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Diamond Anniversary Year

**THE AGRICULTURAL
AND TECHNICAL
COLLEGE OF
NORTH CAROLINA**

AT GREENSBORO

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**GRADUATE
SCHOOL
BULLETIN
1967-1968**







**THE AGRICULTURAL
AND TECHNICAL COLLEGE
OF NORTH CAROLINA**

Greensboro



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***Graduate School Office
Room 200—Dudley***

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THE AGRICULTURAL AND TECHNICAL
COLLEGE OF NORTH CAROLINA

THE GRADUATE SCHOOL

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History

Graduate education at the Agricultural and Technical College of North Carolina was authorized by the North Carolina State Legislature in 1939. The authorization provided for graduate training in agriculture, technology, applied science, and applied areas of study. An extension of the graduate program, approved by the General Assembly of North Carolina in 1957, provided for enlargement of the curriculum to include teacher education, as well as such other programs of a professional or occupational nature as might be approved by the North Carolina State Board of Higher Education.

Purpose

The Graduate School coordinates advanced course offerings of all departments within the School of Agriculture, the School of Education and General Studies, and the School of Engineering. Thus, the Graduate School offers advanced study for qualified individuals who wish to improve their competence for careers in professions related to agriculture, applied science, education, science research, and technology. Such study of information and techniques is provided through curricula leading to the Master of Science degree and through institutes and workshops designed for those who are not candidates for a higher degree. Second, the Graduate School provides a foundation of knowledge and of techniques for those who wish to continue their education in doctoral programs at other institutions. Third, the Graduate School assumes the responsibility of encouraging scholarly research among students and faculty members.

It is expected that, while studying at this college, graduate students (1) will acquire special competence in at least one field of knowledge; (2) will develop further their ability to think independently and constructively; and (3) will develop and demonstrate the ability to collect, organize, evaluate, and report facts which will enable them to make a scholarly contribution to knowledge about their discipline.

Organization

GRADUATE SCHOOL COUNCIL

The Graduate School Council is responsible for formulating all academic policies and regulations affecting graduate students, graduate courses, and graduate curricula. The council consists of the chairmen of the departments offering concentrations in graduate studies, the deans of the schools offering graduate instruction, the Director of the Summer School, the Dean of Academic Affairs, the Director of Admissions and Records, and the Director of Teacher Education. The Dean of the Graduate School serves as chairman of the council.

ADVISORY COMMITTEES OF THE GRADUATE SCHOOL

Standing committees of the Graduate School are organized to advise the council on matters pertaining to present policies, to evaluate existing and proposed programs of study, and to process student petitions relating to academic matters. These committees are

- Committee on Admissions and Retention
- Committee on Curriculum
- Committee on Publications
- Committee on Rules and Policy

FACULTY OF THE GRADUATE SCHOOL

The faculty of the Graduate School is composed of individuals who have been recommended by deans of their schools and have been approved by the Graduate School Council and the president of the college. Full-time members of the college faculty who are assigned to teach graduate courses also teach undergraduate courses.

Degrees Granted

The Graduate School of the Agricultural and Technical College of North Carolina offers one degree, the Master of Science. This degree may be earned in the following fields:

1. Agricultural Education
2. Chemistry
3. Education
 - a. Administration and Supervision
 - b. Elementary Education
 - c. Guidance
 - d. Secondary Education—(The student may select one of the following areas for certification purposes.)
 - (1) Biology
 - (2) Chemistry
 - (3) English
 - (4) French
 - (5) History
 - (6) Mathematics
 - (7) Social Science
4. Industrial Arts Education

Master of Science programs in Agricultural Education, Education, and Industrial Education enable students to become eligible* for the following certificates issued by the North Carolina State Department of Public Instruction:

1. Graduate Elementary Certificate
2. Graduate Secondary Certificate
3. Principal's Certificate
4. School Counselor's Certificate
5. Supervisor's Certificate

* In addition to credits, the Department of Public Instruction requires three years of teaching experience, employment in the public schools of North Carolina, and a minimum score on the common and special fields sections of the National Teachers Examination. For 1967, the minimum score is 550 on each section; for 1968, it is 600.

ADMISSION AND OTHER INFORMATION

Admission to Graduate Study

All applicants for graduate study must have earned a bachelor's degree from a four-year college. Application forms may be obtained from the office of the Graduate School and must be returned to that office with two transcripts of previous undergraduate and graduate studies. Processing of applications cannot be guaranteed unless they are received, with all supporting documents, in the Graduate Office at least fifteen days before a registration period. Applicants may be admitted to graduate studies unconditionally, provisionally, or as special students.

UNCONDITIONAL ADMISSION

To qualify for unconditional admission to graduate studies, an applicant must have earned an over-all average of 2.6 on a 4 point system (or 1.6 on a 3 point system) in his undergraduate studies. In addition, a student seeking a degree in Agricultural Education, Elementary Education, Industrial Education, or Secondary Education must possess, or be qualified to possess, a Class A Teaching Certificate in the area in which he wishes to concentrate his graduate studies. A student seeking a degree with concentration in Administration and Supervision or Guidance must possess, or be qualified to possess, a Class A Teaching Certificate.

PROVISIONAL ADMISSION

An applicant may be admitted to graduate studies on a provisional basis if (1) he earned his baccalaureate degree from a non-accredited institution or (2) the record of his undergraduate preparation reveals deficiencies that can be removed near the beginning of his graduate study. A student admitted provisionally may be required to pass examinations to demonstrate his knowledge in specified areas, to take specified undergraduate courses to improve his background, or to demonstrate his competence for graduate work by earning no grades below "B" in his first nine hours of graduate work at this institution.

SPECIAL STUDENTS

Students not seeking a graduate degree at A. and T. may be admitted in order to take courses for self-improvement or for renewal of teaching certificates. If a student subsequently wishes to pursue a degree program, he must request an evaluation of his record. The Graduate School reserves the right to refuse to accept towards a degree program credits which the candidate earned while enrolled as a special student; in no circumstance may the student apply towards a degree program more than twelve semester hours earned as a special student.

Housing

The college maintains six residence halls for women and two for men. A request for dormitory housing accommodation should be directed to the Dean of Students at least sixty days prior to the expected date of registration.

Food Services

The college provides food service for students at minimum cost. Two well-equipped cafeterias and a snack bar are operated at convenient loca-

tions on the campus. Students who live in the residence halls are required to eat in the cafeterias.

Financial Assistance

GRADUATE ASSISTANTS

A limited number of graduate assistantships are available to qualified individuals. The student is assigned to assist a professor or a department twenty hours per week for the duration of the assistantship. Some graduate assistants are assigned to teach undergraduate classes. Normally, a graduate assistant will be assigned to teach only one class per semester, but he may be assigned to teach a maximum of two. The assistantship offers a small stipend in addition to the funds required for tuition, fees, books, and board and lodging expenses for residence on campus. Application for an assistantship must be made to the Dean of the Graduate School at least 60 days before the term of registration. Only full-time graduate students are eligible.

OTHER ASSISTANCE

Funds, such as the National Defense Student Loan Fund, are available in limited quantity for students. Requests for information concerning these funds should be directed to the Student Aid Officer, A. and T. College.

Expenses

The fees charged to full-time graduate students carrying 12 or more semester hours of work are the same as those charged to full-time undergraduate students. For one academic year, a state resident should expect to pay \$518.00, which will cover tuition and course fees. This sum *does not* include room and board charges. Tuition and course fees for an out-of-state student carrying a full schedule will total \$770.00 for the academic year. Current room and board rates are \$276.00 *per semester*.

For the summer each in-state student pays \$8.40 per credit hour for tuition; each out-of-state student pays \$10.50 per credit hour for tuition. Other fees amount to \$3.80 per semester hour. Room and board are \$17.50 per week.

As student fees are subject to change without prior notice, it is suggested that the Cashier's Office be consulted for complete information concerning charges for full- and part-time students.

SPECIAL FEES

Fee for processing application (required only for first application to graduate studies)	\$ 5.00
Late registration	5.00
Graduation fees (Diploma and rental of academic regalia)	25.00
Transcript (after first one)	1.00
Master's thesis binding fee	20.00

AUDITING

To audit a course, a student must obtain permission from the Dean of the Graduate School and must submit the necessary forms during the registration period. A part-time student must pay all fees, including tuition, that would be charged to a student taking the course for credit. A full-time student is not required to pay any additional fees for auditing. A

change from "credit" registration to "audit" will not be permitted after the close of the deadline date for withdrawing from a course. An auditor is not required to participate in class discussions, prepare assignments, or take examinations.

Schedule of Deadlines

The Graduate School provides schedules of specific dates for completing various requirements for a degree program. These notices are not sent to individuals automatically, but may be found in the schedule of the Graduate School, available upon request.

Requests for Grade Reports, Transcripts, or Record Evaluation

The Office of Admissions and Records is the official record-keeping office at the college. Requests for official statements regarding courses completed, grade reports, or transcripts should be filed in that office.

GENERAL REGULATIONS

Advising

Until he is assigned to an advisor after he has been accepted as a candidate in a degree program, a graduate student is advised by a member of the graduate faculty appointed by the Dean of the Graduate School. The student, however, should consult and follow the curriculum guide prepared for his area of concentration. Separate curriculum guide sheets are available in the office of the department offering the concentration. They may be secured also from the Graduate School Office.

"Special" students are advised by members of the graduate faculty appointed by the Dean of the Graduate School.

Class Loads

FULL-TIME STUDENTS

Class loads for the full-time student may range from 12 to 15 semester hours during a regular session of the academic year.

IN-SERVICE TEACHERS

The maximum load for a fully employed in-service teacher must not exceed six semester hours during any academic year. The teacher may not take more than one course per semester.

COLLEGE STAFF

The maximum load for any fully employed member of the college faculty or staff will be six semester hours for the academic year. The member of the faculty or staff may not take more than one course per semester.

Concurrent Registration in Other Institutions

A student registered in a degree program in this Graduate School may not enroll concurrently in another graduate school except upon permission, *secured in advance*, from the Dean of the Graduate School.

Grading System

Grades for graduate students are recorded as follows: A, excellent; B, good; C, average; F, failure; S, work in progress (for courses in research); I, incomplete; W, withdrawal.

1. In order to earn a degree, a student must have a cumulative average of "B," (a grade point average of 3.0 on a system in which 1 hour of A earns 4 grade points).
2. A graduate student automatically goes on probation when his cumulative average falls below "B."
3. A student will be dropped from the degree program if he has not removed himself from probation after two successive terms as a full-time student.
4. A student may not repeat for credit a course in which he has earned a "C" or above.
5. A student must repeat a required course in which he has earned

- an "F." A student may not repeat the course more than once. If a student fails a second time, he is dismissed from the degree program.
6. All hours attempted in graduate courses and all grade points earned are included in the computation of the cumulative average of a graduate student.
 7. A student who stops attending a course but fails to withdraw officially may be assigned a grade of "F."
 8. All grades of "I" must be removed during the student's next term of residence.
 9. A student may not count towards a degree program any course in which he has earned a grade of "F."

Note: The North Carolina State Department of Public Instruction does not accept towards renewal of certification any course in which a student has received a grade of "D" or "F."

Professional Education Requirements for Class A Teaching Certificate

The Department of Public Instruction of North Carolina requires 18 semester hours of credit in professional education courses for all applicants for Class A teaching certificates on the secondary level. These hours must include six credits in the sociological, historical, and philosophical foundations of American education; four credits in psychological foundations of education; two credits in curriculum, instructional procedures, materials, and methods; and six credits in student teaching. The applicant for a Class A teaching certificate on the elementary level must satisfy the requirements stated above and must also have two additional credits in psychological foundations of education and four additional credits in curriculum, materials, and methods.

In all graduate degree programs except that leading to a Master of Science in Chemistry, the student at A and T College must hold a Class A certificate before he can be admitted as a candidate. To provide for the student who enters graduate studies without the required credits in courses in education, the Graduate School offers the following program: Education 2180, Education 2140 (Principles and Curricula of Secondary Schools), Psychology 2154 (Psychological Foundations of Education), Guidance 2378, a three-semester hour course in methods of teaching, and six hours of student teaching. Ed. 2140, the course in methods, and the student teaching may be taken during the same semester. Ed. 2140, Psy. 2154, the methods course, and the student teaching offer undergraduate credit only.

The program stated above is intended for and required of all students pursuing degree programs in agricultural, industrial, or secondary education or in administration and supervision or guidance who have taken no undergraduate courses in professional education. Students who have earned some but not enough undergraduate credits in education and students without "A" certificates who are seeking graduate degrees in elementary education should consult with the Chairman of the Department of Education and Psychology or the Dean of the Graduate School to work out a program to meet certification requirements .

While taking undergraduate courses in education and psychology to meet certification requirements, a student may enroll in graduate-level courses in his subject-matter area of concentration if he has completed the undergraduate requirements in that area.

Subject-matter Requirements for Class A Teaching Certificate

If a student has not completed sufficient undergraduate courses in a subject-matter field to hold a Class A certificate in that subject, he should consult with the chairman of the department offering that concentration. Together, they must work out a program to satisfy the undergraduate deficiencies by means of undergraduate courses or courses open to undergraduates and graduates.

REGULATIONS FOR A MASTER'S DEGREE

Admission to Candidacy for a Degree

Admission to graduate studies does not guarantee admission to candidacy for a degree. In order to be qualified as a candidate for a degree, a student must have a minimum overall average of 3.0 in at least nine semester hours of graduate work at A. and T., must have removed all deficiencies resulting from undergraduate preparation, and must have passed the Qualifying Essay. A candidate for a degree in Agricultural Education, Education, or Industrial Education must have earned a minimum score of 500 in the common and in special fields sections of the National Teachers Examinations. Some departments require additional qualifying examinations.

The following is the procedure for securing admission to candidacy:

1. The student secures application forms for admission to candidacy from the Graduate Office, fills them out, and returns them to that office. This step should be taken as soon as possible after the student has decided upon a degree program.

2. The Graduate Office processes the application, notifies the student of the action, and informs him of the time when the Qualifying Essay will next be administered.

3. The student may take the Qualifying Essay during his first term of residence in graduate studies. If a student fails the Qualifying Essay, he may take it a second time. After a second failure he must enroll in a prescribed English composition course (English 2440 or 2472) at this college and must earn a grade of "C" or above.

4. As soon as possible after applying for admission, the student should send to the Graduate Office an official copy of his scores on the National Teachers Examination. Application for that examination should be made in the Office of the Department of Education and Psychology. In 1967, the score required for admission to candidacy is 500 or above on the common section and 500 on the special fields section.

5. The Graduate Office informs the student of any qualifying examinations required by the department in which he is concentrating his studies.

6. After the student has completed at least nine semester hours of graduate study at the college, he becomes eligible for admission to candidacy. If, at that time, he has maintained an average of 3.0 in his graduate studies, has passed the Qualifying Essay and all departmental qualifying examinations, and has earned the required minimum on the NTE, the Graduate School informs him that he has been admitted to candidacy and assigns him to an adviser in his field of concentration.

In order to be eligible for graduation during a term, a student must have been admitted to candidacy no less than fifteen days prior to the deadline for filing for graduation during that term.

Credit Requirements

The minimum credit requirements for a graduate degree are thirty semester hours for students in thesis programs and thirty-six semester hours for students in non-thesis programs. It is expected that a student can complete a program by studying full-time for an academic year and one additional summer term or by studying full-time during four nine-week summer sessions.

Residence Requirements

A minimum of three-fourths of the hours required for the degree must be earned in residence study at the college.

Time Limitation

The graduate program must be completed within six successive calendar years. Programs remaining incomplete after this time interval are subject to cancellation, revision, or special examination for out-dated work. Credit transferred from another institution becomes void if it falls within a cancelled period of the student's program.

When the program of study is interrupted because the student has been drafted into the armed services, the time limit shall be extended for the length of time the student shall have been on active duty, if the candidate resumes graduate work no later than one year following his release from military service.

Course Levels

At the college, four-digit numbers are used to designate all course offerings. The last two digits indicate the classification level of the course. Courses ending in -70 through -84 are open to seniors and to graduate students. Courses ending in -85 through -99 are open only to graduate students. At least fifty percent of the courses counted in the work towards a Master's degree must be those open only to graduate students; that is, numbered -85 through -99.

Transfer of Credit

A maximum of six semester hours of graduate credit may be transferred from another graduate institution if (1) the credit has been earned within six years of the date on which the requirements are completed for the Master's degree, (2) the work is acceptable as credit toward a comparable degree at the institution from which transfer is sought, and (3) the courses to be transferred are approved by the Dean of the Graduate School and the Director of Admissions of A and T College.

To request a transfer of credit, the student must complete an application in the Graduate School Office. It will be the applicant's responsibility to request from the appropriate institution(s) a statement certifying that the work is acceptable as credit toward a comparable degree. The transcript should then be sent to the Graduate School Office of A and T.

Final Comprehensive Examination

At least 30 days before a candidate expects to complete all work for the graduate degree, he should file in the Graduate Office an application for a final examination.

1. All graduate students are required to pass a written comprehensive examination in their area of specialty.
2. Students pursuing the degree of M.S. in Education, subject-matter oriented, will take a comprehensive examination in two parts, subject-matter and professional education. The evaluation will be made by the faculties in the respective areas.
3. The maximum number of times a student may take a given comprehensive examination is two.
4. Comprehensive examinations are to be scheduled by the departments,

with the approval of the Graduate Office. A report of the student's performance must be submitted to the Graduate Office at least three weeks prior to commencement.

Options For Degree Program

The student, in consultation with his adviser, selects the degree program to be followed. The adviser must notify the chairman of the department of the program plan which the candidate prefers to follow.

THE THESIS OPTION

In order for a student to pursue a thesis program, he must be recommended to the Dean of the Graduate School by his adviser and the chairman of the department in which he is concentrating his studies. The Graduate School must then approve the student as a candidate. The thesis program consists of thirty semester hours including the thesis. After receiving written approval to follow the thesis option, the candidate shall prepare and present the thesis proposal to the adviser. Upon the request of the adviser, the Dean of the Graduate School shall appoint a Thesis Proposal Committee and shall fix a time of meeting. Following acceptance of the proposal, the adviser must submit to the Dean of the Graduate School an approved copy of the proposal in its final form. Individuals who have been granted the privilege of following the thesis option are expected to demonstrate research competencies and to prepare a scholarly account of resulting data.

THE NON-THESIS OPTION

The non-thesis plan is offered to the candidate who may benefit more from a broader range of studies than from the preparation of a thesis. The program of study must consist of a minimum of 36 credit hours of prescribed courses.

Individuals who are following this plan must demonstrate their ability to conduct and to report the results of original research by preparing a paper as a part of the course Special Problems or Research or Seminar in the appropriate area.

Master's Thesis and Format

The following are regulations for a Master's thesis and the format of the thesis:

1. A student writing a thesis must register for the course, Thesis, during the semester in which he expects to take the final examination.
2. Four typewritten copies of the completed thesis must be submitted to the Dean of the Graduate School, together with two copies of an abstract of the thesis. The abstract should be 400 to 500 words. Consult the Graduate School's calendar for deadline dates regarding submission of these manuscripts.
3. Additional information concerning the format is available in the Graduate School Office.

Application for Graduation

A candidate for graduation must file an application for graduation at least 30 days prior to the close of the session in which he expects to complete the requirements for the degree. A student secures the application forms from his adviser, who must approve the application before it is sent to the Graduate School Office. Failure to meet the deadline may result in delay of graduation for the candidate.

Graduate Record Examination

The Graduate Record Examination is required of all students who desire to become candidates for degrees. Information concerning the time, place and cost of the examination may be obtained from the office of the Dean of the Graduate School.

Administrative Policy Concerning Changes in Requirements for Students Enrolled in Degree Programs

Generally, a student is permitted to graduate according to the requirements specified either in the catalogue current during the year of his first application for candidacy or in the catalogue current during the year of his application for graduation. If more than six years pass between the student's application for candidacy and his application for graduation, the college reserves the right to require the student to satisfy the regulations in effect at the time of his application for graduation. In all instances, the Graduate School reserves the right to require students in programs in Agricultural Education, Education, or Industrial Education to satisfy the requirements specified by the North Carolina Department of Public Instruction at the time of the student's completion of the requirements for the Master of Science degree.

Commencement

Diplomas are awarded only at the commencement exercises following the completion of all requirements for the degree. Attendance at commencement is required of all graduating students unless individually excused by the Dean of the Graduate School.

Additional Regulations

Additional rules, regulations, and standards for each of the areas of graduate study appear in the appropriate sections of the catalogue. The prospective student should read such sections with care.

DEGREE PROGRAMS

A curriculum guide for each degree program can be obtained from the Graduate School Office.

Master of Science in Agricultural Education

The Department of Agricultural Education offers work leading to the Master of Science degree in Agricultural Education.

REQUIREMENTS FOR ADMISSION TO A DEGREE PROGRAM

1. Baccalaureate degree from accredited undergraduate institution.
2. Class "A" teacher's certificate in Agricultural Education (or qualifications for such a certificate).
3. Satisfactory completion of all Graduate School requirements for admission to candidacy for a degree.
4. Failure to meet any of these criteria may necessitate rejection of the application or the requirement of additional undergraduate work.

GENERAL REQUIREMENTS FOR A DEGREE

A. NON-THESIS OPTION: 36 semester hours required.

1. *Required Courses*

- a. Ag. Ed. 1283 or Ed. 2187 or Ed. 2085
- b. Ed. 2299 or Ag. Ec. 1177
- c. Psy. 2390
- d. Ag. Ed. 1287 or Ed. 2392
- e. Ag. Ed. 1285

2. *Other Requirements*

- a. 18 s.h. in courses in technical agriculture.
- b. 5 s.h. of electives in Agricultural Education.
- c. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
- d. 3.0 grade point average for all graduate courses.
- e. Final comprehensive examination in Agricultural Education.

B. THESIS OPTION: 30 s.h. required.

1. *Required Courses*

- a. Ag. Ed. 1283 or Ed. 2187 or Ed. 2085
- b. Ed. 2299 or Ag. Ec. 1177
- c. Psy. 2390
- d. Ag. Ed. 1299 or Ed. 2292.

2. *Other Requirements*

- a. 18 s.h. in courses in technical agriculture.
- b. Thesis
- c. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
- d. 3.0 grade point average for all graduate courses.
- e. Final comprehensive examination in Agricultural Education.

Master of Science Degree in Chemistry

The Department of Chemistry offers the Master of Science degree in Chemistry. In addition to this program, the department provides instruction for those graduate students who wish to pursue a curriculum that can

lead to a degree in Education with specialization in Chemistry. Individuals who desire to renew teaching certificates in the field may also enroll in certain courses in the department for this purpose.

REQUIREMENTS FOR ADMISSION TO A DEGREE PROGRAM

1. Baccalaureate degree from accredited undergraduate institution.
2. Undergraduate major in chemistry including one year of undergraduate physical chemistry and one year of integral and differential calculus.
3. Satisfactory completion of all Graduate School requirements for admission to candidacy for a degree, with the exception of the National Teacher's Examination, which is not required for candidates for a Master of Science in Chemistry.
4. Failure to meet any of these criteria may necessitate rejection of the application or the requirement of additional undergraduate work.

GENERAL REQUIREMENTS FOR A DEGREE: 30 SEMESTER HOURS, INCLUDING THESIS

1. Required Courses

Chemistry 1671
Chemistry 1691
Chemistry 1782
Chemistry 1098
Chemistry 1788
Chemistry 1799
Chemistry 1085, 1086, 1087
(A maximum of 9 hrs. may be earned in 1085, 1086, and 1087)

2. Other Requirements

- a. 2-8 s. h. in electives
- b. GRE (Aptitude Test and Advanced Test in Chemistry). Scores must be submitted to the Graduate School Office before admission to the final examination can be granted.
- c. Satisfactory completion of an examination in German.
- d. Satisfactory presentation and defense of a thesis.
- e. One academic year of residence at A and T.
- f. 3.0 grade point average for all graduate courses.
- g. Final comprehensive examination in Chemistry.

Candidates for the Master of Science in Chemistry, who desire to teach in the public schools of North Carolina on a graduate certificate should study the course and examination requirements described for candidates for an M.S. in Education with concentration in chemistry.

Master of Science Degree in Education

The Department of Education and Psychology offers the Master of Science in Education. This program is designed for the individual who wishes to seek a graduate certificate to teach or to serve in an administrative capacity in the public schools of North Carolina.

Areas of concentration included in this degree program are: 1) Elementary Education, 2) Administration and Supervision, 3) Guidance, and 4) Secondary Education.

REQUIREMENTS FOR ADMISSION TO A DEGREE PROGRAM

1. Baccalaureate degree from accredited undergraduate institution.
2. Class A certificate in area of concentration.
3. Satisfactory completion of all Graduate School requirements for admission to candidacy for a degree.

4. Failure to meet any of these criteria may necessitate rejection of the application or the requirement of additional undergraduate work.

GENERAL REQUIREMENTS FOR A DEGREE

Elementary Education Curriculum

- A. *Non-thesis Option*: 36 semester hours required.
 1. Required Courses
 - a. Ed. 2296 or 2085
 - b. Psy. 2390
 - c. Ed. 2299
 - d. Ed. 2392
 2. Other Requirements
 - a. 18 semester hours taken from no more than three of the following disciplines: English, fine arts, (art and music), health and physical education, mathematics, natural sciences, social sciences (government and history).
 - b. 6 semester hours of electives.
 - c. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
 - d. 3.0 grade point average for all graduate courses.
 - e. Final comprehensive examination in Elementary Education.
- B. *Thesis Option*: 30 semester hours required.
 1. Required Courses:
 - a. Ed. 2296 or 2085
 - b. Psy. 2390
 - c. Ed. 2299
 - d. Ed. 2292
 2. Other Requirements:
 - a. 18 s. h. in the academic disciplines specified in the description of the non-thesis program.
 - b. 6 semester hours of electives
 - c. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
 - d. Comprehensive examination in Elementary Education.

Administration and Supervision Curriculum: 36 s.h. required.

Students pursuing this area of concentration are not eligible for a graduate teaching certificate. This program is designed for those who are interested in qualifying for a principal's or supervisor's certificate.

1. Required Courses
 - a. Psy. 2390
 - b. Ed. 2299
 - c. Ed. 2196
 - d. Ed. 2198
 - e. Ed. 2392
 - f. Ed. 2085
 - g. Ed. 2086
2. Other Requirements
 - a. 6 semester hours in a cognate discipline (such as Sociology, Economics, or Government).
 - b. 6 semester hours in electives.
 - c. Internship in Administration. (3 s.h.)
 - d. Graduate Record Examination (Aptitude Test and Advanced Test in Education).

- e. 3.0 grade point average for all graduate courses.
- f. Final comprehensive examination in Education and Administration and Supervision.

Counselor-Education Curriculum: 36 s.h. required.

This program is designed for the individual who is seeking to qualify for a School Counselor's Certificate.

1. Required Courses

a. Educ. 2187 or 2296 or 2085	g. Guid. 2397
b. Guid. 2378	h. Guid. 2398
c. Psy. 2390	i. Guid. 2386
d. Guid. 2396	j. Guid. 2385
e. Educ. 2299	k. Guid. 2387
f. Psy. 2371	
2. Other Requirements
 - a. Six hours in courses in Societal Forces and Cultural Changes (Sociology or Economics).
 - b. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
 - c. 3.0 grade point average for all graduate courses.
 - c. Internship in Administration (3 s.h.).
 - d. Final comprehensive examination in Guidance.

Secondary Education Curriculum: 36 s. h., non-thesis; 30 s. h., thesis.

Candidates following the secondary education program must select one of the following academic areas of concentration: (1) Biology, (2) Chemistry, (3) English, (4) French (5) Mathematics, (6) History, or (7) Social Science.

1. Required Courses
 - a. Education 2187 or 2085
 - b. Psy. 2390
 - c. Education 2299

2. Other Requirements

Students in a non-thesis program may take either Education 2392 (Seminar) or a seminar in the area of concentration. Students in a thesis program may take Education 2292 (Thesis) or a thesis research course offered in the area of concentration. In all instances, the decision is to be made in consultation with the adviser.

- a. Graduate Record Examination (Aptitude Test and Advanced Test in area of concentration).
- b. 3.0 grade point average for all graduate courses.
- c. Final comprehensive examination in Education and area of concentration.

For details of the specific requirements in each area of concentration, see the descriptive material for the department offering the concentration.

Master of Science Degree in Industrial Education

The Department of Industrial Education offers the Master of Science in Industrial Education with options in Industrial Arts and in Trade and Industrial Education.

REQUIREMENTS FOR ADMISSION TO A DEGREE PROGRAM

1. Baccalaureate degree from accredited undergraduate institution.
2. Class A certificate in Industrial Arts or Industrial Education.
3. Satisfactory completion of all Graduate School requirements for admission to candidacy for a degree.
4. Failure to meet any of these criteria may necessitate rejection of the application or the requirement of additional undergraduate work.

GENERAL REQUIREMENTS FOR A DEGREE

Industrial Arts Curriculum

- A. *Non-thesis Option*: 36 semester hours required.
1. Required Courses
 - a. Ind. Ed. 3596 or Ed. 2187 or Ed. 2085
 - b. Ed. 2299
 - c. Psy. 2390
 - d. Ind. Ed. 3598 or Ed. 2392
 - e. Ind. Arts 3587
 - f. Ind. Ed. 3597 or Ed. 2189
 - g. Ind. Arts 3590
 2. Other Requirements
 - a. 9 s.h. from the following: Ind. Arts 3585, 3586, 3588, 3589, 3591.
 - b. 6 additional s.h. of electives in Ind. Arts or Ind. Ed.
 - c. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
 - d. 3.0 grade point average for all graduate courses.
 - e. Final comprehensive examination in Industrial Arts and Industrial Education.
- B. *Thesis Option*: 30 semester hours required.
1. Required Courses
 - a. Ind. Ed. 3596 or Ed. 2187 or Ed. 2085
 - b. Ed. 2299
 - c. Phy. 2390
 - d. Ind. Arts 3587
 - e. Ind. Arts 3590
 - f. Ind. Ed. 3597 or Ed. 2189
 - g. Ind. Ed. 3599
 2. Other Requirements
 - a. 9 s.h. from the following: Ind. Arts 3585, 3586, 3588, 3589, 3591.
 - b. Thesis
 - c. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
 - d. 3.0 grade point average for all graduate courses.
 - e. Final comprehensive examination in Industrial Arts and Industrial Education.

Trade and Industrial Education Curriculum

- A. *Non-thesis Option*: 36 semester hours required.
1. Required Courses
 - a. Ind. Ed. 3596 or Ed. 2187 or Ed. 2085
 - b. Ed. 2299
 - c. Psy. 2390
 - d. Ed. 2189 or Ind. Ed. 3597
 - e. Ind. Ed. 3598 or Ed. 2392
 - f. Ind. Ed. 3582
 - g. Ind. Ed. 3593

2. Other Requirements

- a. 15 additional s.h. in courses in Ind. Arts or Ind. Ed.
- b. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
- c. 3.0 grade point average for all graduate courses.
- d. Final comprehensive examination in Industrial Education.

B. *Thesis Option*: 30 semester hours required.

1. Required Courses

- a. Ind. Ed. 3596 or Ed. 2187 or Ed. 2085
- b. Ed. 2299
- c. Psy. 2390
- d. Ind. Ed. 3582
- e. Ind. Ed. 3593
- f. Ind. Ed. 3595
- g. Ind. Ed. 3599

2. Other Requirements

- a. 9 additional s.h. in Ind. Arts or Ind. Ed.
- b. Thesis
- c. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
- d. 3.0 grade point average for all graduate courses.
- e. Final comprehensive examination in Industrial Education.

DEPARTMENTS OF INSTRUCTION

Agricultural Economics and Rural Sociology

Howard F. Robinson, Chairman

Office: 224 Carver Hall

AGRICULTURAL ECONOMICS

Advanced Undergraduate and Graduate

1170. Southern Resources in a Changing Economy—a seminar
(Formerly Ag. Econ. 551, 1175) Credit 2(2-0)

A study of trends and the formulation of economic and social problems in the South, particularly in North Carolina; labor and capital mobility, agricultural as compared with the industrial; the problem of underemployment; and important phases of current economic development. Prerequisite: Economics 2840, Sociology 2831, or Ag. Econ. 1121.

1171. Agri-Business Policy. Credit 3(3-0)
(Formerly Ag. Econ. 502-448, 1176)

A study of the place of agri-business in the national and international economy; the impact of public policy on industry. An analysis of policy as it relates to price-support programs, finance, trade, and resource development. Prerequisite: Ag. Econ. 1121.

1172. Commodity Marketing Problems Credit 3(3-0)
(Formerly Ag. Econ. 504, 1178)

A study of economic problems arising out of the demand, supply, and distribution of specific agricultural commodities; the price-making mechanism, marketing methods, grades, values, price, cost, and governmental policy. Not more than two commodities will be studied in any one term. Selection of commodities and emphasis on problem areas will be made on the basis of current need; commodities studied will be cotton, tobacco, fruits and vegetables, and grains. Prerequisite: Consent of the Department Chairman.

1173. Seminar in Marketing Farm Products. Credit 2(2-0)
(Formerly Ag. Econ. 506, 1179)

Discussion, reports, consultation, and research efforts which throw light on marketing problems of low-income farmers in North Carolina, including the national and international importance of locally grown products, such as tobacco and cotton. Prerequisite: Consent of the Department Chairman.

1174. Special Problems in Agricultural Economics. Credit 3(3-0)
(Formerly Ag. Econ. 508, 1180)

Designed for students who desire to work out special problems in the field of agricultural economics; problem definition and formulation; developing thesis proposals. Prerequisite: Consent of the Department Chairman.

1175. Agri-Business Management. Credit 3(2-2)
(Formerly Ag. Econ. 509, 1181)

A study of methods of research, plans, organization, and the application of management principles. Part of the student's time will be spent in consultation with agri-business firms. Prerequisite: Consent of the Department Chairman.

1176. Seminar in Agricultural Economics. Credit 2(2-0)
(Formerly Ag. Econ. 510, 1182)

Discussion, reports, and an appraisal of current literature on agricultural problems. Prerequisite: Consent of the Department Chairman.

1177. Statistical Methods in Agricultural Economics I. Credit 3(2-2)
(Formerly Ag. Econ. 532, 1184)

A study of statistical methods with special applications to agricultural problems. The statistical table, ratios, percentages, bar charts, line charts and frequency distribution are used as analytical tools. Prerequisite: Ag. Econ. 1121, Econ. 2840, or Sociology 2831.

1178. Statistical Methods in Agricultural Economics II. Credit 3(2-2)
(Formerly Ag. Econ. 533, 1185)

A study of statistical methods with special applications to agricultural problems. The time series analysis, sampling theory, analysis of variance, and simple correlation are used as analytical tools. This course is a continuation of Ag. Econ. 1177. Prerequisite: Ag. Econ. 1177.

1179. Appraisal and Finance of Agri-Business Firms. Credit (3-3-0)
(Formerly Ag. Econ. 446-542, 1186)

Principles of land evaluation, appraisal and taxation; the role of credit in a money economy, classification of credit, principles underlying the economic use of credit; the role of the government in the field of credit.

RURAL SOCIOLOGY

Advanced Undergraduate and Graduate

1180. Rural Social Problems. Credit 3(3-0)
(Formerly Rur. Soc. 501, 1187)

A study of population, education, religion, health, land tenure, parity income, farm labor and mechanization, and housing.

1181. Rural Leadership. Credit 3(3-0)
(Formerly Rur. Soc. 502, 1188)

A study of opportunities and needs for rural leadership, educational and psychological requirements for various types of rural leaders.

1182. The Rural Family. Credit 3(3-0)
(Formerly Rur. Soc. 503, 1189)

A study of the institutional nature of the rural family and its role in the community, including its relations to educational, religious, welfare, and other community organizations.

1183. Rural Standards of Living. Credit 3(3-0)
(Formerly Rur. Soc. 505, 1190)

A study of consumption behavior in the main community groups of our society.

1184. Special Problems in Rural Sociology. Credit 3(3-0)
(Formerly Rur. Soc. 506, 1191)

Work on a problem in rural sociology under the guidance of a member of the faculty.

For Graduate Students Only

1185. Cost Accounts of Agri-Business Firms. Credit 3(2-2)
(Formerly Ag. Econ. 503, 1177)

A study of records needed to determine the relative profitability of

various agri-business enterprises, and the interpretation and use of these accounts in the management of the agri-business firms.

1186. **Agricultural Economics Research.** Credit 3(3-0)
(Formerly Ag. Econ. 511, 1183)

Review of different types of research methodology used in the field of Agricultural Economics. Prerequisite: Consent of Department Chairman.

Agricultural Education

Clarence E. Dean, Chairman

Office: 268 Carver Hall

The Department of Agricultural Education offers professional courses to prepare persons for teaching vocational agriculture and related fields. The program is designed to meet the certification requirements of vocational agricultural teachers in North Carolina. The department offers courses leading to the Master of Science degree in the field of Agricultural Education.

AGRICULTURAL EDUCATION

Advanced Undergraduate and Graduate

1271. **Adult Education in Vocational Agriculture.** Credit 3(3-0)
(Formerly Ag-Ed 502 and 503)

A study of the principles and problems of setting up programs for adults. Emphasis is given to the principles of conducting organized instruction.

1272. **The Principles of Agricultural Education.** Credit 3(3-0)
(Formerly Ag-Ed 504)

A study of the principles and practices in agricultural education revealed by research and new trends.

1273. **Problem Teaching in Vocational Agriculture.** Credit 3(3-0)
(Formerly Ag-Ed 506)

Practice in setting up problems for teaching unit courses in vocational agriculture.

1274. **Public Relations in Vocational Agriculture.** Credit 3(3-0)
(Formerly Ag-Ed 507)

A study of the means and methods of promoting and publicizing local programs of vocational agriculture.

For Graduate Students Only

1285. **Seminar in Agricultural Education.** Credit 1(1-0)
(Formerly Ag. Ed. 608)

A review of current problems and practices in the field of agricultural education.

1286. **Public Relations in Agriculture.** Credit 3(3-0)
(Formerly Ag. Ed. 605)

A study of the means and methods of promoting and publicizing local programs in agriculture.

1287. **Research in Agricultural Education.** Credit 3(3-0)
(Formerly Ag. Ed. 606)
A research problem is developed under the supervision of the staff.
1288. **Philosophy of Vocational Education.** Credit 3(3-0)
(Formerly Ag. Ed. 607)
This course deals with the underlying philosophy and basic principles of vocational education. Emphasis is placed upon the factors contributing to the nature, purpose, scope, organization, and administration of vocational education in agriculture.
1289. **Recent Developments and Trends in Agricultural Education.** Credit 3(3-0)
(Formerly Ag. Ed. 610)
The course includes an intensive treatment of the various subject matter fields to keep teachers up-to-date technically as well as professionally. It is designed to cover the developments and trends in agricultural education.
1290. **Community Problems in Agriculture.** Credit (3-0)
(Formerly Ag. Ed. 612)
A study of the common problems of the community that relate to agriculture and of solutions for these problems. (Formerly Ag. Ed. 604.)
1291. **Methods and Techniques of Supervision in Agricultural Education.** (Formerly Ag. Ed. 609) Credit 3(3-0)
The course includes the common methods and techniques that should be used in setting up and supervising agricultural education on state and local levels. In addition, the course will include supervision of student teaching.
1292. **Administration and Supervision.** Credit 3(3-0)
(Formerly Ag. Ed. 601, 1282)
A study of administrative and supervisory problems of vocational agriculture; the practices and policies of local, state, and federal agencies dealing with administration and supervision of vocational agriculture.
1293. **Program Planning.** Credit 3(3-0)
(Formerly Ag. Ed. 602, 1283)
Consideration is given to the community as a unit for program planning in agricultural education. Special emphasis on collecting and interpreting basic data, formulating objectives, developing and evaluating community programs.
1294. **History of Agricultural Education.** Credit 3(3-0)
(Formerly Ag. Ed. 603, 1284)
A brief review of vocational education in Europe and America; special attention is given to vocational agriculture as it has developed in the United States.
1299. **Thesis Research in Agricultural Education.** Credit 3 sem. hrs.

Animal Industry

W. L. Kennedy, Chairman
Office: Ward Hall

ANIMAL HUSBANDRY

Advanced Undergraduate and Graduate

1371. **Principles of Animal Nutrition.** Credit 3(3-0)
(Formerly A. H. 501)
A study of fundamentals of modern animal nutrition including classifica-

tion of nutrients, their general metabolism and role in productive functions. (Prerequisite: A. H. 1324)

1372. **Animal Husbandry Seminar.** Credit 1(1-0)
(Formerly A. H. 502 and A. H. 503)

A review and discussion of current literature pertaining to all phases of animal husbandry.

1373. **Advanced Livestock Management.** Credit 3(3-0)
(Formerly A. H. 513, A. H. 514, and A. H. 515)

Special work in problems in dealing with feeding, breeding, and management in the production of beef cattle, sheep and swine.

For Graduate Students Only

1385. **Selection of Meat and Meat Products.** Credit 3(3-0)
(Formerly A. H. 607, 1381)

Identification, grading, and cutting of meats.

1386. **Advanced Livestock Marketing.** Credit 3(3-0)
(Formerly A. H. 619, 1382)

A special study of advanced research in beef cattle with emphasis on breeding, nutrition selection, marketing and management.

1387. **Advanced Livestock Production.** Credit 3(3-0)
(Formerly A. H. 620, 1383)

Nutrition, breeding, management and marketing of lamb and mutton will be considered.

DAIRY HUSBANDRY

Advanced Undergraduate and Graduate

1374. **Dairy Seminar I.** Credit 1(1-0)
(Formerly Dairy Hub. 501)

Research on subjects relating to the dairy industry and methods of preparing and presenting such research.

1375. **Dairy Seminar II.** Credit 1(1-0)
A continuation of 1374.

1376. **Special Problems.** Credit 3(3-0)
(Formerly Dairy Hub. 504)

Work along special lines in which a student may be interested, given largely by the project method for individuals either in Dairy Manufacturing or Dairy Production. (Prerequisite—three advanced courses in dairying.)

For Graduate Students Only

1388. **Advanced Dairy Farm Management.** Credit 3(3-0)
(Formerly D. H. 610, 1384)

A study of dairy farm operations; rations; feeding and care of the herd; selecting and grading the herd; herd sires; testing for production; barns and equipment; marketing; cost of production.

POULTRY HUSBANDRY

For Advanced Undergraduates and Graduates

1378. Poultry Seminar. Credit 1(1-0)
(Formerly Poultry Husb. 501)

Special articles and reports on subjects relating to the poultry industry will be assigned each student; round-table discussion.

1379. Poultry Anatomy and Physiology. Credit 3(2-2)
(Formerly Poultry Husb. 334)

A course which deals with the structure and function of tissues, organs, and systems of the domestic fowl. (Prerequisite: Poultry Husb. 1356.)

For Graduate Students Only

1389. Special Problems in Poultry. Credit 3(1-4)
(Formerly Poultry Husb. 502 and 504, 1380)

Work along special lines in which a student may be interested, given largely by the project method for individuals in Poultry Husbandry. (Prerequisite: three advanced courses in poultry.)

1394. Poultry Research. (Formerly P. H. 601) Credit 3(0-6)

Art

LeRoy F. Holmes, Chairman

Office: Frazier Hall

Advanced Undergraduate and Graduate

3270. Public School Art. Credit 3(3-0)
(Formerly Art 501, 3280)

Study of materials, methods, and procedures in teaching art in public schools. Special emphasis is placed on selection and organization of materials, seasonal projects, lesson plans.

3272. Seminar in Art History. Credit 3(3-0)
(Formerly Art 503, 3282)

Investigation in depth of the background influences which condition stylistic changes in art forms by analyzing and interpreting works of representative personalities.

3273. Studio Techniques. Credit 3(0-6)
(Formerly Art 504, 3283)

Demonstrations that illustrate and emphasize the technical potentials of varied media. These techniques are analyzed and discussed as a point of departure for individual expression.

3274. Ceramics Workshop. Credit 3(0-6)
(Formerly Art 505, 3284)

Advanced studio problems and projects in ceramics with emphasis on independent creative work. The student is given opportunity for original research and is encouraged to work toward the development of a personal style in the perfection of technique.

3275. Printmaking. Credit 3(0-6)
(Formerly Art 506, 3285)

Investigation of traditional and experimental methods in printmaking.

Advanced studio problems in woodcut etching, lithography, and serigraphy.

3276. Sculpture. Credit 3(0-6)
(Formerly Art 507, 3286)

Further study of sculpture with an expansion of techniques. Individual problems for advanced students.

3277. Project Seminar. Credit 2(0-4)
(Formerly Art 508, 3287)

Advanced specialized studies in creative painting, design, and sculpture. By means of discussion and suggestions, this seminar intends to solve various problems which might arise in each work. Prerequisite: Consent of the instructor.

3278. Arts and Crafts. Credit 3(0-6)
(Formerly Art 3288)

Creative experimentation with a variety of materials, tools, and processes: projects in wood, metal, jewelry making, wood and metal construction, fabric design, leather craft, puppet making, and paper sculpture.

Biology

Artis P. Graves, Chairman

Office: 306 Noble Hall

Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the degree Master of Science in Education with concentration in Biology must hold or be qualified to hold a class A teaching certificate in Biology.

Requirements for a Degree

Non-thesis Option: 36 s. h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. Zoology 1575, 1576, 1577, 1594, 1595, and 1599 (or 1588-1589).
2. 9 s. h. of electives in education, biology, or subjects related to biology.

Thesis Option: 30 s. h. required

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

Zoology 1575, 1576, 1577, 1594, 1595, and 1599 (or 1588-1589).

For Advanced Undergraduates and Graduates

GENERAL SCIENCE

1570. General Science for Elementary School Teachers. Credit 2(2-0)
(Formerly Gen. Sci. 506)

This course will consider some of the fundamental principles of the

life and physical sciences in an integrated manner in the light of present society needs.

BACTERIOLOGY

1571. Principles and Practices of Immunology. Credit 3(3-0)
(Formerly Bact. 501)

In this course the fundamental mechanism of immunological reactions and their theoretical foundations will be studied. Selected lectures will deal with antigenic and chemical composition of certain micro-organisms and methods of laboratory practice, including some clinical applications. Prerequisite: Gen. Microbiol. 1524.

BOTANY

1572. Plant Biology. Credit 3(2-2)
(Formerly Bot. 505)

A presentation of fundamental botanical concepts to broaden the background of high school biology teachers. Bacteria, fungi, and other microscopic plants will be considered as well as certain higher forms of plants. The course will consist of lectures, laboratory projects, and field trips.

1573. Special Problems in Botany. Credit 3(2-2)
(Formerly Bot. 504)

Open to advanced students in botany for investigation of specific problems. Prerequisite: Botany 1507 or 1572..

ZOOLOGY

1574. Special Problems in Zoology. Credit 3(2-2)
(Formerly Zool. 501)

Open to students qualified to do research in zoology.

1575. Mammalian Biology. Credit 3(3-0)
(Formerly Zool. 502)

Study of the evolutionary history, classification, adaptation and variation of representative mammals with special emphasis on the prenatal variations in prototherian, metatherian and eutherian types. Prerequisites: Zoology 1512 and Botany 1507.

1576. Biology of Sex. Credit 3(3-0)
(Formerly Zool. 503)

Lectures on the origin and development of the germ cells and reproductive systems in selected animal forms. Prerequisite: Zoology 1512 or equivalent.

1577. Cytology. Credit 3(3-0)
(Formerly Zool. 504)

Study of the cell with lectures and periodic student reports on modern advances in cellular biology. Prerequisite: Zoology 1551 or special consent of instructor.

1578. Histo-Chemical Technique. Credit 3(1-4)
(Formerly Zool. 505)

Designed to develop skills in the preparation of cells, tissues and organs for microscopic observation and study. Prerequisite: Zoology 1512.

1579. Nature Study. Credit 3(3-0)
(Formerly Zool. 506)

A study of diversified organisms, their habits, life histories, defenses,

sex relationships, periodic activities, and economic values; designed to acquaint the student with fundamental knowledge that should lead to a fuller appreciation of nature.

1580. **Experimental Embryology.** Credit 3(1-4)
(Formerly Zool. 507)

A comprehensive lecture-seminar course covering the more recent literature on experimental embryology and developmental physiology. Experimental studies treating amphibian, chick and rodent development are designed as laboratory projects. Prerequisite: Zoology 1566 or equivalent.

1581. **Animal Biology.** Credit 3(2-2)
(Formerly Zool. 508)

A lecture-laboratory course stressing fundamental concepts and principles of biology with the aim of strengthening the background of high school teachers. Emphasis is placed on the principles of animal origin, structure, function, development, and ecological relationships.

For Graduate Students Only

BOTANY

1585 **Essentials of Plant Anatomy.** Credit 4(2-4)
(Formerly Botany 611, 1582)

A study of the growth, development and organization of roots, stems, leaves, and reproductive organs of higher plants. Lectures, discussions, field trips, and the laboratories are employed in the presentation of this course.

1586. **Applied Plant Ecology.** Credit 4(2-4)
(Formerly Botany 612, 1583)

A study of the relations of plants to their environment with emphasis on climate and soil factors influencing their structure, behavior and distribution. Prerequisite: Botany 1572, 1585 or equivalent.

1587. **Physiology of Vascular Plants** Credit 3(2-2)

Selected topics on the physiology of higher plants. Relationships of light quality, intensity, and periodicity to plant growth and reproduction: photosynthesis, and photoperiodism. Chemical control of growth and reproduction, and the general aspect of plant metabolism. Lectures, conferences, laboratory work and field studies of higher plant ecology. (To be offered in 1968.)

ZOOLOGY

1588. **Projects in Biology.** Credit 2(0-4)
(Formerly Zoology 601)

This course will require student participation in project developments, some of an experimental nature, that might be utilized by high school biology teachers in classroom activities.

1589. **Seminar in Biology.** Credit 1(1-0)
(Formerly Zool. 602)

Discussion of concepts and research in animal and plant biology.

1590. **Applied Invertebrate Zoology.** Credit 4(2-4)
(Formerly Zoology 611)

A study of the lower groups of animals, especially insects, and their economic importance to the southeastern region. Lectures, field trips, and experimental work with local animals are stressed, as well as factors

affecting growth, development and behavior. Prerequisite: Zoology 1581 or equivalent.

1591. Fundamentals of Vertebrate Morphology. Credit 4(2-4)
(Formerly Zoology 612)

A study of the morphological evolution of the chordate animals from a comparative aspect, with lecture-demonstrations of dissected organ systems of the frog and cat. Reference to man is made to give this course a human approach. Prerequisite: Zoology 1581 or equivalent.

1592. Basic Protozoology. Credit 4(2-4)
(Formerly Zoology 613)

A study of the biology of free-living and parasitic protozoa with special emphasis on structure, behavior, life histories, and classification. Special attention will be given to free-living forms from such local animals as fish, frogs, and wild rodents. Prerequisite: Zoology 1581.

1593. Introductory Experimental Zoology. Credit 4(2-4)
(Formerly Zoology 614)

Studies of fertilization, breeding habits, regeneration, growth and differentiation of certain invertebrates and vertebrates from the experimental approach. Emphasis will be placed on laboratory procedures on the frog and the chick.

**1595. Genetics and Inheritance for the
Secondary School Teacher** Credit 3(2-2)

A study of mendelian and molecular genetics with emphasis on organic evolution, linkage, mutation of genes and of chromosomes, population mechanics and the relation between genes and environment in development. Laboratory experiments with drosophila and maize. (To be offered in 1968.)

1599. Seminar In Biology Credit 3(2-2)

Lectures, reports and laboratory procedures will be presented by student participants, staff and guest lecturers on modern techniques and recent developments of selected biological problems. The nature and scope of the problem and the methods employed to study them will be varied to suit the needs and background of the student. (To be offered in 1968.)

Chemistry

J. Pendergrast, Acting Chairman

Office: Hines Hall Annex

The Department of Chemistry in its graduate division:

1. Provides a program of study that leads either to the M. S. degree in Chemistry or the M. S. degree in Education with concentration in chemistry.
2. Provides formal instruction in depth in several areas of chemistry (inorganic, organic, analytical, physical and biochemistry).
3. Provides the opportunity for the development of creativity in special problems and research activities.
4. Provides the opportunity for the students to progress toward academic maturity by engaging in group discussions, developing and presenting seminar topics, writing up research findings, and by presenting an approved thesis to the Graduate School (the latter is required of all candidates for the M. S. degree in Chemistry).

MASTER OF SCIENCE IN CHEMISTRY

Requirements for admission to candidacy and for the degree are listed earlier in this catalogue in the description of the degree programs.

MASTER OF SCIENCE IN EDUCATION WITH CONCENTRATION IN CHEMISTRY

Academic-year Program (intended for students enrolled for a year of residence) Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the degree Master of Science in Education with concentration in Chemistry must hold or be qualified to hold a class A teaching certificate in Chemistry and must have completed, on the undergraduate level, a course in physical chemistry and a course in integral and differential calculus (or the equivalent).

Requirements for a Degree

Non-thesis Option: 36 s. h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. Chemistry 1671, 1691, 1782, 1785, and 1098.
2. 10 additional s. h. in chemistry, including a special problems course in inorganic, analytical, organic, or physical chemistry.

Advanced Undergraduates and Graduates

1670. Inorganic Synthesis. Credit 2(1-3)
(Formerly Chem. 1677)

Discussion of theoretical principles of synthesis and development of manipulative skills in the synthesis of inorganic substances. Prerequisites: One year of organic chemistry; one semester of quantitative analysis.

1671. Advanced Inorganic Chemistry. Credit 4(4-0)
(Formerly Chem. 1678-79)

A sequence course in the theoretical approach to the systematization of inorganic chemistry. Prerequisites: Chemistry 1663, 1664 concurrent.

1776. Qualitative Organic Chemistry. Credit 5(3-6)
(Formerly Chem. 1771)

A course in the systematic identification of organic compounds. Prerequisite: One year of organic chemistry.

1780. General Biochemistry. Credit 5(3-6)
(Formerly Chem. 1777)

A study of modern biochemistry designed for graduate students. The course emphasizes chemical kinetics and energetics associated with biological reactions and includes a study of carbohydrates, lipids, proteins, vitamins, nucleic acids, hormones, photosynthesis and respiration. Prerequisites: Chemistry 1662 and 1664.

1781. Instrumental Methods of Analysis. Credit 4(2-6)
(Formerly Chem. 1772)

A study of the theory and the operational features of some of the more important instruments that are currently being used as analytical tools,

such as U.V., visible-light, and infrared spectrophotometers, electroanalytical instruments, thermometric titrators, fluorimeters, etc. Prerequisite: Chemistry 1662 or equivalent.

1782. Radiochemistry. Credit 4(3-3)
(Formerly Chem. 1773)

A study of the fundamental concepts, processes, and applications of nuclear chemistry, including natural and artificial radioactivity, sources and chemistry of the radioelements. Open to advanced majors and others with sufficient background in chemistry and physics. Prerequisite: Chemistry 1664 or Physics 3846.

1783. Radioisotope Techniques and Applications. Credit 2(1-3)
(Formerly Chem. 1774)

The techniques of measuring and handling radioisotopes and their use in chemistry, biology, and other fields. Open to majors and non-majors. Prerequisite: Chemistry 1612 or 1614.

1784. Introduction to Quantum Mechanics. Credit 2(2-0)
(Formerly Chem. 1775)

Non-relativistic wave mechanics and its application to simple systems by means of the operator formulation. Prerequisites: Math 3622, Physics 3822, and Chemistry 1664 prior or concurrent.

For Graduate Students Only

INORGANIC CHEMISTRY

1685. Structural Inorganic Chemistry Credit 2(2-0)
(Formerly Chem. 1683)

A study of the stereochemistry of inorganic substances; the relationship of structure to properties; and a discussion of experimental methods. Prerequisites: Chem. 1671 and 1784.

1686. Selected Topics in Inorganic Chemistry Credit 2(2-0)
(Formerly Chem. 1685)

A lecture course on advanced topics in inorganic chemistry. Prerequisite: Chemistry 1671 or permission of the instructor.

ORGANIC CHEMISTRY

1690. Elements of Organic Chemistry Credit 3(2-3)
(Formerly Chem. 1687)

A systematic study of the classes of aliphatic and aromatic compounds and individual examples of each. Structure, nomenclature, synthesis, and characteristic reactions will be considered. Illustration of the familiarity of organic substances in everyday life will be included. In the laboratory, preparation and characterization reactions will be performed.

1691. Advanced Organic Chemistry Credit 4(4-0)
(Formerly Chem. 1688-89)

Recent developments in the areas of structural theory, stereochemistry, molecular rearrangement and mechanism of reactions of selected classes of organic compounds. Prerequisite: One year of organic chemistry or Chemistry 1690.

1692. Organic Reactions Credit 2(2-0)
(Formerly Chem. 1690)

An advanced treatment of organic reactions designed to give the student

a working knowledge of the scope and limitations of the important synthetic methods of organic chemistry. Prerequisite: Chemistry 1691.

1693. Selected Topics in Organic Chemistry Credit 2(2-0)
(Formerly Chem. 1691)

A lecture course on advanced topics in organic chemistry.

1694. Organic Preparations Credit 2(0-6)
(Formerly Chem. 1692-93)

An advanced laboratory course. Emphasis is placed on the preparation and purification of more complex organic compounds. Prerequisite: One year of organic chemistry.

BIOCHEMISTRY

1695. Selected Topics in Biochemistry Credit 2(2-0)
(Formerly Chem. 656, 1794)

A lecture course on advanced topics in biochemistry.

ANALYTICAL CHEMISTRY

1786. Selected Topics in Analytical Chemistry Credit 2(2-0)
(Formerly Chem. 1699)

A lecture course on advanced topics in analytical chemistry.

1787. Modern Analytical Chemistry Credit 3(2-3)
(Formerly Chem. 1694)

The theoretical bases of analytical chemistry are presented in detail. In the laboratory, these principles together with a knowledge of chemical properties are used to identify substances and estimate quantities in unknown samples.

1788. Advanced Analytical Chemistry Credit 4(4-0)
(Formerly Chem. 1695-96)

A lecture course in which the theoretical bases of analytical chemistry and their application in analysis will be reviewed with greater depth than is possible in the customary undergraduate courses. Equilibrium processes, including proton and electron transfer reactions and matter-energy interactions, will be considered. Prerequisite: One year of analytical chemistry or Chemistry 1787.

PHYSICAL CHEMISTRY

1789. Principles of Physical Chemistry I Credit 4(3-3)
(Formerly Chem. 1782)

A review of the fundamental principles of physical chemistry, including the derivation of the more important equations and their application to the solution of problems.

1790. Principles of Physical Chemistry II Credit 4(3-3)
(Formerly Chem. 1783)

A continuation of Chem. 1789. May be taken concurrently with Chem. 1789.

1791. Chemical Thermodynamics Credit 2(2-0)
(Formerly Chem. 1784)

An advanced course in which the laws of thermodynamics will be considered in their application to chemical processes. Prerequisite: Chemistry 1664 or 1790.

1792. **Chemical Spectroscopy** Credit 3(2-3)
(Formerly Chem. 1785)

An advanced course in which the principles and applications of spectroscopy will be considered. Prerequisite: Chemistry 1664 or 1790.

1793. **Chemical Kinetics** Credit 2(2-0)
(Formerly Chem. 1789)

A study of theory of rate processes; application to the study of reaction mechanisms. Prerequisites: Mathematics 3622 and Chemistry 1664 or 1790.

1794. **Colloid Chemistry** Credit 2(2-0)
(Formerly Chem. 1788)

A study of the types of colloidal systems and the fundamental principles governing their preparation and behavior. Prerequisite: Chemistry 1664 or 1790.

1795. **Selected Topics in Physical Chemistry** Credit 2(2-0)
(Formerly Chem. 1786)

A lecture course on advanced topics in physical chemistry. Prerequisite: chemistry 1664 or 1790.

THESIS RESEARCH

1799. **Thesis Research** Credit 3 Sem. Hrs.
(Formerly Chem. 699)

RESEARCH AND SPECIAL PROBLEMS

1085. **Chemical Research I** Credit 2(0-6)
(Formerly Chem. 1082)

A course designed to permit qualified students to do original research in chemistry under the supervision of a senior staff member.

1086. **Chemical Research II** Credit 3(0-9)
(Formerly Chem. 1083)

1087. **Chemical Research III** Credit 4(0-12)
(Formerly Chem. 1084)

1088. **Special Problems in Inorganic Chemistry I** Credit 2(0-6)
(Formerly Chem. 1085)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in inorganic chemistry.

1089. **Special Problems in Inorganic Chemistry II** Credit 3(0-9)
(Formerly Chem.1086)

1090. **Special Problems in Organic Chemistry I** Credit 2(0-6)
(Formerly Chem. 1088)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in organic chemistry.

1091. **Special Problems in Organic Chemistry II** Credit 3(0-9)
(Formerly Chem. 1089)

1092. **Special Problems in Analytical Chemistry I** Credit 2(0-6)
(Formerly Chem. 1091)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in analytical chemistry.

1093. **Special Problems in Analytical Chemistry II** Credit 3(0-9)

1094. **Special Problems in Physical Chemistry I** Credit 2(0-6)
(Formerly Chem. 645)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in physical chemistry.

1095. **Special Problems in Physical Chemistry II** Credit 3(0-9)
(Formerly Chem. 645)

1096. **Special Problems in Biochemistry I** Credit 2(0-6)
(Formerly Chem. 1097)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in biochemistry.

1097. **Special Problems in Biochemistry II** Credit 3(0-9)
(Formerly Chem. 1098)

1098. **Seminar** Credit 1(1-0)
(Formerly Chem. 1682)

Presentation and discussion of library or laboratory research problems.

Education and Psychology

Charles L. Hayes, Chairman

Office: 201 Hodgin Hall

For Advanced Undergraduates and Graduates

EDUCATION

2171. **Materials and Methods in Teaching Reading.** Credit 3(3-0)
(Formerly Education 504)

The application of principles of learning and child development to the teaching of reading and the related language arts.

2172. **Introduction to Adult Education.** Credit 3(3-0)
(Formerly Education 505)

The history, philosophy, and general organization and administrative problems of adult education. Prerequisite: Psychology 2340.

2173. **Methods in Adult Education.** Credit 3(2-2)
(Formerly Education 506)

Methods of informal instruction, group leadership, conference planning, and techniques in handling various issues of interest to adults. For persons preparing to conduct adult education programs as well as those preparing to serve as instructors or leaders in the public schools and/or in various agencies serving adults. Prerequisite: Education 2172.

2174. **Principles of School Law.** Credit 3(3-0)
(Formerly Education 507)

The study of statutes and judicial decisions of North Carolina affecting public school education. Legal authority, powers, and liabilities of school personnel, legal control and limitations of school finance, curriculum, and property.

2175. **Library Usage for the Classroom** Credit 3(2-2)
(Formerly Education 510)

A consideration of the study, collection, organization and graduation

of instructional materials for educational materials centers at all grade levels; also includes methods and techniques for library usage for pupils and teachers, central library organization, library requisition practices and library classroom coordination of the instructional program. For pre-service and in-service teachers.

2176. Preparation of Audiovisual Materials Credit 3(2-2)

The development and application of basic skills in the production of graphic and audio teaching materials as media of communications. Preparing instructional materials as they relate to educational programs.

2177. Teaching the Slower Learner in the Regular Classroom. Credit 3(3-0)

A study of materials and methods for adjusting instruction in arithmetic, spelling, language, reading to the slower learning child in heterogeneous classes. Consideration given to discussion and study in the unit and activity program and the drill and skill program in relation to it.

2180. Theory of American Public Education Credit 3(3-0)
(Formerly 601)

An examination of the philosophical resources, objectives, historical influences, social organization, administration, support, and control of public education in the United States.

2184. History of American Education. Credit 3(3-0)
(Formerly 607)

A study of the historical development of education in the United States emphasizing educational concepts and practices as they relate to political, social, and cultural developments in the growth of a system of public education.

PSYCHOLOGY

2371. Theories of Personality Development. Credit 3(3-0)
(Formerly Psych. 501)

A discussion of structural theories of personality and major theories of personality development from biological, cultural, and social points of view.

SPECIAL EDUCATION

2372. Introduction to Exceptional Children. Credit 3(3-0)
(Formerly 501)

An over-view of the education needs of exceptional or "different" children in the regular classroom situation; emphasis placed on classroom techniques known to be most helpful to children having hearing losses, speech disorders, visual problems, emotional, social handicaps and intelligence deviation, including slow-learners and gifted children. An introduction to the area of special education. Designed for classroom teachers.

2373. Psychology of the Exceptional Child. Credit 3(3-0)
(Formerly 502)

An analysis of psychological factors affecting identification and development of mentally retarded children, physically handicapped children, and emotionally and socially maladjusted children.

2375. Measurement and Evaluation in Special Education. Credit 3(2-2)
(Formerly 504)

The selection, administration, and interpretation of individual tests; in-

tensive study of problems in testing exceptional and extremely deviate children; consideration to measurement and evaluation of children that are mentally, physically, and emotionally or socially handicapped. Emphasis upon the selection and use of group tests of intelligence and the interpretation of their results.

2376. Mental Deficiency. Credit 3(3-0)
(Formerly 505)

A survey of types and characteristics of mental defectives; classification and diagnosis; criteria for institutional placement and social control of mental deficiency. Prerequisites: Special Education 2372 and 2373.

2377. Materials, Methods, and Problems in Teaching
Mentally Retarded Children. Credit 3(2-2)

Basic organization of programs for the education of the mentally retarded; classification and testing of mental defectives; curriculum development and principles of teaching intellectually slow children. Attention is also given to the provision of opportunities for observing and working with children who have been classified as mentally retarded. Prerequisites: Special Education 2372, 2373, 2375, and 2376.

GUIDANCE

2378. Introduction to Guidance. Credit 2(2-0)
(Formerly 501)

A consideration of the nature, scope, and principles of guidance services. A foundation course for prospective teachers, part-time or full time counselors who plan to do further work in the field of guidance or education.

For Graduate Students Only

EDUCATION

2085. Curriculum Development. Credit 3(3-0)

Basic concepts and modern trends in curriculum development for grades 1-12; the purposes, objectives, and programs of the school; the relationship of allied subject areas to curriculum development; the relationship of the community; and the contributions and interrelationships of administrative personnel, other personnel, and lay persons to curriculum development.

2086. Supervision of Instruction. Credit 3(3-0)

Modern concepts and techniques of supervision; the roles of the supervisor, principal, and consultant in curriculum development; and the procedures, problems, and materials of supervising and improving instruction in grades 1-12.

2185. Philosophy of Education. Credit 3(3-0)
(Formerly 608)

A critical study of and a philosophic approach to educational problems. The nature and aims of education in a democratic society, relation of the individual to society, interests and disciplines, play and work, freedom and control, subject matter and method.

2186. School Planning. Credit 3(3-0)
(Formerly 609)

An examination of the principles governing the selection and landscaping of school grounds, location and design of buildings, and care of plant from standpoint of use, sanitation, health, and attractiveness.

2187. Curriculum in the Secondary School. Credit 3(3-0)
(Formerly 610)

Curriculum development, functions of the secondary school, types of curricula; emphasis on trends, issues, and innovations.

2188. Utilization of Audiovisual Materials. Credit 3(3-0)
(Formerly 611)

The development of skills and competencies in the utilization, selection, evaluation, and integration of audiovisual materials, equipment, and resources in the implementation of the curriculum and educational programs; the preparation of instructional materials, the locating of source materials; and the operation and care of equipment.

2189. Methods and Techniques of Research. Credit 3(3-0)
(Formerly 612)

Careful analysis and study of research problems; techniques and methods of approach.

2190. Organization and Administration of Audiovisual Programs Credit 3(3-0)
(Formerly 613)

Planning, organizing, and administering audiovisual programs. The philosophical, psychological, and curricular bases for an audiovisual program; the selection, evaluation, acquisition, and circulation of audiovisual materials and equipment; and the planning of facilities and budget for a program. (If a student has had no previous course in audiovisual communication, permission of the instructor is required.)

2191. Workshop in Audiovisual Media Credit 3(1-4)
(Formerly 614)

An exploration of recent materials, methods, and techniques and the development of skills and competencies in audiovisual communications. Demonstrations and presentations by specialists, audiovisual representatives, and other persons skilled in the use of these media; projects, field trips, and discussions based upon the problems and needs of the participants.

2192. Problems and Trends in Teaching Social Science. Credit 3(3-0)
(Formerly 615)

Survey of major problems in the broad field of social studies and consideration of improved ways of presentation and class economy, including lesson plans, assignments, audiovisual materials, and other means of facilitating learning.

2193. Problems and Trends in Teaching Science. Credit 3(3-0)
(Formerly 616)

Attention to major problems of the high school teacher of science. Lesson plans, assignments, tests, etc., constructed and administered by each student in class. Visual aids, demonstration and laboratory techniques carried out.

2194. School Publicity and Public Relations. Credit 3(3-0)
(Formerly 619)

Study of the interrelationships between the lay community and the schools. Appraisal and procedures, actual or proposed, for improvement of the relationships.

2195. Educational Sociology. Credit 3(3-0)
(Formerly 623)

The school as a social institution, school-community relations, social control of education, and structure of school society.

- 2196. Administration of the Elementary School.** Credit 3(3-0)
(Formerly 624)
Role of the elementary school principal; administrative structure and policies, curriculum development, guidance, and in-service education of teachers.
- 2197. Problems in Supervision of the Elementary School.** Credit 3(3-0)
(Formerly 625)
The nature, theory and practice of supervision, and the supervisor's role in improvement of instruction.
- 2198. High School Administration.** Credit 3(3-0)
(Formerly 626)
A basic professional course for the principalship and for other administrative positions in junior high schools, senior high schools, and junior colleges. The materials adapted to the needs of those holding positions of these types and to experienced teachers who desire to prepare for such positions.
- 2199. Problems in High School Supervision.** Credit 3(3-0)
(Formerly 627)
A study of problems, techniques, and materials in the improvement of instruction in secondary schools. A course for principals, heads of departments, and supervisors.
- 2285. Supervision of Student Teachers.** Credit 3(3-0)
(Formerly 635)
A basic professional course for classroom teachers, principals, and supervisors who serve in an official capacity directing the field-laboratory experiences of student teachers.
- 2286. Issues in Elementary Education.** Credit 3(3-0)
(Formerly 639)
A critical review of the background and functions of the elementary school as a social institution. Attention is given to increasing the ability to formulate the generalizations of development and learning into a meaningful framework for appraising current educational thinking and practice and predicting the direction in which these must move if elementary school programs are to continue to improve.
- 2287. Issues in Secondary Education.** Credit 3(3-0)
(Formerly 640)
An analysis of the role of the high school as an educational agency in a democracy. Attention is given to: (1) philosophical, psychological, and sociological bases for the selection of learning experiences; (2) contrasting approaches to curriculum construction; (3) teaching methods and materials; (4) evaluation procedures; and, (5) school-community relationships.
- 2288. Current Research in Elementary Education.** Credit 3(3-0)
(Formerly 641)
A critical analysis of the current research in elementary education and the implications of such for elementary school educative experiences.
- 2289. Current Research in Secondary Education.** Credit 3(3-0)
(Formerly 642)
A critical analysis of the current research in secondary education and the implications of such for high school educative experiences.

2290. **Workshop in Methods of Teaching Modern Mathematics.** Credit 3(3-0)
(Formerly 643)
Discussion of concepts concerning the teaching of modern mathematics.
Prerequisite: Math. 3685.
2291. **Workshop in Methods of Teaching Language Arts.** Credit 3(3-0)
(Formerly 644)
A consideration of instruction in language arts, literature, grammar, composition. Designed for teachers in the elementary and junior high schools.
2292. **Thesis Research.** Credit 3 s. h.
(Formerly 699)
2294. **Introduction to Graduate Study.** Credit 2(2-0)
(Formerly 604)
Methods of research, interpretation of printed research data, and use of bibliographical tools.
2295. **Principles of Teaching.** Credit 3(3-0)
(Formerly 605)
A study of the status of teaching as a profession in the United States; teacher obligations, responsibilities and opportunities for leadership in the classroom and community with special emphasis on principles of and procedures in teaching.
2296. **Curriculum in the Elementary School.** Credit 3(3-0)
(Formerly 606)
Basic concepts of curriculum and curriculum development with attention to curriculum issues and to desirable instructional practices in the elementary school.
2297. **Pupil Personnel Administration.** Credit 2(2-0)
(Formerly 630)
Pupil accounting, records and reports, financial reports, school census, special school records, pupil adjustment and progress, health and safety and legal aspects of pupil administration.
2299. **Educational Statistics.** Credit 3(3-0)
(Formerly 631)
A course designed to develop the student's command of the essential vocabulary, concepts, and techniques of descriptive statistics as applied to problems in education and psychology.
2392. **Seminar in Educational Problems.** Credit 3(1-4)
(Formerly 632)
Intensive study, investigation, or research in selected areas of education; reports and constructive criticism. Prerequisites: A minimum of 24 hours in prescribed graduate courses, and consent of instructor.
2393. **The Community College and Post Secondary Education.** Credit 3(3-0)
(Formerly 633)
Philosophy, organization, and character of school programs needed to meet educational needs of individuals who desire to continue their education on the post-secondary level. Special attention is given to the trends in developing community colleges. Prerequisites: Ed. 2187, Psych. 2390 or three or more years of teaching experience.

2394. Principles of College Teaching. **Credit 2(2-0)**
(Formerly 634)

Principles involved in teaching at the college level; techniques of teaching aids; criteria used in evaluation. Prerequisite: Psych. 2390.

GUIDANCE

2385. Guidance Practicum. **Credit 3(1-4)**
(Formerly 607)

Practice in the job of the high school counselor with students of high school age. Primary emphasis will be placed on counseling, but all phases of the work of the counselor will be covered.

2386. Organization and Administration of Guidance Services. **Credit 2(2-0)**
(Formerly 608)

A study of methods by which guidance policies and services may be properly implemented through organizational framework; consequently, leads to more effective organization of current guidance programs.

2387. Research Seminar. **Credit 3(1-4)**
(Formerly 609)

Critical discussions of research projects in progress and of the related literature to such projects. An acceptable written report is required. The course is required of all guidance majors in the degree program and others seeking the School Counselor's certificate. Prerequisite: Guidance 2385.

2395. Measurement for Guidance. **Credit 3(2-2)**
(Formerly 602)

The development of understandings and skills in collecting and interpreting data concerning the individual, and the use of such data in case studies and follow-up procedures.

2396. Techniques of Individual Analysis. **Credit 2(2-0)**
(Formerly 603)

A study of educational and vocational testing with reference to a general frame work for using statistical information in several types of counseling problems. Statistics necessary for the evaluation of psychological and educational measurement will be considered. This course also includes the measurement of aptitude including special aptitude with reference to prediction of proficiency in various occupations and curricula.

2397. Educational and Occupational Information. **Credit 3(3-0)**

Sources and procedures of assembling information about occupations and education; methods of using collected information.

2398. Introduction to Counseling. **Credit 3(3-0)**
(Formerly 605)

Information regarding the background and theories of counseling. Consideration will be given to the counselor's function, counseling interview, use of records, and the school counselor's place in a total personnel program.

2399. Case Studies in Counseling. **Credit 2(1-2)**
(Formerly 606)

The development of a basic understanding of the case study technique as used in counseling. Compilation, analysis, diagnosis and treatment of theoretical and actual counseling case histories.

PSYCHOLOGY

2388. **Mental Hygiene for Teachers.** Credit 3(3-0)
(Formerly 617)

An analysis of the function of mental hygiene in the total educative process. Attention is given to the basic principles of mental health as these apply to pupils and teachers alike; to the types of adjustment; to the development of personality; and to psychotherapeutic techniques for the restoration of mental health. Prerequisite: Psychology 2390.

2389. **Child Growth and Development.** Credit 3(3-0)
(Formerly 618)

A comprehensive analysis of physical, mental, emotional, and social growth and development from birth through adolescence.

2390. **Educational Psychology.** Credit 3(3-0)
(Formerly 621)

A study of the applications of psychological principles to educational practices.

2391. **Measurement and Evaluation.** Credit 3(2-2)
(Formerly 622)

A consideration of measurement techniques and interpretation of group surveys and individual pupil diagnosis.

English

Walter C. Daniel, Chairman

Office: 318 Hodgin Hall

The Department of English offers a concentration of studies for persons seeking to improve their knowledge of English and American literature and language and for individuals seeking a Master of Science in Education with concentration in English.

Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the degree Master of Science in Education with concentration in English must have earned the following in undergraduate studies:

Twenty-four (24) semester hours in English courses above freshman composition. The hours must include at least three semester hours of Shakespeare, three of American literature, three of English literature, three of world literature or contemporary literature, and three of advanced grammar and composition.

A student who fails to meet these qualifications will be expected to satisfy the requirements by enrolling in undergraduate courses before beginning his graduate studies in English.

Requirements for a Degree

Thesis Option: 30 s. h. required

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. English 2485, 2493, 2494, and 2499.

2. 6 s. h. selected from the following: English 2471, 2478, 2479, 2486, 2487, 2489, 2490, 2493, 2495.

Non-thesis Option: 36 s. h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. English 2485, 2493, 2494, and 2499.
2. 12 semester hours selected from the following: 2470, 2471, 2476, 2478, 2479, 2486, 2487, 2489, 2490, 2492, 2493, 2495.
3. 3 semester hours in electives in English or education.

For Advanced Undergraduates and Graduates

2470. **Community and Creative Dramatics.** Credit 3(3-0)
(Formerly English 515)

An introduction to basic elements and techniques of play production: acting, direction, stagecraft, lighting, costuming, play selection.

2471. **Elizabethan Drama.** Credit 3(3-0)

Chief Elizabethan plays, tracing the development of dramatic forms from early works to the close of the theaters in 1642. Prerequisite: English 2437 and 2438; 2436 or 2485.

2472. **Grammar and Composition for Teachers.** Credit 3(3-0)
(Formerly English 500, 2460)

A course designed to provide a review of fundamentals of grammar and composition for the elementary or secondary school teacher. Not accepted for credit toward undergraduate or graduate concentration in English.

2473. **Voice and Speech for Teachers.** Credit 2(1-2)
(Formerly English 510, 2467)

A course designed to provide a review of the fundamental skills or oral communication and instruction in public speaking. Not accepted for credit toward undergraduate or graduate concentration in English.

2476. **Children's Literature.** Credit 3(3-0)
(Formerly English 520)

A study of the types of literature designed especially for students in the upper levels of elementary school and in junior high school. Prerequisites: Graduate standing or English 2402, Humanities 2434-2435.

2478. **The American Novel.** Credit 3(3-0)
(Formerly English 540)

A history of the American novel from Cooper to Faulkner. Melville, Twain, Howells, James, Dreiser, Lewis, Hawthorne, Faulkner, Hemingway will be included. Prerequisite: English 2436 or 2485.

2479. **The Negro Writer in American Literature.** Credit 3(3-0)
(Formerly English 541)

A study of prose, poetry, and drama by American authors of Negro ancestry. Their works will be studied in relation to the cultural and literary traditions of their times. Dunbar, Chesnutt, Johnson, Cullen, Bontemps, Hughes, Wright, Ellison, Baldwin, and Yerby will be included. Graduate standing or English 2402, Humanities 2434-2435.

For Graduate Students Only

(English 2485 is a prerequisite for all literature courses numbered above 2485).

2485. Literary Analysis & Criticism. Credit 3(3-0)
(Formerly 610, 611)

An introduction to intensive textual analysis of poetry, prose fiction, prose non-fiction, and drama.

A study of basic principles and practices in literary criticism and of the various schools of criticism from Plato to Eliot.

2486. Milton. Credit 3(3-0)
(Formerly 621) Prerequisite: English 2485.

A study of the works of Milton in relation to the cultural and literary trends of seventeenth century England. Emphasis is placed upon Milton's poetry.

2487. Eighteenth Century English Literature. Credit 3(3-0)
(Formerly 625) Prerequisite: English 2485.

A study of the major prose and poetry writers of the eighteenth century in relation to the cultural and literary trends. Defoe, Swift, Fielding, Addison, Pope, Johnson, and Blake will be included.

2488. Language Arts for Elementary Teachers. Credit 3(2-2)
(Formerly 501)

A course designed to provide elementary school teachers with an opportunity to discuss problems related to the language arts taught in the elementary school. (Not accepted for credit toward concentration in English.)

2489. Studies in American Literature. Credit 3(3-0)
(Formerly 627) Prerequisite: English 2485.

A study of major American prose and poetry writers.

2490. Romantic Prose and Poetry. Credit 3(3-0)
(Formerly 626) Prerequisite: English 2485.

A study of nineteenth century British and American authors whose works reveal characteristics of Romanticism. Wordsworth, Coleridge, Shelley, Keats, Byron, Lamb, Carlyle, De Quincey, Emerson, Thoreau, Poe, and Whitman will be included.

2491. Modern British and Continental Fiction. Credit 3(3-0)
(Formerly 640) Prerequisite: English 2485.

A study of British and European novelists from 1914 until the present. Included in the study are Joyce, Kafka, Gide, Mann, and Camus.

2492. Restoration and 18th Century Drama. Credit 3(3-0)
(Formerly 631) Prerequisite: English 2485.

A study of the theatre and drama in relation to the cultural trends of the period. Etherege, Farquhar, Vanbrugh, Congreve, Fielding, Gay, Steele, Goldsmith, and Sheridan will be included.

2493. Literary Research and Bibliography. Credit 3(3-0)
(Not open to those who have completed English 2461).

An introduction to tools and techniques used in investigation of literary subjects.

2494. **History and Structure of the English Language.** Credit 3(3-0)
(Formerly 606, 607)

A study of the changes in the English language—syntax, vocabulary, spelling, pronunciation, and usage—from the fourteenth century through the twentieth century.

2495. **Contemporary Practices in Grammar and Rhetoric.** Credit 3(3-0)

A course designed to provide secondary teachers of English with experiences in Introduction to Linguistics applied to modern grammar and composition.

2499. **Seminar.** Credit 3(3-0)
(Formerly 650) Prerequisite: 15 hours of graduate-level courses in English.

Provides an opportunity for presentation and discussion of thesis, as well as selected library or original research projects from non-thesis candidates.

Foreign Languages

Waverlyn N. Rice, Chairman

Office: 312 Hodgin

Requirements for Admission to a Degree Program in French

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the degree Master of Science in Education with concentration in French must hold or be qualified to hold a class A teaching certificate in French.

Requirements for a Degree in French

Thesis Option: 30 s. h. required

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. French 2585 and 2587.
2. 12 additional s. h. in graduate-level courses in French.

Non-thesis Option: 36 s. h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. French 2585 and 2487.
2. 12 additional semester hours in graduate-level French courses.
3. 6 hours of electives in education, French, or courses related to French.

For Advanced Undergraduate and Graduates

2571. **Problems and Trends in Foreign Languages.** Credit 3(3-0)
(Formerly French 501)

Problems encountered by teachers given consideration. Place and purpose of foreign language in the curriculum today.

2572. **Oral Course for Teachers of Foreign Languages.** Credit 3(3-0)
(Formerly French 502)

Designed for teachers of foreign languages, to improve pronunciation and spelling.

2573. **Research in the Teaching of Foreign Languages.** Credit 3(3-0)
(Formerly French 503)
The study of a special problem in the teaching of a foreign language.
2574. **French Literature of the Seventeenth Century.** Credit 3(3-0)
(Formerly French 302)
A study of Classicism through masterpieces of Corneille, Racine, Moliere, other authors of the "Golden Period" in French letters. Conducted in French.
2575. **French Literature of the Eighteenth Century.** Credit 3(3-0)
(Formerly French 303)
A study in particular of the life and works of Montesquieu, Voltaire, Rousseau, and the Encyclopedists.
2576. **French Literature in the Nineteenth Century.** Credit 3(3-0)
(Formerly French 304)
A study of the great literary currents of the nineteenth century, Romanticism and Realism.
2577. **The French Theatre.** Credit 3(3-0)
(Formerly French 504)
A thorough study of the French theatre from the Middle Ages to the present.
2578. **The French Novel.** Credit 3(3-0)
(Formerly French 505)
A study of the novel from the seventeenth century to the present.
Credit 3(3-0)
2579. **French Syntax.**
(Formerly French 506)
Designed to teach grammar on an advanced level.

For Graduate Students Only

2585. **Advanced Reading and Composition.** Credit 3(3-0)
(Formerly 601, 2580)
A composition course with emphasis on idiomatic expressions.
2586. **Romantic Movement in France (1820-1848)** Credit 3(3-0)
(Formerly 602, 2581)
Background study of Chateaubriand and Madame de Stael. Emphasis will be placed on Lamartine, Hugo, Vigny, and Musset in poetry. Other genres, e.g., the theatre, novel, etc., will be studied.
2587. **Seminar in Foreign Languages.** Credit 3(3-0)
(Formerly 603, 2582)
Scholarly papers from students, faculty, and guest lecturers will be presented. Scholarly papers are required of all candidates for a degree with concentration in French.
2588. **Contemporary Literary Criticism.** Credit 3(3-0)
(Formerly 604, 2583)
Methods and purposes of literary criticism and of French literary critics.
2589. **Independent Study in Foreign Languages.** Credit 3(3-0)

Health and Physical Education

William M. Bell, Chairman

Office: Moore Gymnasium

HEALTH EDUCATION

For Advanced Undergraduates and Graduates

2771. Personal, School, and Community Health Problems. Credit 3(3-0)
(Formerly 502)

A study of personal, school and community health problems and resources. Emphasis is placed on the control of communicable diseases, healthful school living and the development in individuals of the scientific attitude and a positive philosophy of healthful living.

2772. Methods and Materials in Health Education for Elementary and Secondary School Teachers. Credit 3(3-0)
(Formerly 503)

A study of the fundamentals of the school health program, pupil needs, methods, planning instruction, teaching techniques, selection and evaluation of materials for the elementary and secondary programs, and the use of the community resources.

PHYSICAL EDUCATION

For Advanced Undergraduates and Graduates

2775. Current Problems and Trends in Physical Education. Credit 3(3-0)
(Formerly 501)

A practical course for experienced teachers. Consideration given to individual problems in physical education with analysis of present trends.

2776. Administration of Interscholastic and Intramural Athletics. Credit 3(3-0)
(Formerly 504)

A study of the relation of athletics to education, and the problems of finance, facilities, scheduling, eligibility, and insurance. Consideration given to the organization and administration of intramural activities in the school program.

2778. Current Theories and Practices of Teaching Sports. Credit 3(3-0)
(Formerly 506)

Methodology and practice at various skill levels. Emphasis placed on seasonal activity.

2777. Community Recreation. Credit 3(3-0)
(Formerly 505)

A study of the recreational facilities and problems with consideration being given to the promotion of effective recreational programs in rural and urban communities.

Industrial Education

Charles W. Pinckney, Chairman

Office: Graham 123

For Advanced Undergraduates and Graduates

INDUSTRIAL ARTS

3573. Advanced General Metals I. Credit 3(2-2)
(Formerly 510)

A course in metal work for teachers of industrial arts. Emphasis will

center on art metal (including plating, finishes, etc.), advanced bench metal, sheet metal operations and machine shop. Specifications of equipment, organization of instruction sheet, special problems and material will be covered as well as shop organization. Prerequisite: 3525 or equivalent.

3574. Advanced General Metals II. Credit 3(2-2)
(Formerly 511)

Advanced course in metal work for the industrial arts teacher or other persons who may require more specialization in an area of metalwork. With the necessary prerequisites, the student may select any of general metals for concentration and special study. Construction of projects, special assignments, etc. will be made after the area of work is selected and after consultation with the instructor. Prerequisite: 3573.

3575. Graphic Arts. Credit 3(2-2)
(Formerly 611)

Fundamentals of typography, hand composition, press operation, block printing, silk screen techniques, and other reproduction methods, also bookbinding.

3576. Plastic Craft. Credit 3(2-2)
(Formerly 506)

For teachers of industrial arts, arts and crafts and those interested in plastics as a hobby. Operations in plastics analyzed and demonstrated; design, color, kinds, and uses of plastics, how plastics are made and sold; vocational information. Projects suitable for class use constructed.

3577. Handcrafts. Credit 3(2-2)
(Formerly 508)

Craft materials and their application to industrial arts shops; principles and techniques of crafts suitable for industrial arts craft activities; for industrial arts majors and others interested in craft experience.

INDUSTRIAL EDUCATION

3579. Industrial Cooperative Programs. Credit 3(3-0)
(Formerly I. E. 520)

For prospective teachers of vocational education. Principles, organization and administration of industrial cooperative programs.

3580. Organization of Related Study Materials. Credit 3(3-0)
(Formerly I. E. 521)

Principles of scheduling and planning pupils' course and work experience, selecting and organizing related instructional materials in I. C. T. programs.

3581. Teaching Problems in Industrial Education. Credit 3(3-0)
(Formerly I. E. 502)

Problems involve objectives, curriculum content, text and reference books, teaching aids, class organization and administration, safety programs, teaching techniques and plans, remedial instruction, industry and community relations. Prerequisites: I. E. 3552, 3555.

3582. History and Philosophy of Industrial Education. Credit 3(3-0)
(Formerly I. E. 504)

Chronological and philosophical development of industrial education with special emphasis on its growth and function in American schools.

For Graduate Students Only

INDUSTRIAL ARTS

3585. **Electricity-Electronics.** Credit 3(2-2)
(Formerly I. A. 609)

For teachers and prospective teachers of Industrial Arts. Emphasis placed on the selection and construction of projects useful in school shops, development of selected information. Theory and fundamentals of electricity and radio communication, selecting equipment and supplies, course organization and instructional materials.

3586. **Industrial Arts and Crafts Workshop.** Credit 3(2-2)
(Formerly 600)

For elementary school teachers and others interested in crafts; materials, tools, processes and activities for programs without specialized shops; of value to those employed in activity-type programs. Offered in summer sessions. Non-credit for industrial education majors.

3587. **Industrial Arts Seminar I.** Credit 3(2-2)
(Formerly 512)

An advanced study in modern technology, may deal with recent developments, trends, practices and procedures of manufacturing and construction industries. Individual and group research and experimentation, involving selection, design, development and evaluation of technical reports and instructional materials for application in Industrial Arts program. Prerequisite: 3560 or 3590.

3588. **Industrial Arts Seminar II.** Credit 3(2-2)
(Formerly 507)
Continuation of 3587.

- 3589 **Advanced Furniture Design and Construction** Credit 3(2-2)
(Formerly I. A. 608, 3584)

Laws, theories and principles of aesthetic and structural design, planning, designing, pictorial sketching and furniture drawing. Laboratory work involving setting up, operating, and maintaining furniture production equipment, plus firms, requisitions, orders, invoices, stock bills, buying and professional problems. Prerequisite: Permission from instructor.

3590. **Comprehensive General Shop.** Credit 3(2-2)
(Formerly I. A. 613)

Problems involving wood, electricity-electronics, graphic arts, metal and crafts; emphasis on organization, instructional materials and procedures.

3591. **Advanced Drafting Techniques.** Credit 3(2-2)
(Formerly I. A. 614)

For teachers with undergraduate preparation or trade experience. School techniques, standards, conventions, devices, experimentation in advance of opportunities offered in regular courses. Use of literature and research expected.

3592. **Construction and Use of Instructional Aids.** Credit 3(2-2)
(Formerly I. A. 623)

The analysis of various instructional aids useful in shop teaching, planning, designing, and construction of various teaching aids. Facilities for laboratory work provided.

INDUSTRIAL EDUCATION

3593. **General Industrial Education Programs.** Credit 3(3-0)
(Formerly I. E. 631)

A study of the development of local, state, and national levels of day industrial schools, evening industrial schools, part-time day and evening

schools. Their organization types, courses of study, scope of movement; study of special student groups, fees and charges, building and equipment.

3594. Supervision and Administration of Industrial Education. Credit 3(3-0)
(Formerly I. Ed. 604)

A study of the relation of industrial education to the general curriculum and the administration responsibilities involved. Courses of study, relative costs, coordination problems, class and shop organization, and the development of an effective program of supervision will be emphasized.

3595. Testing in Industrial Subjects. Credit 3(3-0)
(Formerly I. Ed. 632)

Study and application of principles of achievement test construction to shop and drawing subjects; evaluation of results.

3596. Curriculum Laboratory in Industrial Education. Credit 3(3-0)
(Formerly I. Ed. 605)

Principles and preparation of instructional materials for classroom use. Students select and develop some significant areas of instruction for use in a shop or related subject class. Courses of study that function in teaching situations are prepared. Opportunity offered to analyze existing courses of study.

3597. Research and Literature in Industrial Education. Credit 3(3-0)
(Formerly 606)

Research techniques applied to technical and educational papers and thesis; classification of research; selection, delineation and planning; collection, organization and interpretation of data; survey of industrial education literature.

3598. Industrial Education Seminar. Credit 3(3-0)
(Formerly I. A. 612)

Designed to enable non-thesis graduate majors to complete educational and technical investigations. Each student will be expected to plan and complete a research paper and present a summary of his findings to the seminar.

3599. Thesis Research in Industrial Education. Credit 3
(Formerly I. Ed. 699)

Mathematics

Theodore R. Sykes, Chairman

Office: Graham Bldg.

The Department of Mathematics offers two curricula leading to the Master of Science in Education. One is intended primarily for individuals preparing to teach mathematics in junior or senior high school. The second is intended for individuals preparing to teach mathematics in senior high school or junior college, or planning to continue with graduate studies leading to a doctorate in mathematics.

Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the Master's degree program in Education with a concentration in Mathematics must have earned thirty (30) semester hours

in mathematics including differential and integral calculus and differential equations. A student who fails to meet these qualifications will be expected to satisfy the requirements by enrolling in undergraduate courses before beginning his graduate studies in mathematics.

Requirements for a Degree

A student may not receive credit for a course which is equivalent to one for which he has received an undergraduate grade of "C" or above.

JUNIOR HIGH-SENIOR HIGH CURRICULUM

Non-thesis Option: 36 s. h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must satisfy the following:

1. At least one mathematics course numbered higher than 3686.
2. 18 additional hours from the following: Mathematics 3670, 3671, 3672, 3673, 3674, 3677, 3682, 3683, 3684, 3690, 3691, 3692, 3693, 3694, 3695, 3696.
3. An elective of 3 semester hours in education or mathematics or courses related to mathematics.

Thesis Option: 30 s. h. required

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must satisfy the following:

1. At least one mathematics course numbered higher than 3686.
2. 15 additional semester hours in mathematics from the following: Math. 3670, 3671, 3672, 3673, 3674, 3677, 3682, 3683, 3684, 3690, 3691, 3692, 3693, 3694, 3695, 3696.
3. A thesis focused on research in mathematics or in the teaching of mathematics.

SENIOR HIGH-JUNIOR COLLEGE CURRICULUM

Non-thesis Option: 36 s. h. required.

In addition to the courses specified in the description of general requirements for a Master of Science degree in Education, a student must complete the following:

1. 15 semester hours in mathematics courses numbered higher than 3686.
2. 6 additional hours from the following: Mathematics 3670, 3671, 3672, 3673, 3674, 3677, 3682, 3683, 3684, 3690, 3691, 3692, 3693, 3693, 3694, 3695, 3696.
3. An elective of 3 semester hours in education or mathematics or courses related to mathematics.

Thesis Option: 30 s. h. required

In addition to the courses specified in the description of general requirements for a Master of Science degree in Education, a student must complete the following:

1. 9 semester hours in mathematics courses numbered higher than 3686.
2. 9 additional hours from the following: Mathematics 3670, 3671, 3672, 3673, 3674, 3677, 3682, 3683, 3684, 3690, 3691, 3692, 3693, 3694, 3695, 3696.
3. A thesis requiring research on a problem in the field of mathematics.

Advanced Undergraduate and Graduate

- 3670. Introduction to Modern Mathematics for Secondary School Teachers.** Credit 3(3-0)
(Formerly Mathematics 502)
A study of the elementary theory of sets, elementary logic and postulational systems, the nature and methods of mathematical proofs, structure of the real number system. Open only to inservice teachers, or by permission of Department of Mathematics.
- 3671. Algebraic Equations for Secondary School Teachers.**
(Formerly Math. 501)
Algebra of sets, solution sets for elementary equations, linear equations and linear systems of equations, matrices and determinants with applications to the solution of linear systems. Prerequisite: Math. 3670.
- 3672. Modern Algebra for Secondary School Teachers.** Credit 3(3-0)
Sets and mappings, properties of binary operations, groups, rings, integral domains, vector spaces and fields. Prerequisite: Math. 3670.
- 3673. Modern Analysis for Secondary School Teachers.** Credit 3(3-0)
Properties of the real number system, functions, limits, sequences, continuity, differentiation and differentiability, integration and integrability. Prerequisite: Math. 3670.
- 3674. Modern Geometry for Secondary School Teachers.** Credit 3(3-0)
Re-examination of Euclidean geometry, axiomatic systems and the Hilbert axioms, introduction to projective geometry, other non-Euclidean geometries. Prerequisite: Math. 3670.
- 3676. Mathematics for Chemists.** Credit 3(3-0)
(Formerly Math. 509)
This course will review those principles of mathematics which are involved in chemical computations and derivations from general through physical chemistry. It will include a study of significant figures, methods of expressing large and small numbers, algebraic operations, trigonometric functions, and an introduction to calculus.
- 3677. Theory of Numbers.** Credit 3(3-0)
(Formerly Math. 3687, 521)
Divisibility properties of the integers, Euclidean algorithm, congruences, diophantine equations, number-theoretic functions, and continued fractions. Prerequisite: Twenty hours of college mathematics.
- 3678. Mathematics of Life Insurance.** Credit 3(3-0)
(Formerly Math. 518, 3686)
Probability, mortality tables, life insurance, annuities, endowments; computation of net premiums; evaluation of policies; construction and use of tables. Prerequisite: Math. 3624.
- 3682. Elements of Set Theory and Topology.** Credit 3(3-0)
(Formerly Math. 515)
Operations on sets, relations, correspondences, comparison of sets, functions, ordered sets, general topological spaces, metric spaces, continuity, connectivity, compactness, homeomorphic spaces, general properties of T-spaces. Prerequisite: Math. 3622.
- 3683. Mathematical Statistics.** Credit 3(3-0)
(Formerly Math. 516)
Introduction to probability, distribution functions and moment-generating functions, frequency distribution of two variables, development of chi-square, students' "T" and "F" distributions. Prerequisite: Math. 3622.

3684. **Method of Applied Statistics.** Credit 3(3-0)
(Formerly Math. 517)

Presents the bases of various statistical procedures. Applications of normal, binomial, Poisson, chi-square, students' "T" and "F" distributions. Tests of hypotheses, power of tests, statistical inference, regression and correlation analysis and analysis of variance. Prerequisite: Math. 3624.

3686. **Mathematics of Life Insurance.** Credit 3(3-0)
(Formerly Math. 518)

Probability, mortality table, life insurance, annuities, endowments, computation of net premiums, evaluation of policies, construction and use of tables. Prerequisite: Math. 3624.

For Graduate Students Only

3685. **Modern Mathematics for Elementary School Teachers I.**
(Formerly Math. 3677)

A study of mathematic language, sets, relations, number systems, bases, structures, informal geometry, computations. No credit towards a degree in mathematics; not open to secondary school teachers of mathematics.

3686. **Modern Mathematics for Elementary School Teachers II.** Credit 3(3-0)

A continuation of Math. 3685. Prerequisite: Math. 3685 (formerly 3677). No credit towards a degree in mathematics; not open to secondary school teachers of mathematics.

3690. **Theory of Functions of a Real Variable I.** Credit 3(3-0)
(Formerly Math. 600)

A study of point set theory, metric spaces, measurable sets, measurable functions, Lebesgue integral of a bounded function. L_2 -spaces. Prerequisites: Math. 3663 and 3682.

3691. **Theory of Functions of a Real Variable II.** Credit 3(3-0)
(Formerly Math. 601)

Continuation of Mathematics 3690.

3692. **Theory of Functions of a Complex Variable I.** Credit 3(3-0)
(Formerly Math. 602)

A study of complex numbers, elementary functions, analytic functions, residue calculus, conformal mapping, Taylor and Laurent expansions. Prerequisite: Math. 3663.

3693. **Theory of Functions of a Complex Variable II.** Credit 3(3-0)
(Formerly Math. 603)

Continuation of Mathematics 3692.

3694. **Projective Geometry.** Credit 3(3-0)
(Formerly Math. 604)

A study of homogenous coordinates, linearly dependent points and lines, the principle of duality, harmonic points, harmonic lines, conics, projective and affine transformations. Prerequisites: Math. 3671, 3643, and 3667.

3695. **Special Topics in Algebra.** Credit 3(3-0)
(Formerly Math. 605)

A study of advanced topics in algebra which do not receive full development in the prerequisite courses. Prerequisite: Math. 3665 or Math. 3668.

3696. **Special Topics in Analysis.** Credit 3(3-0)
 (Formerly Math. 606)
 A study of advanced topics in analysis.
3699. **Thesis Research in Mathematics** Credit 3 s. h.

Music

Howard T. Pearsall, Chairman

Office: Frazier Hall

For Advanced Undergraduates and Graduates

2680. **Music in the Elementary Schools Today.** Credit 3(3-0)
 (Formerly 534)
 Selection and presentation of rote songs; the child's voice in singing—its care and development; the introduction and development of music reading; rhythmic development; creative music; and the listening program.
2681. **Music in the Secondary Schools Today.** Credit 3(3-0)
 (Formerly 535)
 Techniques of vocal and instrumental music instruction in the junior and senior high schools; the general music class; the organization, administration, and supervision of music programs. This course includes discussion of the adolescent's voice and its care; the testing and classification of voices; operetta production; the instrumental program, with emphasis on instruments pertinent to the secondary school music curriculum.
2682. **Choral Conducting of School Music Groups.** Credit 2(0-4)
 (Formerly 536)
 The skills of conducting, with literature for mixed, female, and male groups. Permission of instructor required.
2683. **Instrumental Conducting of School Music Groups.** Credit 2(0-4)
 (Formerly 537)
 The skills of conducting, with literature for beginner, intermediate, and advanced high school bands and orchestras.
2684. **The Psychology of Music.** Credit 3(3-0)
 (Formerly 538)
 The use of psychology in the learning and teaching of music.

For Graduate Students Only

2685. **Advanced Music Appreciation.** Credit 2(1-2)
 (Formerly Music 603)
 Emphasis on large music forms—Bach's *B Minor Mass* and *Six Brandenburg Concertos*; Mozart's *Don Giovanni*; Beethoven's *Symphony No. IX*; Schubert's *Symphony in C Major* and the *Trout Quintet*; Berlioz's *Symphony Fantastique*; Brahms's *Symphony No. IV*; Bizet's *Carmen*; Verdi's *Aida*; Wagner's *Lohengrin*; Debussy's *Afternoon of a Faun*; Bartok's *Concerto for Orchestra*; Berg's *Wozzeck*; Hindemith's *Mathis der Maler*; and others.

Physics

Donald A. Edwards, Chairman

Office: 109 Cherry Hall

For Graduate Students Only

3885. **General Physics for Science Teachers I.** Credit 3(2-2)
(Formerly Phys. 501, 3880)
For persons engaged in the teaching of science. Includes two hours of lecture-demonstration and one two-hour laboratory period per week. Emphasis is placed upon understanding the basic principles of physics. May be taken concurrently with 3886. For science teachers only.
3886. **General Physics for Science Teachers II.** Credit 3(2-2)
(Formerly Phys. 502, 3881)
A continuation of Physics 3885.
3887. **Electricity for Science Teachers.** Credit 2(2-0)
(Formerly Phys. 540, 3882)
Includes study of electric fields potentials, direct current circuits, chemical and thermal emf's, electric meters, and alternating currents. For science teachers. Prerequisite: Physics 3886.
3888. **Modern Physics for Science Teachers I.** Credit 2(2-0)
(Formerly Phys. 580, 3883)
An introductory course covering the areas of modern physics. May be taken concurrently with 3889. For science teachers only. Prerequisite: Physics 3886.
3889. **Modern Physics for Science Teachers II.** Credit 2(2-0)
(Formerly Phys. 581, 3884)
A continuation of Physics 3888.

Plant Science and Technology

Samuel J. Dunn, Chairman

Office: 235 Carver Hall

For Advanced Undergraduates and Graduates

AGRICULTURAL ENGINEERING

1475. **Conservation, Drainage and Irrigation.** Credit 3(1-4)
(Formerly Ag. Engr. 500)
Study of the improvement of soil by use and study of conservation practices, engineering structures, drainage, and irrigation systems. Prerequisite: Ag. Engr. 1441.
1476. **Advanced Farm Shop.** Credit 3(1-4)
(Formerly Ag. Engr. 502)
Study of the care, operation, and maintenance of farm shop power equipment. Prerequisite: Ag. Engr. 1404.
1477. **Special Problems in Agricultural Engineering.** Credit 3(0-6)
(Formerly Ag. Engr. 503)
Special work in agricultural engineering on problems of special interest to the student. Open to seniors in Agricultural Engineering.

CROP SCIENCE

1478. Plant Chemicals. Credit 3(2-2)
(Formerly Crop Science 500)

A study of the important chemical pesticides and growth regulators used in the production of economic plants. Prerequisites: Chem. 1612 and Pl. Sc. 1420.

1479. Crop Ecology. Credit 3(3-0)
(Formerly Crop Science 501)

Study of the physical environment and its influence on crops; geographical distribution of crops.

1480. Breeding of Crop Plants. Credit 3(2-2)
(Formerly Crop Science 502)

Significance of crop improvements in the maintenance of crop yields; application of genetic principles and techniques used in the improvement of crops; the place of seed certification in the maintenance of varietal purity.

1481. Special Problems in Crops. Credit 3(3-0)
(Formerly Crop Science 503)

Designed for students who desire to study special problems in crops. By consent of instructor.

1482. Research Design and Analysis. Credit 3(2-2)
(Formerly Crop Science 505)

Experimental designs, methods and techniques of experimentation; application of experimental design to plant and animal research; interpretation of experimental data. Prerequisite: Ag. Econ. 1177 or Math. 3624.

HORTICULTURE

1483. Special Problems. Credit 3(3-0)
(Formerly Hort. 501)

Work among special lines given largely by the project method for advanced undergraduate and graduate students who have the necessary preparation.

SOIL SCIENCE

1484. Special Problems in Soils. Credit 3(3-0)
(Formerly Soil Sc. 504)

Research problems in soil for advanced students. By consent of instructor.

For Graduate Students Only

AGRICULTURAL ENGINEERING

1489. Rural Electrification for Vocational
Agriculture Teachers. Credit 3(3-0)

Rural electrification for vocational agriculture teachers. A study of electricity with particular emphasis on its application to the home and farm.

CROP SCIENCE

1491. Grass Land Ecology. (Formerly Crop Sc. 634) Credit 2(2-0)

The use of grasses and legumes in a dynamic approach to the theory and practice of grass-land agriculture, dealing with the fundamental ecological principles and their application to management practices.

EARTH SCIENCE

1492. Topics in Earth Science. Credit 2(2-0)

A discussion of special topics from astronomy, geology, soil genesis, meteorology, oceanography, and physical geography.

1493. Problem Solving in Earth Science. Credit 3(0-6)

A laboratory-demonstration course involving identification of earth materials, measurements in environmental processes, and field observation of natural physical phenomena.

1494. The Physical Universe. (Formerly Earth Sc. 601) Credit 3(3-0)

This course is designed to give the student a broad general background knowledge of the earth's physical environment; its lithosphere, hydrosphere and atmosphere and their interaction on weather and climate. The physical nature of the stars, the sun, and planets will also be studied in the light of modern concepts of space.

1495. Physical Geology. (Formerly Earth Sc. 602) Credit 3(3-0)

The development of the earth's surface, its material composition and forces acting upon its surface will be considered. Specific topics include origin of mountains and volcanos, causes of earthquakes, work of rivers, wind, waves, and glaciers. Prerequisite: Ea. Sci. 1492 or consent of instructor.

1496. Conservation of Natural Resources. Credit 3(3-0)
(Formerly Earth Sc. 604)

A descriptive course dealing with conservation and development of renewable natural resources encompassing soil, water, and air; cropland, grassland and forests; livestock, fish, and wildlife; and recreational, aesthetic and scenic values. Attention will be given to protection and development of the nation's renewable natural resources base as an essential part of the national security, defense, and welfare.

1497. Seminar in Earth Science. Credit 2(2-0)

A seminar concerned with recent developments in the earth sciences and related disciplines.

SOIL SCIENCE

1498. Soils of North Carolina. (Formerly Soils 631) Credit 3(2-2)

A study of the factors basic to the understanding of the soils of North Carolina, their classification and properties as related to sound land-use and management.

Social Sciences

Virgil C. Stroud, Chairman

Office: 308 Hodgkin

The Department of Social Sciences offers a Master of Science degree in Education with concentration in History or Social Studies.

Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the degree Master of Science in Education with concentration in History or Social Studies must hold or be qualified to hold a class A teaching certificate in History or Social Studies.

Requirements for a Degree

HISTORY

Non-thesis Option: 36 s. h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. History 2878, 2879 or 2880, 2881, 2889, and 2896.
2. 6 additional s. h. in history courses.
3. 3 s. h. in electives in history, education, or related disciplines.

Thesis Option: 30 s. h. required

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. History 2878, 2879 or 2880, 2881, 2889, and 2896.
2. 3 additional s. h. in history courses.

SOCIAL STUDIES

Non-thesis Option: 36 s. h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. History 2878, 2893; Pol. Sc. 2976; Soc. 2979; Econ. 2876; and Geog. 2885.
2. 3 s. h. from the following: Pol. Sc. 2977; Econ. 2883.
3. 3 s. h. in electives in history, education, geography, political science, sociology, or related disciplines.

Thesis Option: 30 s. h. required

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

History 2878, 2893; Pol. Sc. 2976; Soc. 2979; Econ. 2876; and Geog. 2885.

For Advanced Undergraduates and Graduates

ANTHROPOLOGY

2981. Cultural Anthropology. Credit 3(3-0)
(Formerly Ant. 401)

Special emphasis upon acculturation. Description and historical reviews of contacts of societies with different cultural traditions; analysis of interaction and resulting interpretation of cultures.

ECONOMICS

2876. Economic Understanding. Credit 3(3-0)
(Formerly Ec. 501)

An analysis of the institutional organization and functions of the American economy. Special references will be made to the state of North Carolina.

2877. Comparative Economic Systems. Credit 3(3-0)
(Formerly Ec. 502)

A description and analytical study of the various systems that have developed in different countries at different times; motivations, production and distribution patterns.

HISTORY

2878. **The British Colonies and the American Revolution.** Credit 3(3-0)
(Formerly History 501)

The evolution of colonial institutions, growth of the American colonies, the American Revolution and its aftermath.

2879. **Economic History of the United States, 1787-1865.** Credit 3(3-0)
(Formerly History 503)

A study of pre-industrial America with special emphasis on agriculture, commerce, transportation, banking and industry.

2880. **Economic History of the United States Since 1865.** Credit 3(3-0)
(Formerly History 504)

A treatment of the American economy in the industrial capitalism, finance capitalism, business organization and the relationship between government and business.

2881. **The Civil War and Reconstruction, 1860-1877.** Credit 3(3-0)
(Formerly History 607)

This course begins with a summary of the Civil War. It then treats the historiography of the Reconstruction period, the reconstruction of the South, and the restoration of the Union.

2882. **Contemporary History of the United States.** Credit 3(3-0)
(Formerly History 612, 2893)

An intensive study and analysis of important problems in American history since 1928. Emphasis will be placed on methods of historical research and writings.

2883. **The Soviet Union Since 1917.** Credit 3(3-0)
(Formerly History 610, 2892)

A discussion of the ideological background of the Soviet Union with emphasis on the doctrines of Marx, Engels, and Lenin. This is followed by events leading up to the revolution of 1917 and the establishment of Communist autocracy, the new economic policy, the first Five-year Plan, Stalin's doctrine, and Soviet Communism since the death of Stalin.

2884. **Backgrounds of African Civilization.** Credit 3(3-0)

This course is designed, first, to provide general background information about major historical events on the continent of Africa from its earliest recorded history to the twentieth century, and second, to survey and study in detail the political, socio-economic, educational, and technological progress taking place in the New Africa.

2982. **Foundations of Civilization.** Credit 3(3-0)

A course designed to help teachers give to pupils in the elementary schools a better acquaintance with the history and culture of the western and non-western cultural areas of the world. Such influences in civilization as the role of religion and the rise of industrialism will be considered. This course will present through lectures, discussions, readings, and various instructional media some main currents of institutional and cultural developments in world civilization. No credit towards degree in Hist. or Soc. St.

2983. **Foundations of American History.** Credit 3(3-0)

The purpose of this course is to give a broad view of American history from the Revolution to the present day. After a study of the roots of American values, the development of institutions, and nineteenth-century foundations of our present economic, social, and political conditions, considerable attention will be given to several themes of twentieth-century American history. No credit towards degree in Hist. or Soc. St.

POLITICAL SCIENCE

2976. Federal Government. Credit 3(3-0)
An intensive study of the federal government and its operations, federal organization, departments, independent offices, legislation, regulations, control and encouragement of enterprises by educational programs and research.

2977. State and Local Governments. Credit 3(3-0)
A study of state and local governments and their power to regulate, control and promote the general welfare, labor and health laws, educational programs and other services.

SOCIOLOGY

2979. Current Economic and Social Problems. Credit 3(3-0)
(Formerly Soc. 502)
A practical course in applied economics and sociology dealing with analysis of present trends in government, economics, industry, agriculture and the social implications of these trends. Open to seniors by permission of instructor.

2980. Population Problems. Credit 3(3-0)
(Formerly Soc. 506)
Introduction to various phases of population study; special attention will be given to the population explosion and problems created by man-kind-in-motion; various theories of population growth will be considered. Open to seniors by permission of instructor.

Courses for Graduates Only

ECONOMICS

2882. Labor and Industrial Relations. Credit 3(3-0)
(Formerly Ec. 601)
Development and structure of American unions; theories of union growth, economics of collective bargaining and wage determination; and survey of labor legislation.

2883. Government Economic Problems. Credit 3(3-0)
(Formerly Ec. 602)
This course will consider the growth of public expenditures, revenues, and debt of the United States; theories of taxation, and tax incidence; and the effects of public expenditures and taxes on economic growth.

GEOGRAPHY

2885. World Geography. Credit 3(3-0)
(Formerly Geog. 501)
This course will consider man's relation to soil, minerals, and climate. Emphasis will be placed on physiography and human progress.

2886. Geography of North America. Credit 3(3-0)
(Formerly Geog. 603)
A regional study of North America. A study of climates, landforms, soils, flora and fauna, ocean and coast lines of North America.
NOTE: See offerings in Earth Science in the Department of Plant Science and Technology.

HISTORY

2888. The French Revolution and Napoleon. Credit 3(3-0)
(Formerly History 602)
A study of the causes, course, and major consequences of the revolutionary movement; also the program and role of Napoleon.

2889. **Recent United States Diplomatic History.** Credit 3(3-0)
(Formerly History 605)

A survey of recent diplomatic history of the United States to the present time, with special reference to the development of basic as well as contemporary policies.

2890. **Social and Political History of England from 1714 to 1832.** Credit 3(3-0)
(Formerly History 606)

Particular attention is given to political, social, cultural, and diplomatic aspects of England during the eighteenth century.

2891. **History of Nineteenth-Century Europe.** Credit 3(3-0)
(Formerly History 505)

This course treats the history of Europe between the Congress of Vienna and the outbreak of World War I. Special attention is given to the growth of ideologies such as nationalism, liberalism, and socialism. Attention is also paid to economic growth, scientific progress, colonial expansion, and international conflict.

2894. **Independent Study in History.** Credit 3(3-0)
(Formerly History 613)

2895. **Europe Since 1914.** Credit 3(3-0)
(Formerly History 506)

An account of Europe's history in the twentieth century. Special consideration is given to attempts at reconstruction, 1919 to 1939; the conflict of ideologies; World War II; and the issues in crisis between East and West.

2896. **Constitutional Development Since 1865.** Credit 3(3-0)

Historical study of the development of the Constitution since 1865. Treatment will be given to important Constitutional decisions, major documents, major Supreme Court decisions, and public policy. Assignments in paperback books will be frequent.

POLITICAL SCIENCE

2898. **Government Finance.** Credit 3(3-0)
(Formerly Pol. Sc. 603)

A study at the graduate level of government finances. It will cover (a) the pattern and methods of taxation, from a direct poll tax to a withholding system; (b) the use of revenues, from "funding the debt" to foreign aid. A parallel study of local and state financial systems will be made. The political implications of government finances will be considered. The course will also consider a newer concept of government finances, "taxes as an investment." Intensive readings and reports required.

2899. **Comparative Government.** Credit 3(3-0)
(Formerly Pol. Sc. 508)

Comparative analysis of the American system of government and selected foreign governments. Administration, organization, and processes in these systems of government will also be considered.

2900. **Research and Current Problems.** Credit 3(3-0)
(Formerly Pol. Sc. 506)

Considered are: fundamental concepts of scientific method of research; effective research procedures; techniques and sources used in research about government; investigation of some current and recurrent problems inherent in Federalism and "States Rights," individualism and collective action, free enterprise and governmental regulations.

SOCIOLOGY

- 2984. Theories of Human Development and Interaction.** Credit 3(3-0)
(Formerly 600)

An advanced course in social psychology, of interest to those in the field of Behavioral Science. Prerequisite: Permission of instructor.

- 2985. Race and Ethnic Relations.** Credit 3(3-0)

A study of race relations in America with specific emphasis upon the Negro in American society; a comparative analysis of human relations in America with those in selected countries.

- 2986. Socialization and Culture.** Credit 3(3-0)
(Formerly Sociology 501)

A comparison of ethnographic and other research materials in the fields of psychology, sociology and anthropology on child rearing, personality development, and the learning of social roles. Examination of hypotheses relating early experiences to cultural behavior. Structural and ideological determinants of childhood experiences.

- 2987. Advanced Readings in American Sociology.** Credit 3(3-0)
(Formerly Sociology 505)

This course is designed to give special attention to the work of American scholars in the area of sociology.

