field. A critical review of materials and methods used for nutrition education including approaches for individuals and various age and interest groups. Development and use of effective teaching aids. Methods of evaluating the effectiveness of education programs. **Two lecture hours and two hours of seminar or laboratory sessions per week, spring.** Cines.

NUTR 207 **THERAPEUTIC NUTRITION** (3). A study of the relationship of diet to diseases of man and of dietary intervention in the prevention and/or treatment of these conditions. **Course will consist of two lecture hours and two hours of clinical demonstration per week, spring.** Prerequisite, NUTR 200 or equivalent. McLachlan.

NUTR 208 **NUTRITION PROGRAMS AND SERVICES** (3). This course is designed to illustrate the need, planning, delivery and evaluation of community nutrition programs and services. Each student will be required to make an in-depth study of the application of the principles of program planning and evaluation to meeting the needs of a high-risk group such as mothers and infants, the chronically ill and aging or the handicapped. **Four hours of seminar and concurrent field work each week, spring.** Brannon, Bryan and McLachlan.

NUTR 240 **PROBLEM IN NUTRITION** (1 or more). Prerequisite, permission of the instructor. A course for students who wish to make a study of some special problem in nutrition. Lectures, seminars and/or laboratory work according to the special area under study. **Fall, spring, and summer.** Staff.

NUTR 250 **CLINICAL NUTRITION PRACTICE** (1 or more). Experience in preparation and use of diets for medical care of patients in hospital ward, outpatient clinic or community health facility. **Two or more seminar or laboratory hours per week, fall, spring, and summer.** Staff.

NUTR 251 **FIELD EXPERIENCE** (8). Students are assigned to a local or district health department or other appropriate agency for six to eight weeks of supervised field experience. Field fee $450.00. An abridged report of activities undertaken during this period is required. Students should consult their faculty advisors for guidelines in preparing the report. Those who wish to do so, may submit an extended report in lieu of a master's dissertation. **Fall, spring, and summer.** Staff; field preceptors.

NUTR 340 **SEMINAR IN NUTRITION** (1 or more). Prerequisite, a minimum of one year of graduate work in nutrition and permission of the instructor. Seminars and/or laboratory work, according to the special area under study. **Two or more hours a week, fall, spring, and summer.** Staff.

NUTR 390 **NUTRITION RESEARCH** (2 or more). Individual arrangements may be made by the student to spend part or all of his time in supervised investigation of selected problems in nutrition. **Four or more laboratory or field hours a week, fall, spring, and summer.** Staff.

NUTR 393 **MASTER'S THESIS** (3-6). **Fall, spring, and summer.** Staff.

NUTR 394 **DOCTORAL DISSERTATION. Fall, spring, and summer.** Staff.

NUTR 400 **GENERAL REGISTRATION.**