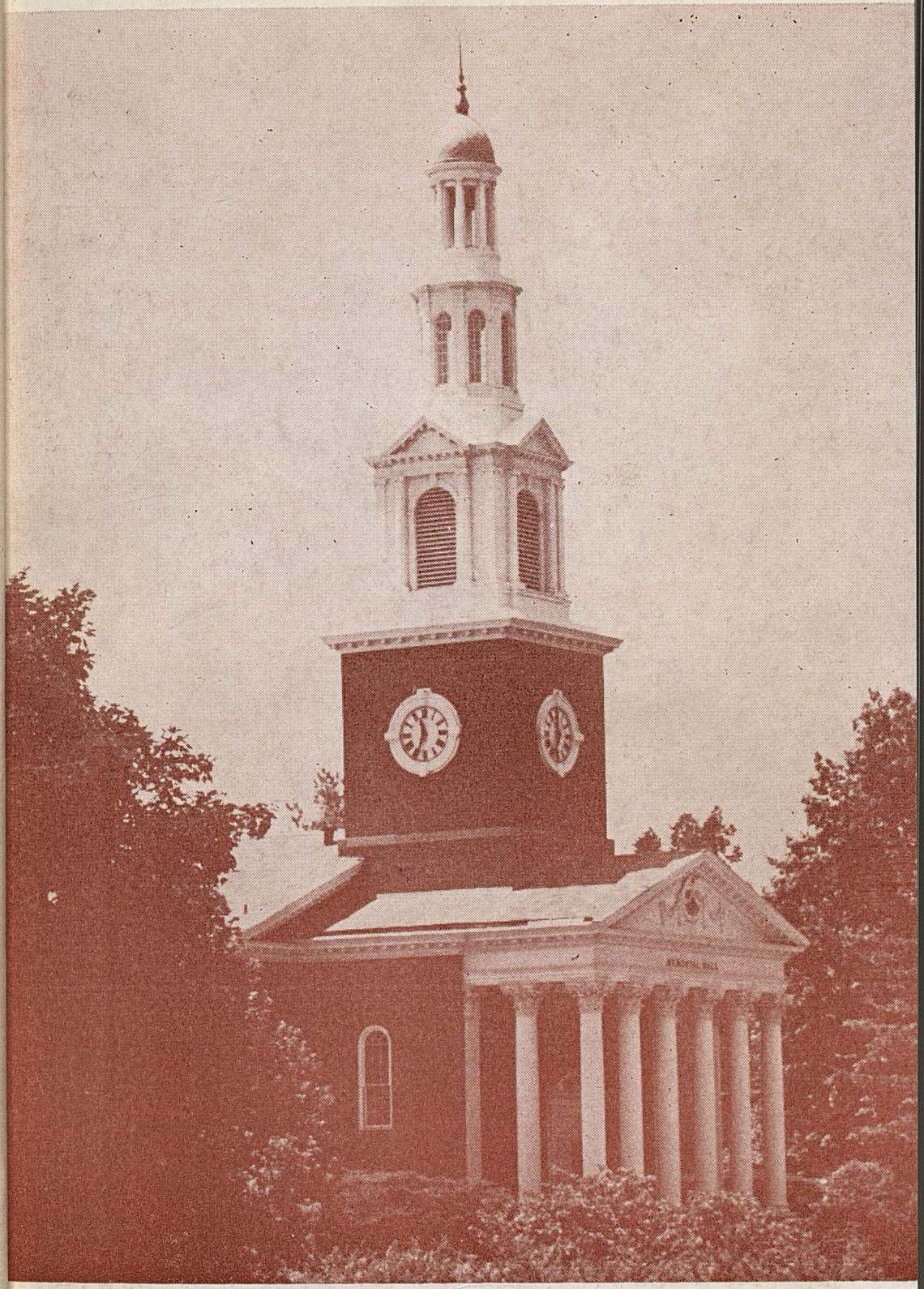
BULLETIN OF THE UNIVERSITY OF KENTUCKY



The Graduate School

LEXINGTON 1962-63

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BULLETIN OF THE

UNIVERSITY OF KENTUCKY

JULY, 1962

Graduate School

1962-63

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Volume 54 July, 1962 Number 7

KENTUCKY RESEARCH FOUNDATION FELLOWS FOR 1962-63

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Patricia Ann Caudill	Psychology	Elkhorn City
Nedra D. Lundberg	English	Dixon, S. D.
Potu Narasimha Rao	Plant Pathology	India
Vernon Warren	Diplomacy	Lexington

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Barbara Barrett	English	Plankinton, S. D.
Philip B. Coulter	Political Science	Benton
Jettie M. Crisp	Education	Beaverdam, O.
Linda L. Gassaway	English	Watertown, Tenn.
Mary M. Haroz	Psychology	Dallas, Tex.
Grace Leonard	Psychology	Lexington
Dwayne R. Mason	History	Missoula, Mont.
Oscar C. Page	History	Bowling Green
John A. Rider	Education	Orange City, Iowa
Thomas B. Ripy	Political Science	Lawrenceburg
Theodore R. Robinson	English	Manchester
Mary E. Ruhl	Music	Angels Camp, Calif.
Sylvia Elaine Smith	Zoology	West Lawn, Pa.
Ronald Sollenberger	Microbiology	Williamsburg, Pa.
Patricia L. Sumner	Modern Foreign Languages	Somerset
Meredith W. Watts, Jr.	Diplomacy	Mundelein, Ill.

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1962

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April

May

May

UNIVERSITY CALENDAR FOR THE YEAR 1962-63

1962	Fall Semester
Aug. 15	Wednesday—Last date to submit application and transcripts to Admissions Office for Fall Semester, 1962-63
Sept. 17-19	Monday, Tuesday, Wednesday—Classification, registration, and orientation
Sept. 20	Thursday—Class work begins
Sept. 25	Tuesday—Last date one may enter an organized class for the Fall Semester
Oct. 1	Monday—Last date one may drop a course without a grade
Oct. 2, 3	Tuesday and Wednesday—Last days for filing application for a January degree in College Dean's office
Oct. 12, 13	Graduate Record Examination
Nov. 21-25	Wednesday noon through Sunday—Thanksgiving holidays. Class work begins Monday, November 26th, at 8:00 a.m.
Dec. 20	Thursday, 8:00 a.m.—Christmas holidays begin
1963	
Jan. 3	Thursday, 8:00 a.m.—Classes resume—Christmas holiday ends
Jan. 7	Monday—Last date to submit application and transcripts to Admissions Office for Spring Semester, 1962-63
Jan. 9	Wednesday—Thesis deadline
Jan. 21-25	Monday-Friday—Final Examinations
Jan. 25	Friday—End of Fall Semester
Jan. 28	Monday—All grades due in Registrar's Office by 9:00 a.m.
	Spring Semester
Feb. 4-6	Monday, Tuesday, Wednesday—Registration
Feb. 7	Thursday—Class work begins
Feb. 13	Wednesday—Last date one may enter an organized class for Spring Semester
Feb. 18	Monday—Last date one may drop a course without a grade
Feb. 27, 28	Wednesday and Thursday—Last days for filing application for a June degree in College Dean's office
March 15, 16	Graduate Record Examination
April 6-14	Saturday noon through Sunday—Spring vacation. Class work begins Monday, April 15th at 8:00 a.m.
May 13	Monday—Thesis deadline
May 15	Wednesday—Last date to submit application and transcripts to Admissions Office for 1963 Summer Session

May 27-31	Monday-Friday—Final examinations
May 31	Friday—End of Spring Semester
June 1	Saturday—Alumni Day
June 1	Saturday—Grades for graduating seniors due in Registrar' Office by 9:00 a.m.
June 2	Sunday—Baccalaureate Services
June 3	Monday—All grades due in Registrar's Office by 9:00 a.m.
June 5	Wednesday—Ninety-sixth Annual Commencement

Summer Session 1963

June 14, 15	Friday and Saturday—Orientation and registration
June 17	Monday—Class work begins
June 20	Thursday—Last date one may enter an organized class fo
June 27	Thursday—Last date one may drop a course without a grad
June 28, 29	Graduate Record Examination
July 4	Thursday—Independence Day holiday
July 5, 6	Friday and Saturday—Last days for filing application fo August degree in College Dean's office
July 20	Saturday—Thesis deadline
Aug.8	Thursday—End of 1963 Summer Session
Aug. 10	Saturday—All grades due in Registrar's Office by 12 noon
Aug. 15	Thursday—Last date to submit application and transcripts t Admissions Office for Fall Semester, 1963-64

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ALBERT DENNIS KIRWAN, M.A., LL.B., PH.D.
Dean of the Graduate School

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Graduate work is offered in all colleges in the University. Approximately a thousand courses acceptable for graduate credit are listed in the catalogue, under the various departments. Directors of graduate study in the various subjects are listed in this bulletin just before the list of courses.

The following advanced degrees are conferred by the University:

Master of Arts
Master of Science
Master of Science in Agriculture
Master of Science in Home Economics
Master of Science in Agricultural Engineering
Master of Science in Civil Engineering
Master of Science in Electrical Engineering
Master of Science in Library Science
Master of Science in Mechanical Engineering
Master of Science in Metallurgical Engineering
Master of Science in Mining Engineering
Master of Science in Public Health
Chemical Engineer (Ch.E.)
Civil Engineer (C.E.)
Electrical Engineer (E.E.)
Mechanical Engineer (M.E.)
Metallurgical Engineer (Met.E.)
Mining Engineer (E.M.)
Master of Arts in Education
Master of Science in Education
Master of Business Administration
Master of Music
Specialist in Education
Doctor of Education (Ed.D.)
Doctor of Engineering (Engr.D.)
Doctor of Philosophy

The degree of Doctor of Philosophy is offered with major work in the following fields: Agricultural Economics, Animal Husbandry, Biochemistry, Biology, Chemistry, Dairy Science, Diplomacy and International Commerce, Economics, Education, English, Guidance and Counseling, History, Mathematics, Microbiology, Physics, Physiology, Political Science, Psychology, and in the combined fields of Sociology and Rural Sociology. Minor work may be carried in any department offering graduate courses. The degree of Doctor of Engineering is offered in Metallurgical Engineering.

ADMISSION

A student who is a graduate of a fully accredited institution of higher learning and has an overall standing of 2.5 on a basis of 4.0 may apply for admission to the Graduate School by submitting to the Registrar of the University two official transcripts of undergraduate courses and a written application

at least a month before anticipated entrance. Blanks for the latter may b obtained from the Registrar or from the office of the Graduate School. A st dent without an average of 2.5, if admitted, is designated as an "unclassifie student and may attain candidacy for a degree only upon conditions stated the section "Application for Full Graduate Standing", below.

It should be clearly understood that a graduate student may not be al to begin immediately a full graduate program leading to the degree he desir It may be necessary for him to satisfy certain prerequisites which he omitt in his undergraduate curriculum. These will be determined by the departme in which the major work is to be done. In brief, it may be stated that a gra uate student may begin a full program in the fields in which he has the equiv lent of a balanced undergraduate major; in some cases the equivalent of undergraduate minor is adequate.

Admission to the Graduate School by the Registrar entitles a student to ta such courses as he or she desires, provided the necessary preparatory cours have been taken. *However, admission does not automatically make a stude an applicant for a graduate degree.*

Attendance in the Graduate School at the University of Kentucky is not right. It is a privilege which the student concedes may be withdrawn by t University or any area of graduate study if it is deemed necessary by the De of the Graduate School in order to safeguard the University's ideals of schol ship and character.

Advanced Degrees for Faculty Members

Members of the faculty of the University of Kentucky having a rank high than that of instructor may not be considered as candidates for advanced d grees from this institution.

The Graduate Record Examination

All students working for graduate degrees should take three parts of t Graduate Record Examination (the Area Tests, the Aptitude Test, and t Advanced Test in the major subject). This should be done during the first te of graduate work. (See the calendar at the front of this catalogue.)

Application for Full Graduate Standing and the Graduate Record Examination

A graduate student desiring to earn a graduate degree must be approv as an applicant and as a candidate for a degree by the department in whi he intends to major and by the Graduate School. This application should made as soon as scores on the Graduate Record Examination are available a in any case prior to the beginning of the semester or term in which the deg is sought.

To be admitted as a candidate for a master's degree or an applicant fo doctor's degree a student must have met the following requirements: (1) average of at least 2.5 (midway between B and C) on a scale of 4.0 on previous college work; (2) satisfactory scores (in the opinion of the depa ment concerned and the Dean of the Graduate School) on three parts of t Graduate Record Examination (the Area Tests, the Aptitude Test, and t Advanced Test, if there is one, suitable to the student's major); and (3) a average or better on all work taken while registered as a graduate student the University of Kentucky. A student not having a 2.5 average on all previo college work may be admitted as a candidate for a master's degree or applicant for a doctor's degree provided: (1) his performance on the Gradua Record Examination (in the opinion of the major area and the Dean of t Graduate School) is sufficiently high; or (2) in the judgment of the maj area and the Dean of the Graduate School, he has demonstrated his co

petence in graduate work. (The Graduate Record Examination may be taken either before admission or during the first semester after admission.)

Graduate work taken before students are admitted as "applicants for degrees" will be evaluated by the major area and the Graduate School at the time the application for full graduate standing is considered, and the remaining requirements for the degree will be indicated, insofar as is feasible

Graduating Seniors as Part-Time Graduate Students

Seniors of the University of Kentucky lacking no more than six semester hours for graduation and having an undergraduate average of at least 2.5 may register in the Graduate School with the consent of their college deans and the Dean of the Graduate School. Approval of the appropriate director of graduate study is required if the students are to be applicants for degrees. The total load of such a student shall not exceed twelve credits. The graduate residence assigned shall be one and one-half weeks for each semester hour of graduate work beyond the six or less credits needed to complete undergraduate requirements. The incidental fee shall be that of a full-time student in the school in which more than half of the work is taken. In cases where the load is evenly divided between the schools, the larger fee, if any, shall be assessed. Requirements for the undergraduate degree must be completed during the semester in which the student is allowed to register for part-time graduate work. Students desiring to do this should fill out in duplicate a petition requesting such and listing the course or courses to be taken to complete undergraduate requirements. Such a petition must be approved by both deans concerned.

GENERAL REQUIREMENTS FOR ALL ADVANCED DEGREES

Courses, Grades, and the Mark "I" (Incomplete)

All courses listed in the Graduate School Bulletin (both those numbered 400 to 599 and those numbered 600 and above) may be counted as credit toward a graduate degree provided they are approved as an appropriate part of the student's graduate program by his graduate adviser or committee. An over-all average of B on all work taken as a graduate student must be attained before an advanced degree may be awarded. An "incomplete" (I) must be converted within one calendar year after the close of the term in which the I is assigned. The grade S may be recorded as a permanent mark for graduate students in courses carrying no academic credit.

No work is given graduate credit unless the student was enrolled in the Graduate School at the time during which the work was taken.

Registration and Classification

Before registering each semester a graduate student should confer with the director of graduate study in his major subject. (Directors of graduate study are listed just ahead of the catalogue of courses in this Bulletin.) If convenient, this conference should come in advance of the day of registration and classification; in any case it must come prior to the completion of classification and the beginning of classes. For all regular graduate students the Graduate Office will require for each registration the signature of the director of graduate study indicating approval of the proposed program.

Student Loads and Short Courses

The normal load of a graduate student during any semester is twelve semester hours if he is working for a master's degree under Plan A, or if he is working for a doctor's degree. In no case may this load for a semester exceed

fifteen semester hours. In the summer session the normal load is six hours an the maximum nine. Graduate students serving in the University as assistan or part-time instructors should register for less than the normal load, as d termined by their advisers. Persons holding full-time working or professiona assignments, whether employed by the University or not, may not take fu graduate credit toward a degree in any single semester or term more tha 3 or 4 credits. Two short courses of 4 weeks or less, or two full-term course and a short course, may not be taken simultaneously. A short course may no carry credit greater than the number of weeks it is offered.

Residence

A load for full-time residence comprises a minimum of 9 semester hours o graduate course work, or the equivalent in thesis research. In the summer se sion the corresponding load is 6 semester hours. Part-time residence during an semester is computed on the basis of one and one-half weeks of residence fo each semester hour earned. Part-time students in the summer session receiv one and one-half weeks per semester hour except for short courses of less tha eight weeks, in which case residence shall not exceed the actual number o weeks involved.

Masters' candidates who wish to do research on their thesis problems an who need additional residence credit should register for course No. 768 in th appropriate department. In order to be eligible for veteran's subsistence th student may register in Course 768 for as much as nine weeks residence in an semester; however, not more than six weeks residence credit can be applie toward the requirements for the master's degree under the thesis plan.

Doctoral candidates working on their dissertations and in need of residenc credit should register for course No. 769 in the appropriate department.

Time Limit for Degrees

No course or residence credit is given for graduate study completed mor than eight years prior to the date of the commencement at which the studen expects to take his degree unless such credit or residence is specifically validate by the Graduate Council on written recommendation of the director of grad uate study. No course or residence credit may be validated in this manner i completed more than twelve years prior to the commencement date.

Proficiency in English

No student shall be approved for a graduate degree until he has demon strated his ability to write accurate and effective English. A decision on thi matter shall be based on the student's rating on the Graduate Record or equiva lent examination and such other evidence as the director of graduate study o special committee and Graduate Council shall deem necessary.

Graduation

Advanced degrees may be conferred at the close of any semester o summer session, although commencement exercises are held only at the clos of the academic year. *A student who is scheduled to receive his degree at th close of the academic year is expected to attend the commencement exercise unless he is excused in writing by the Dean of the Graduate School.* Student who are eligible to receive degrees at the end of a first semester or a summe session may elect to defer their graduation and participate in commencemen exercises. Appropriate academic costume must be worn. The graduation fe covers the cost of the diploma, the hood, and, in the case of the master's degre (with thesis), the binding of the thesis.

Students intending to graduate at the close of a given semester or term must make formal application (at the Graduate Office) for the degree within the first two weeks of the semester or term.

Fees

Registration fees per semester are $100.00 for residents of Kentucky, $250.00 for non-residents. Part-time graduate students who are legal residents of the state pay $12.00 per semester hour; non-residents pay $30.00 per semester hour. Students carrying full loads in the summer session pay one-half the regular semester fees. Those taking less than full loads pay the regular semester credit-hour fee.

Graduate students holding University fellowships and scholarships, graduate assistants, and instructors pay the fees assigned to Kentucky residents.

GENERAL REQUIREMENTS FOR ALL MASTERS' DEGREES

(See also pages 11-15.)

Transfer of Credits

With the approval of his graduate adviser, the dean, and the registrar, a student may transfer up to six credits (but no residence) toward the satisfaction of the minimum requirements for masters' degrees, provided the work in question was taken while enrolled in a Graduate School.

To be eligible for such transfer, the student must have taken the courses in residence (rather than by Extension) as an enrollee of an accredited Graduate School.

Extension and Correspondence Work

Under certain conditions, up to six of the credits required for any master's degree in course may be satisfied by extension courses given in person by University of Kentucky instructors. No graduate credit is given for courses taken by correspondence.

M.A. or M.S. Degree

Whether a candidate selects a Master of Arts or a Master of Science degree is left to the option of the candidate and his major department. In general it may be said that a candidate with major work in the natural sciences should take the M.S. degree; others, the M.A.

Courses and Curricula

All courses listed in the Graduate School Bulletin are open to graduate students if approved by their directors of graduate study.

Graduate students are eligible to take (1) regular courses which meet as organized classes and (2) independent-study or research courses in which each student carries on investigations independent of class meetings; but at least one-half, and preferably three-fourths, of the minimum requirements for the master's degree shall be in regular courses.

All candidates for masters' degrees shall earn at least nine semester hours in courses numbered 600 or above. Exceptions to this rule may be made only with the approval of the Graduate Council.

Sustained Residence

Normally candidates for masters' degrees shall spend at least two full summer terms or one semester in full-time study at the University. The minimum full load for a summer term is 6 semester hours and for a semester 9

semester hours. For individual superior students this requirement may waived if recommended by the director of graduate study in the studen major subject and approved by the graduate dean. Minimum eligibility being so recommended includes: (1) the satisfactory completion of 12 mester hours of graduate work, (2) the attainment of national average better) scores on the Aptitude and Advanced Test portions of the Gradu Record Examination, and (3) appropriateness of employment facilities a conditions which make feasible satisfactory completion of degree requireme while fully employed. A total graduate program may not be made up entir of courses offered in short terms of 3 or 4 weeks each, or in classes wh meet only once a week.

Examinations

A final oral or written examination is given all candidates for masters' grees, not later than eight days before the close of the semester. The Dean the Graduate School appoints examining committees of at least three memb each for the purpose, selecting the members from the major and minor prof sors under whom the work was done. The Dean is ex-officio a member of such examining committees. The candidate is asked to defend his thesis, if has been written, and is examined on any subject matter related to his field.

Application for the Degree

Within the first two weeks of the final semester or term the student m make formal application in the Graduate Office for his degree.

Fees

Before any master's degree is conferred, a commencement fee of $20 must be paid at the Business Office of the University.

REQUIREMENTS FOR THE DEGREES OF MASTER OF ARTS AND MASTER OF SCIENCE

The Two Plans

The Graduate School authorizes all departments which are approved graduate work and which wish to do so to permit students to satisfy the quirements for the M.A. and the M.S. degrees by either of two plans. T option rests with the department.

PLAN A

(See also page 15.)

Credits and Courses

The candidate must complete at least 24 semester hours of graduate cou work with a standing of 3.0 ("B") or better. At least 9 of these hours (exce when excused in rare individual cases by special permission of the Gradu Council) must be in courses limited to graduate students (in courses numbe 600 or above).

The candidate shall have a major field which shall comprise at least tw thirds of the course work; the other one-third may be taken in that field or fields which have graduate relationship with it. In education and agricult only one-half of the work must be in the major field.

Residence

The minimum residence required is one academic year of 36 weeks. T residence may be fulfilled by any combination of semesters or summer sessio which totals the required number of weeks, provided at least one full semes

or two complete summer terms are spent in residence. (See "Sustained Residence" above)

This does not mean that the work described for each individual can always be completed in the minimum length of time. Inadequate preparation or assistance in departments very frequently makes a longer period necessary.

Thesis

Two typewritten, unbound copies of the thesis, approved by the thesis director and the appropriate director of graduate study, and in a form acceptable to the Graduate School and on 100% rag content paper, must be presented to the Graduate School Office not later than two weeks before the last day on which grades may be reported to the Registrar's Office. The candidate must also submit an abstract of his thesis not exceeding two hundred words and suitable for publication. The final oral examination may not be taken before the thesis has been accepted by the Graduate School Office. Information about this thesis deadline may be obtained from the Graduate School Office.

Theses and dissertations must be developed under the direction of a member of the Graduate Faculty.

Each thesis or dissertation is to be judged by the final committee on its merits as presented to it at the examination.

Collaborative group effort by two or more graduate students is not forbidden; but there must be enough independent effort to enable each one to make a separate contribution and to prepare an individual thesis or dissertation.

A master's thesis must bear the signed approval of the thesis director and the appropriate director of graduate study. If these are the same person, the thesis must be signed by another professor in the major department.

The University protects the rights of thesis and dissertation authors by placing certain restrictions upon borrowers' use of them as long as they are unpublished. Before the title-page of every thesis and dissertation a copy of the following *Rules for the Use of Theses* is placed. The student prepares this page for each copy of his thesis and submits it as part of the thesis.

RULES FOR THE USE OF THESES

Unpublished theses submitted for the masters' and doctors' degrees and deposited in the University of Kentucky Library are as a rule open for inspection, but are to be used only with due regard to the rights of the authors. Bibliographical references may be noted, but quotations or summaries of parts may be published only with the permission of the authors, and if granted, proper credit must be given in subsequent written or published work.

Extensive copying or publication of the thesis in whole or in part requires also the consent of the Dean of the Graduate School of the University of Kentucky.

A library which borrows this thesis for use by its patrons is expected to secure the signature of each user.

This thesis has been used by the following persons, whose signatures attest their acceptance of the above restrictions.

Name and Address	Date
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Language Requirements

A reading knowledge of at least one modern foreign language is requir This language should be pertinent to the program of the student and appro by his adviser. The language requirement must be satisfied by an examinati given by the foreign language department of the University offering instructi in the language concerned. The passing of this examination may satisfy o of the two language requirements for the doctorate if approved by the studen Special Committee.

PLAN B

Plan B (which is not necessarily available in all departments that ha Plan A) has the same minimum requirements as Plan A except that six or mo semester hours of course work may be substituted for a thesis and that in few departments a reading knowledge of a foreign language may not be r quired. A student may follow this plan only with the approval of the depar ment concerned. Additional requirements, if any, set up by an area of stu may be found in the area announcements in the Graduate School Bulletin.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS OR MASTER OF SCIENCE IN EDUCATION

See Education, pages 120-121, and General Requirements for all Advanc Degrees, pages 13-16.

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN AGRICULTUR MASTER OF SCIENCE IN AGRICULTURAL ENGINEERING AND MASTER OF SCIENCE IN HOME ECONOMICS

(See also pages 13-16.)

Students holding a bachelor's degree from a standard agricultural colle may obtain the degree of Master of Science in Agriculture or Master of Scien in Home Economics by satisfying the following requirements:

1. The completion of 24 semester hours of graduate work with an avera standing of 3.0 or better, 36 weeks in residence, and a thesis, or at t option of the major professor (except in Agricultural Engineering), t completion of 36 semester hours of graduate work with a standing 3.0 or better, 45 weeks in residence, and no thesis requirement. least 9 hours must be on the 600 level or above.
2. Under either plan no grade below C may be counted.
3. One-half of the work must be in one department, the remainder in an other department or departments approved by the major professor.
4. There is no language requirement for either of these professional d grees.

In either case a final oral examination is given the candidate not later tha 8 days before the close of the semester in which the degree is to be secure The candidate is expected to show a comprehensive knowledge of the subje matter related to the field of his major work and in case a thesis has been pr pared to defend it.

REQUIREMENTS FOR THE DEGREE MASTER OF MUSIC

(See pages 85-90.)

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN PUBLIC HEALTH

(See also pages 13-16.)

Students holding a bachelor's degree from a fully accredited institution or the M.D. degree from a recognized Medical School may obtain the degree of Master of Science in Public Health by satisfying the following requirements:

1. Twenty-four semester hours in graduate courses with an average standing of 3.0 or better.
2. No grade below C may be counted.
3. Thirty-six weeks in residence.
4. An acceptable thesis.
5. There is no language requirement for this degree.

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN LIBRARY SCIENCE

(See also pages 13-16.)

Students holding a bachelor's degree from a fully accredited institution may obtain the degree of Master of Science in Library Science by satisfying the following requirements:

1. Nine hours of prerequsite work in library science.
2. Thirty semester hours in graduate courses (12 in courses numbered 600 or above).
3. An average standing of 3.0 or better on all work taken as a graduate student.
4. Thirty-six weeks in residence.
5. At least one year of college credit (six semester hours with a grade of C or better) in a modern foreign language or a reading knowledge as demonstrated by the usual graduate examination.

REQUIREMENTS FOR ADVANCED DEGREES IN ENGINEERING

(See also pages 13-16.)

Two classes of advanced degrees are offered in the College of Engineering, the masters' degrees and the professional degrees.

THE MASTERS' DEGREES IN ENGINEERING. The masters' degrees in engineering may be obtained by satisfying the following requirements:

1. Twenty-four semester hours in graduate courses with an average standing of 3.0 or better.
2. No grade below C may be counted.
3. Thirty-six weeks in residence.
4. An acceptable thesis.
5 Two-thirds of the work must be in the major subject (For Agricultural Engineering, one-half in Agricultural Engineering).
6. There is no language requirement for these degrees.

The candidate must hold the corresponding Bachelor of Science degree in engineering or the equivalent from this institution or from another engineering school of recognized standing. The degrees offered are Master of Science in Agricultural Engineering, Master of Science in Civil Engineering, Master of Science in Electrical Engineering, Master of Science in Mechanical Engineering, Master of Science in Metallurgical Engineering, Master of Science in Mining Engineering.

The Professional Degrees in Engineering

The professional degrees of Chemical Engineer (Ch.E.), Civil Engine (C.E.), Electrical Engineer (E.E.), Mechanical Engineer (M.E.), Meta lurgical Engineer (Met.E.), or Mining Engineer (E.M.) will be granted onl to graduates of the University of Kentucky College of Engineering who prese satisfactory evidence of professional work of creditable quality in the enginee ing fields of their choice, extending over a period of five years, and who subm satisfactory theses as further evidence of their professional attainments.

A candidate holding a master's degree in engineering shall be considere to have fulfilled two years of the five-year requirement for the correspondin professional degree.

An application for a professional degree must be made to the Dean of th Graduate School and have the approval of the director of graduate study i the applicant's engineering field not less than one academic year before the d gree may be granted.

The Graduate Committee will pass on the qualifications of each applican It may, at its discretion, require an oral examination. The applicant is expecte to submit a record of his engineering experience, which should include a com plete list of his professional engagements, showing in each case the length time employed and the position held. He should give for references the name of at least three persons who are familiar with his engineering work. Preferabl these persons should be connected with the organizations by whom he ha been employed.

A thesis is required of each candidate. It may be in the field of research design, invention or engineering processes and methods. It must contain som original thought and be the product of the individual submitting it. Quotation and references with proper credit may be used. In general, the thesis shoul be of such a nature that it will be of value to the engineering profession.

A candidate holding a bachelor's degree in one field of engineering ma apply for a professional degree in another field of engineering if he has attaine unusual prominence and success in that field.

Fees

The fees for a professional degree in engineering are $15.00 for registratio and $20.00 for graduation.

REQUIREMENTS FOR THE DOCTOR OF ENGINEERING DEGREE

(These are the same as those for the Ph.D. degree.)

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

(See also pages 13-15 of this bulletin.)

The degree of Doctor of Philosophy is conferred upon a candidate wh after completing not less than three years of graduate work devoted to th study of a special field of knowledge, presents a satisfactory dissertation an passes a comprehensive examination, thus qualifying for recognition as a schola of high attainments in his chosen province.

The doctor's degree is intended to represent not a specified amount of wor covering a specified time, but the attainment, through long study, of inde pendent and comprehensive scholarship in a special field. Such scholarshi should be shown by a thorough acquaintance with present knowledge in particular field of learning and a marked capacity for research.

Admission

For information concerning admission see pages 11-12.

Advisers and the Special Committee

The director of graduate study in the student's major area will be the student's adviser until he has selected his dissertation director and has been accepted by him. When the dissertation director has been chosen, the student's Special Committee will be set up by the dean after he has conferred with the student, the director of graduate study, and the dissertation director. This committee should be set up as soon as the student has adjusted himself to the University environment and has found a suitable dissertation problem. Until the Special Committee is formed, the director of graduate study will advise the applicant as to his schedule of study, and he must initial each schedule before it is presented to the Dean.

The Special Committee will consist of the dissertation director as chairman, two or three other members from the major area, and one or two members from the minor academic area—in all, five members. This committee will advise the applicant and will set the requirements which the student must meet before he will be admitted to the final examination.

The Special Committee keeps minutes of all meetings and sends abbreviated copies to the Dean's Office to be made a part of the student's record. This Committee determines when the qualifying examinations are to be administered, and the chairman schedules the examinations in writing, sending a copy of the announcement to the dean. The appointed Special Committee will be the final judge on a majority basis of the questions to be asked on the qualifying examinations and of the result of the examinations. This committee may be advised by colleagues when it thinks advice is desirable.

Courses of Study and Student Loads

Every applicant for the degree must select one major area of study and no more than two minor subjects, at least one of which must be outside the major area. The major subject shall be one in which he intends to concentrate his efforts; the minor subjects must be approved by the major area and by the representative of the minor on the Special Committee.

The applicant's principal work must be in the major subject. Although the regulations are somewhat elastic respecting the time to be devoted to the major and minor subjects, the major subject should represent approximately two-thirds of the student's entire time. The other one-third should be devoted to the minor subject(s). At least one-sixth of the total time must be devoted to a minor outside of the major academic department, and at least one member of the Special Committee from outside the major area must represent this outside minor. Only the Graduate Council may authorize departures from this rule.

A full-time course load for any semester ranges from 9 to 15 semester hours of credit; in the summer, from 6 to 9 semester hours.

Residence

A minimum of three collegiate years of resident graduate work is required for the doctorate. At least two semesters, exclusive of summer sessions, of the required residence above the master's (or its residence equivalent) must be earned at the University of Kentucky in full-time devotion to graduate study, or to a combination of graduate study, research, and part-time teaching at the University. "Residence equivalent" to the master's degree is interpreted as thirty-six weeks of official residence. The amount of residence to be transferred on account of prior graduate work at some other institution is determined

jointly by the Special Committee, the Registrar, and the Dean of the Graduate School.

A doctoral student's schedule may include an assignment to work on his dissertation, and appropriate residence may be allowed for such research, but in no case shall the residence allowed exceed the number of weeks spent in such dissertation research.

A year of residence is normally required after the qualifying examination before the degree is conferred. If a student has completed his minimum residence requirements and his course requirements, and wishes to complete his dissertation in absentia, he may petition the Graduate Council for permission to do this out of residence and without payment of the usual registration fee. In rare individual cases, if material to complete a dissertation must be sought away from this University, the student may petition the Council to receive residence credit during the last year while registered here but working on his dissertation elsewhere. Even if such permission is granted, at least a year must elapse between the qualifying examinations and the awarding of the degree.

While it is expected that a well-prepared student of good ability may secure the degree upon completion of three years of full-time study, it should be understood that this requirement is a minimum and is wholly secondary to the matter of scholarship. Time spent in study, however long, the accumulation of facts, however great in amount, and the completion of courses, however numerous, cannot be substituted for independent thinking and original research.

Language Requirements

The applicant must give evidence of having a good reading knowledge of and of being able to translate at sight, at least two modern foreign languages. This proficiency is determined by examinations conducted by the respective language departments at the University of Kentucky. While ordinarily French and German are acceptable, the final choice should be made under the guidance of the student's Special Committee, which will recommend what languages are to count. The language requirements must be satisfied before the applicant can be admitted to the qualifying examinations.

Qualifying Examinations

Qualifying examinations are required of all applicants for the doctorate to determine whether the applicant should be admitted to candidacy. These examinations probably should be taken during the student's fourth semester of full-time graduate study, or the equivalent, but in no case later than the thirtieth day of the academic year in which the degree is expected. These examinations shall be both written and oral and shall cover both major and minor subjects. The Special Committee shall report to the dean the result of the examinations, including the time schedule. If the result is failure, the committee shall recommend the conditions to be met before the examination may be repeated. The minimum time before repeating the examinations is six months. The same committee, or as many of the members as are available, plus those added by the dean to fill vacancies, shall give the second series of examinations. Additional examinations shall not be allowed.

Dissertation

Each candidate must present a dissertation covering his thesis work. This dissertation must give evidence of the candidate's ability to carry on independent investigation, must be satisfactory in style and composition and must be on 100% rag content paper. It must represent a definite contribution to the knowledge of his subject, must be the result of independent work, must include

original research, and must in some way add to or otherwise modify what was previously known on the subject. Unless the director of the dissertation specifically recommends departures from the instructions in the thesis manual recommended by the Graduate School, the thesis must be in conformity with advice in this manual.

Before the dissertation is formally submitted, the student should bring it to the Graduate Office to have it checked for form. Two typewritten copies of the dissertation (along with a check for the binding fee) and two typewritten copies of an abstract, usually of not less than 400 words nor more than 600 words, must be presented to the Dean of the Graduate School at least two weeks before the final date on which the Registrar's Office will receive grades of candidates for degrees at the next commencement. An approval sheet signed by a majority of the special committee (including the director of the thesis) must accompany the dissertation. When dissertations are submitted a standard form containing *Rules for the Use of Theses* must be prepared and submitted with the manuscript, before the title page. (See page 17 for these *Rules.*)

It is expected that every doctoral dissertation will be worthy of publication either in its entirety in book form or as articles in the leading journals and periodicals of the field, and the candidate is urged to use every reasonable effort to obtain such publication for his own sake and in the interest of the Graduate School. In order to insure availability of such contributions, the following arrangements are provided:

1. A candidate may elect in writing to have his dissertation published, either as a whole or in acceptable part (if approved by the director of graduate study in the area concerned and by the Dean of the Graduate School), in a book or an approved journal. A candidate must make a deposit of $50 to guarantee publication. If within four years after the commencement at which the degree was received the candidate demonstrates that he has a contract with a recognized publisher or an acceptance by an editor of a recognized journal, he will be allowed one more year to submit the required number of copies to the Graduate School and to recover his deposit. Failing of either step he will forfeit his deposit and arrangement no. 2 will be followed. The printed dissertation must have a cover and a title page, and the latter, in addition to the title and the name of the author, must bear an appropriate inscription as follows:

   A dissertation
   A portion of a dissertation } presented
   to the Faculty of the Graduate School of the University of Kentucky in candidacy for the degree of Doctor of Philosophy (Education)

2. A candidate may elect in writing to let his dissertation be microfilmed and copyrighted by the University. The copyright will be taken in the name of the author. One positive microfilm copy will be deposited in the University Library and will be available for inter-library loan. Microfilm copies of dissertations may be purchased at cost. The abstract of each dissertation will be printed in an issue of *Microfilm Abstracts* (published by University Microfilms, Ann Arbor, Michigan), which is distributed to leading libraries here and abroad. University Microfilms will also have the microfilm copy of the dissertation catalogued by an expert, and this information sent to the Library of Congress for printing and distribution of cards to depository catalogues and libraries.

To cover the costs involved, a candidate is required to pay at th Business Office a fee of $50 before taking the final examination. Eve if the candidate elects to use this arrangement for publication he shoul understand that it is still desirable for him to have his work printed in recognized way.

Final Examination

After the acceptance of the dissertation by the Special Committee and th Dean of the Graduate School the candidate shall be given a final oral, or, i the examining committee elects, an oral and a written examination. The exam ining committee shall consist of a minimum of five persons, appointed by th Dean of the Graduate School, after he has conferred with the director of grad uate study for the area. (The President of the University and the Dean of th Graduate School are ex-officio members of all examining committees.) Th director of graduate study (or his delegate) shall be chairman of the committe Other members shall include the major professor, a third representative of th department, a representative of the minor, and one member of the Graduat Faculty associated with neither the major nor minor areas. The final examina tion shall include a defense of the dissertation and shall be as comprehensiv in the major and minor areas as the committee desires to make it.

If the student passes this examination, he will be recommended for the de gree at the next graduation date provided he has satisfied the residence require ment after the qualifying examinations.

The completion of three years of residence work confers no right upon th student to be examined.

Recommendation for the Degree and Attendance at Commencement

After the final examination has been passed, the name of the candidat will be presented for recommendation to the Board of Trustees for the degre of Doctor of Philosophy in course.

Attendance at commencement exercises is expected for those receivin degrees at the close of the acadmic year unless they are excused in writing b the Dean of the Graduate School.

Fees

Before any doctor's degree is conferred, a commencement fee of $25.0 must be paid at the Business Office of the University.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF EDUCATION

The requirements for the degree of Doctor of Education are the same a those for the degree of Doctor of Philosophy with the following exceptions

1. No foreign languages are required for the Ed.D. degree.
2. A total of 72 semester hours is required of which at least one-third an not more than one-half must be in departments outside the College o Education.

Applicants for the Ed.D. degree, who are required to do at least one-third of the minimum requirements outside of areas in the College of Education shall declare at least one area other than Education when their Special Com mittees are appointed. Two members shall be chosen from areas outside th College of Education.

The Registrar, the Graduate committee of the College of Education, an the Graduate Dean will evaluate credits and residence to be allowed transfe students. It is understood, however, that the Special Committee may accep only such courses as fit into the graduate program of the student.

JOINT EDUCATION-PSYCHOLOGY DOCTORAL PROGRAM IN COUNSELING AND GUIDANCE

A doctoral program in counseling and guidance is provided through the cooperation of the College of Education and the Department of Psychology. A faculty committee administers this program and serves as the student's adviser until the Special Committee is appointed by the Dean of the Graduate School. A doctoral candidate may apply for the degree of Doctor of Education or the degree Doctor of Philosophy. In either case the candidate must complete the Graduate School requirements for his intended degree. For information concerning admission to the program, course requirements, and the like, write to the Dean, College of Education, or to the Chairman, Guidance and Counseling.

REQUIREMENTS FOR THE DEGREE OF SPECIALIST IN EDUCATION

The degree of Specialist in Education is conferred upon a candidate who satisfactorily completes a sixth-year planned program in Education under the general requirements of the Graduate School (pp. 13-16) and the following special requirements.

Admission

The student, prior to admission to the program, (1) must have a master's degree, (2) have a standing of 3.4 or higher on his graduate work, except in special cases, (3) meet the requirements for a teaching certificate or have credentials appropriate to his field of specialization, and (4) have completed at least 30 semester hours of courses in education (undergraduate and graduate).

A student must file an application with the Dean of the College of Education. The application will be considered by an admissions committee of the College of Education and each student must be recommended to the Graduate School by the division or department in which he plans to major.

Program

The student must earn a minimum of 24 semester hours of graduate work beyond the master's degree (of which at least 12 semester hours must be in 600 level courses or above) with a limit of 12 semester hours per semester for a full-time student, 6 semester hours per summer session, and 3 semester hours for a three-week intensive course.

The division or department in which the student majors shall be responsible for helping the student plan a program to meet his needs. The program should contribute to specialization in a field but should not neglect the broader development of the individual. The total disciplinary resources of the University of Kentucky will be recognized in planning a program to meet the student's needs.

An independent research problem (equal to 3 but not to exceed 6 semester hours) must be done by the student and a satisfactory written report prepared, a copy of the report to be filed with the division or department directing the research.

With the approval of the Graduate Dean and of the division or department in which he is to major, the student may transfer a maximum of 6 semester hours of residence credit earned beyond the master's degree from an institution which is approved to offer work above the master's level.

Final Examination

A final examination shall be required of all candidates.

An examining committee, consisting of at least three qualified membe is recommended by the adviser and director of graduate study and appointe by the Dean of the Graduate School.

Eligibility

This program is instituted as of June, 1957, and all post-master's requir ments pertaining to the degree must be met after this date, except for tho who in 1956 began an organized and supervised plan of post-master's wo at the University of Kentucky, while the final details of this program we being discussed by the faculty.

GRADUATE STUDENTS NOT APPLICANTS FOR DEGREES

Graduate students who are not working toward advanced degrees are no required to designate major or minor subjects, but may elect their work with view to the special purposes for which they are in attendance at the University

Any course of study announced for advanced undergraduates and graduate is open for election by such students under the same conditions as apply t candidates for degrees.

Should a graduate student who has not arranged for his work with a vie to obtaining a degree subsequently desire to become an applicant for a degre the number of semester hours he is to receive for work already done will b determined at the time he applies for admission as applicant for the degree.

CHECK LIST FOR GRADUATE STUDENTS SEEKING ADVANCED DEGREES

1. Send to the Registrar application for admission; request Registrars o former institutions to send transcripts of work previously completed; an request references to send letters of recommendation—all at least thir days prior to first admission.
2. On or before date of first registration consult appropriate director o graduate study (see list in this Bulletin) and plan tentative course o study. (At registration the director's signature on the classification car approving the registration is required.)
3. *Within the first week of the first term or semester apply for the Graduat Record Examination* (Area Tests, Aptitude Test, and Advanced Tes if available, in your major field), if you have not previously taken thi standardized test. Apply at the University Testing Service, Administra tion Building. Take test at time designated in the calendar at the fron of this bulletin. (*Scores on this test are necessary before admission t full graduate standing.* See page 12 of this bulletin.)
4. Early in the first term or semester begin preparations for the languag examination(s) required for the degree and arrange to take the nece sary language examination(s) early in graduate career.
5. *After first term or semester apply for full graduate standing* (secur forms from the Graduate Office), if a graduate degree is sought.
6. Before the beginning of each succeeding semester or term consult th appropriate director of graduate study concerning program for the ne term.
7. If doctoral applicant, during or before the fourth semester of graduat study confer with director of graduate study and graduate dean con cerning Special Committee. After the appointment of the Special Com

mittee, the chairman becomes graduate adviser. At least once each year request the chairman of the Special Committee to hold a meeting to review the course program and the research, in retrospect and (especially) in prospect.

8. If doctoral applicant, arrange with Special Committee for Qualifying Examinations at least one academic year before the degree is expected.
9. Before beginning thesis or dissertation, secure from the Campus Bookstore Kate Turabian's *A Manual for Writers of Term Papers, Theses, and Dissertations* and follow instructions therein, unless specifically directed otherwise by your director of graduate study.
10. *Within the first two weeks of the semester or term when the degree is expected, file application for the degree* (Graduate Office).
11. Submit to the Graduate Office the thesis (if required) or dissertation in final form (after it has been read and approved by the director of graduate study and the committee) by or before the thesis deadline indicated in the University Calendar at the front of this Bulletin.
12. Arrange for the final oral examination (consult the director of graduate study and the Graduate Office) at least two weeks before the end of the term or semester when the degree is expected.
13. Pay the commencement fee and (if applicable) the dissertation fee as soon as the final oral examination is scheduled.
14. Secure commencement instructions from the Graduate Office.

RESEARCH PROGRAM AT OAK RIDGE INSTITUTE OF NUCLEAR STUDIES

The University is one of the Sponsoring Universities of the Oak Ridge Institute of Nuclear Studies located at Oak Ridge, Tennessee. Through this cooperative association with the Institute the University of Kentucky Graduate Research Program has at its disposal all the facilities of the National Laboratories in Oak Ridge and of the research staffs of these laboratories. When masters' and doctoral candidates have completed their residence work it is possible, by special arrangement, for them to go to Oak Ridge to do their research problems and prepare their theses. In addition, it is possible for the staff members of this university to go to Oak Ridge for varying periods, usually not less than three months, for advanced study in their particular fields. Thus, both staff and students may keep abreast of the most modern and up-to-date developments in atomic and nuclear research that is in progress at the Oak Ridge laboratories.

The students will go to Oak Ridge on Oak Ridge Graduate Fellowships which have varying stipends determined by the number of dependents they have and the level of work that they are doing. Staff members may work in Oak Ridge on stipends commensurate with their present salary and rank.

For further information inquire at the office of the Graduate School or write directly to the Chairman of the University Relations Division of the Oak Ridge Institute of Nuclear Studies, Box 117, Oak Ridge, Tennessee.

Southern Regional Training Program in Public Administration

Since 1945 the Universities of Kentucky, Alabama, and Tennessee have conducted a joint program in public administration leading to a master's degree. Part of the course work is completed at each institution, and three months of successful internship are required. For detailed information, anyone interested should inquire of the Political Science Department at the University of Kentucky.

Advanced Study and Research by Guests of the University

When the appropriate resources are available at the time desired, the President of the University, upon the recommendation of the Dean of the Graduate School and the department affected, will welcome advanced scholars as guests of the University, with the privilege of auditing seminars and research courses and of carrying on research in laboratories and libraries. Normally there will be no charge except for laboratory expenses. Negotiations for such arrangements should be conducted in advance through the Graduate Office.

KENTUCKY RESEARCH FOUNDATION FELLOWSHIPS

The Kentucky Research Foundation supports several graduate fellowships of $1800 to $2400 each awarded, without limitation as to the field of specialization, to students who possess outstanding personal qualities and professional qualifications. The deadline for submitting applications to the Graduate Office is March 1 of each year. Only those with highly superior undergraduate and graduate records should apply for these.

HAGGIN FELLOWSHIPS

These fellowships, which were endowed by Margaret Voorhies Haggin in memory of her father, George Voorhies, carry a stipend of $1500 each and $1200 each, plus remission of out-of-state fees.

Fellows are expected to devote their entire time to graduate work, and no teaching or other departmental work may be required of them; nor are they permitted to perform any duties for extra pay. Fellows must carry a full schedule unless work on a thesis is substituted for part of the load. In this case recommendation must be made by the adviser and approved by the Graduate Dean. The award is paid in nine equal monthly installments. Fellows, graduate assistants, and instructors pay the fees assessed residents of Kentucky. The appointments are made for one year only but may be renewed once if it can be shown that the study and research should be continued.

These fellowships are open to students who hold a bachelor's degree or higher from any college or university of recognized standing. Forms for making applications may be secured from the office of the Dean of the Graduate School and must be submitted not later than March 1 of each year.

THE DR. PAUL I. MURRILL MEMORIAL SCHOLARSHIP

This scholarship was set up by Mrs. Paul I. Murrill in honor of her husband, who was a graduate of the University of Kentucky. It pays a variable stipend of approximately $2500 a year to a student who possesses outstanding qualities of character and aptitude for fruitful graduate work. Preference shall be given to scholars in the field of Chemistry.

THE GEORGE W. PIRTLE FELLOWSHIP IN GEOLOGY

A grant of $500 a year is given by George W. Pirtle to a graduate student in geology upon the recommendation of the faculty of the Department of Geology. The award is made upon the basis of need and promise of future achievement in the geological field. Mr. Pirtle has set up this grant in appreciation of the training he received in the Geology Department. He was the first student to obtain the master's degree from the University with a major in Geology. The grant is given in honor of Dr. A. C. McFarlan.

The recipient is expected to write a thesis based on field work.

Applications for this grant should be directed to the Head, Department of Geology.

OTHER GRADUATE SCHOLARSHIPS

For information concerning other scholarships (National Science Cooperative Fellowships, National Defense Fellowships, etc.) inquire of the Graduate Office.

SUBJECTS AND DIRECTORS OF GRADUATE STUDY

The courses offered for graduate work are listed under the following groups:

Subjects	*Directors of Graduate Study*

I. Agriculture and Home Economics

Agricultural Education	Carsie Hammonds
Agricultural Economics	A. J. Brown
Agricultural Engineering	(Acting) Blaine F. Parker
Agricultural Entomology	L. H. Townsend
Agricultural Extension Education	C. Milton Coughenour
Agronomy	G. T. Webster
Animal Science	W. P. Garrigus
Animal Nutrition (See Animal Science)	
Animal Pathology	
Dairy Science	D. M. Seath
Forestry (See Horticulture)	
Genetics (See Animal Science)	
Home Economics	Abby Marlatt
Home Economics Education (See Education)	
Horticulture	C. S. Waltman
Plant Pathology (See Agronomy)	
Poultry Science	W. M. Insko, Jr.
Rural Sociology	Lee Coleman

II. Arts and Sciences

Ancient Languages	
Anthropology	(Acting) Frank Essene
Art	(Acting) Richard B. Freeman
Biology	H. P. Riley
Botany	H. P. Riley
Chemistry	L. R. Dawson
Diplomacy and International Commerce	Amry Vandenbosch
Dramatic Arts (See English)	
Economics (See Commerce)	
English, Speech, and Dramatic Arts	W. S. Ward, A. L. Cooke
French (See Modern Foreign Languages)	
Geography	J. R. Schwendeman
Geology	A. C. McFarlan
German (See Modern Foreign Languages)	
Greek (See Ancient Languages)	
History	T. D. Clark
Hygiene and Public Health	W. A. Heinz
Journalism (At present no graduate majors are offered in this subject)	
Latin (See Ancient Languages)	
Library Science	(Acting) Maurice D. Leach, Jr.
Mathematics and Astronomy	J. C. Eaves
Microbiology	M. Scherago

Modern Foreign Languages ..... A. E. Bigge
Music ..... B. Fitzgerald
Philosophy ..... John Kuiper
Physical Education ..... C. W. Hackensmith
Physics ..... F. L. Yost
Political Science ..... E. G. Trimble
Psychology ..... J. S. Calvin, G. B. Dimmick (Clinical)
Radio Arts (At present no graduate majors are offered in this subject)
Social Work (At present no graduate majors are offered in this subject)
Sociology and Rural Sociology ..... Lee Coleman
Spanish (See Modern Foreign Languages)
Speech (See English)
Zoology ..... J. M. Carpenter

III. COMMERCE

Commerce ..... Ralph R. Pickett
Economics ..... W. W. Haynes

IV. EDUCATION

Administration and Supervision ..... M. B. Cierley
Agricultural Education ..... Carsie Hammonds
Business Education ..... V. A. Musselman

Elementary Education ..... James T. Moore
Foundations of Education ..... E. F. Hartford
Home Economics Education .... (Acting) Anna M. Gorman
Secondary Education ..... (Acting) Charles Manker
Guidance and Counseling ..... (Acting) William T. Carse

V. ENGINEERING

Agricultural Engineering ..... (Acting) Blaine F. Parker
Civil Engineering ..... R. A. Lauderdale
Electrical Engineering ..... H. A. Romanowitz
Mechanical Engineering ..... W. M. Carter
Metallurgical Engineering ..... Richard S. Mateer
Mining Engineering ..... Ernest M. Spokes

VI. LAW (At present no graduate majors are offered in this subject)

VII. MEDICINE

Biochemistry ..... George W. Schwert
Physiology ..... Loren D. Carlson

VIII. PHARMACY (At present no graduate majors are offered in this subject)

GRADUATE COURSES OF STUDY

Note. Arabic numbers in parentheses indicate the number of semester hours given for each course and the Roman numerals refer to the semester in which the course is offered; S stands for the summer session.

I. AGRICULTURE AND HOME ECONOMICS

AGRICULTURAL ECONOMICS

The degrees of Master of Science, Master of Science in Agriculture, and Doctor of Philosophy may be earned with a major in Agricultural Economics. The student will be expected to concentrate in addition to Agricultural Economics, in Economics and Research Methodology. Those without sufficient background of training will be expected to make up deficiencies indicated by the department.

The Ph.D. program emphasizes training in research. In addition to Agricultural Economics and Economics courses the student can select courses from Statistics, Mathematics, Philosophy, Sociology, Psychology and Political Science. The student will be expected to demonstrate ability to interrelate knowledge gained within and among the areas of concentration, and to demonstrate his ability to do independent thinking in preparation for his dissertation.

The courses in statistical methods offered by the department are designed for all graduate students majoring in the Agricultural Sciences. The mathematical economics and econometrics courses are cross-listed with the College of Commerce and can be used to fill requirements in Agricultural Economics or in Economic Theory. The statistical and mathematical work is intended to provide research tools that can be used in connection with the University of Kentucky's electronic computing equipment.

Agricultural Marketing

400(100)—AGRICULTURAL MARKETING. Principles and methods of marketing farm products, with attention to systems and agencies at both country and central markets. *Prereq: Econ.* 251 *and Agr. Econ.* 100. (3) I, II (Pearson, Binkley)

401(102a)—MARKETING TOBACCO. Special emphasis on the marketing of and the market system for tobacco. Application of marketing principles and methods to tobacco. *Prereq: Agr. Econ.* 400. (2) II (Clark)

402(102b)—TOBACCO MARKET GRADES AND GRADING. Procedures and problems in establishing market standards for tobacco, including practice in grading. *Prereq. or concur: Agr. Econ.* 401 *or approval of instructor.* (1) II (Clark)

403(103)—MARKETING LIVESTOCK AND LIVESTOCK PRODUCTS. Analysis of livestock and dairy markets; market organization, agencies, institutions, and services; and public regulations. *Prereq: Agr. Econ.* 400. (2) I (Pearson)

500(101)—AGRICULTURAL COOPERATION. Principles, methods, and problems involved in the cooperative marketing of farm products and in the purchase of farm production supplies through cooperatives. *Prereq: Ag. Econ.* 400. (3) II, S (Binkley)

606(206)—ADVANCED AGRICULTURAL MARKETING. A critical examination of methods, objectives, and results of various types of research in market organization, marketing functions, market management, and price analysis. *Prereq: approval of instructor.* (3) I (Rudd)

Farm Management

410(110)—FARM MANAGEMENT. A study of management and of the science of organizing and operating farms. *Prereq: Agr. Econ.* 100 *and Econ.* 251. (8) I, II (Bradford)

415(115)—FARM ACCOUNTING. A study of farm records and farm accounts including farm cost accounting. *Prereq: Agr. Econ.* 410. (2) I (Bradford, Criswell)

511(111)—ADVANCED FARM MANAGEMENT. An advanced analysis of management and managing farms. *Prereq: Agr. Econ.* 410. (3) II (Thompson)

514(114)—CURRENT FARM MANAGEMENT PROBLEMS. An analysis of the current economic problems in farming, such as costs, technological developments, demand changes, and resource use. An introductory course designed primarily for professional workers in agriculture. *Prereq: Agr. Econ.* 410, *or approval of instructor.* (3) S (Bradford)

516(116)—LAND VALUE AND APPRAISAL. (Odd No. Years) The capitalization process, and other methods of valuing farm land; appraisal procedures of the Federal Land Banks and other credit institutions. *Prereq: Agr. Econ.* 410, *or approval of instructor.* (3) II (Bondurant)

517(117)—TYPES AND SYSTEMS OF FARMING. (Even No. Years) Critical study of the business organization and management of Kentucky farm businesses. Field trips required. *Prereq: Agr. Econ.* 410, *or approval of instructor.* (3) II (Bondurant)

518(118)—FARM LABOR UTILIZATION. Efficient work method fundamentals as applied to agricultural production, work simplification analysis of specific farm jobs and incentive payment plans for encouraging economic use of farm labor, are studied. *Prereq. or concur: Agr. Econ.* 410. (3) I (Byers)

Production Economics

520(120)—PRODUCTION ECONOMICS FOR THE AGRICULTURAL SCIENCES. Economic analysis of agricultural production. A theoretical treatment of land and capital returns, costs and related functions of agricultural production at an elementary level. *Prereq: Agr. Econ.* 410. (3) I (Redman)

521(121)—COST, PRICE AND PRODUCTION RELATIONSHIPS IN AGRICULTURE. Will acquaint the student with data (and their use) on production expenses, cost of production, prices paid, prices received, agricultural production, and farm income. Designed primarily for professional workers in agriculture. *Prereq: Agr. Econ.* 410, *and approval of instructor.* (3) S (Bradford)

620(220a)—ECONOMICS OF AGRICULTURAL PRODUCTION: STATIC APPLICATION. Application of economic principles to agricultural production problems of resource combination, enterprise selection, scale of operations, household-firm relationships, interregional competition, and national agricultural policies and programs. *Prereq: Approval of instructor.* (3) II (Thompson)

621(220b)—ECONOMICS OF AGRICULTURAL PRODUCTION: DYNAMIC APPLICATION. A continuation of 620 with application to dynamic situations. *Prereq:* 620 *and approval of instructor.* (3) I (Redman)

Agricultural Statistics and Mathematical Economics

530(130)—AGRICULTURAL STATISTICS. Principles and methods involved in the analysis, interpretation, and use of agricultural statistics including variation, correlation, standard errors, and simple analysis of variance. (3) I, II (Card, Shuffet)

590(190)—INTRODUCTION TO MATHEMATICAL ECONOMICS. A review of mathematical approaches to economic theory. Models applicable to production, marketing and pricing problems. *Prereq: Math* 201 *and Economics* 515 *or equivalents* (same as Economics 590). (3) II (Johnson)

630(230)—STATISTICS FOR AGRICULTURAL RESEARCH—SOCIAL SCIENCES. Multiple and partial correlation and regression, tests of reliability, tabular analysis, graphic techniques and sample surveys. *Prereq: Agr. Econ.* 530 *or equivalent.* (3) I (Shuffett)

631(231)—STATISTICS FOR AGRICULTURAL RESEARCH—PLANT AND ANIMAL SCIENCES. Analysis of variance and covariance; statistical consideration in the design of experiments; test of significance and confidence limits. *Prereq: Agr. Econ.* 530 *or equivalent.* (3) II (Card)

690(290)—MATHEMATICAL ECONOMICS. Problems of economics amenable to the mathematics of differential and difference equations, vectors, complex numbers and matrix algebra. Agricultural and business applications. *Prereq: Agricultural Economics* 590 *and Economics* 618 *or equivalents* (same as Economics 690). (3) I

691(291)—ECONOMETRICS. The application of statistical methods to problems of economic analysis. Building and measuring relationships among economic variables. Econometric models of the economy as a whole and of individual sectors. *Prereq: Economics* 618, *Ag. Econ.* 630 *or equivalent* (same as Economics 691). (3) II (Johnson)

Agricultural Policy and Land Economics

540(140)—AGRICULTURAL POLICY. Historical development of principles underlying agricultural policy; objectives of agricultural policy; appraisal of current and proposed agricultural programs. *Prereq: Agr. Econ.* 400. (3) I (Bradford)

545(145)—LAND ECONOMICS. Institutional, technological and physical forces affecting the use of land resources in agriculture. Analysis of problems connected with land tenure, land conservation and transfer of farm real estate. *Prereq: Agr. Econ.* 410, *or approval of instructor.* (3) II (Bondurant)

640(240)—ADVANCED AGRICULTURAL POLICY. Impacts of policies upon economic progress, efficiency in resource use, distribution of income, and welfare in agriculture. *Prereq: approval of instructor.* (3) I (Rudd)

Agricultural Prices and Finance

455(155)—AGRICULTURAL AND FARM FINANCE. Credit needs of agriculture; problems connected with farm and market agency financing; organization and operation of agricultural credit agencies. *Prereq: Agr. Econ.* 410. (3) I, S (Clark, Bradford)

550(150)—AGRICULTURAL PRICES. Price behavior of agricultural products including supply-price relationships and general price-level relationships. *Prereq: Econ.* 251. (3) II (Johnson)

650(250)—ADVANCED AGRICULTURAL PRICES. Advanced study of agricultural price behavior by the application of economic theory and statistical analysis. *Prereq: approval of instructor.* (3) II (Rudd)

Special Problems

580(160)—SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS. Directed independent study of a selected problem. *Prereq: approval of instructor and head of department.* (3) I, II (Brown, Staff)

780(260a-c)—SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS. Open to graduate students who have the necessary training and ability to do research on some selected problem. *Prereq: approval of head of department.* (3) I, II, S (Brown, Staff)
May be repeated to a maximum of nine credits.

Research Methods

560(106)—INTRODUCTION TO RESEARCH METHODS IN AGRICULTURAL ECONOMICS. Survey of agricultural economics research areas, methods of initiating, preparing and conducting research projects, financing agricultural research. Applicable to problems of agricultural production and marketing. *Prereq: consent of instructor.* (3) I (Smith)

660(216)—RESEARCH METHODS IN AGRICULTURAL ECONOMICS. An analytical examination of research methods and techniques used in agricultural economics. *Prereq: approval of instructor.* (3) I (Redman)

Seminar

770(200a-d)—AGRICULTURAL ECONOMICS SEMINAR. Analysis of economic problems which affect agriculture. (0) I, II (Staff)
May be repeated three times.

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

AGRICULTURAL EDUCATION *(See Education)*

AGRICULTURAL ENGINEERING *(See Engineering)*

AGRICULTURAL ENTOMOLOGY

500(102)—ECONOMIC ENTOMOLOGY. For those interested in agricultural teaching and extension work. Life history, control, and means of identification of economic insects of Kentucky are considered. Lecture, 2 hours; lab, 2 hours. Prereq: Ag. Ent. 100. (3) S (Townsend)

510(103)—ECONOMIC ENTOMOLOGY. Fruit and garden insects. Life histories, habits, distribution, and control of insects injurious to fruits and vegetables, with attention to those found in Kentucky. The enemies of these species are considered. Lecture, 2 hours; lab, 2 hours. *Prereq: A. E.* 100. (3) I, S (Rodriguez)

520(104)—ECONOMIC ENTOMOLOGY. Farm crop insects and animal parasites. Life histories, habits, distribution, and control of insects injurious to farm crops; also insect parasites of farm animals. Enemies of these species are considered. Lecture, 2 hours; lab, 2 hours. *Prereq: A. E. 100.* (3) II, S (Thurston)

550(105a, b)—SYSTEMATIC AND TECHNICAL AGRICULTURAL ENTOMOLOGY. Insect physiology, anatomy, ecology, and taxonomy, entomological literature and technique; studies of special groups of insects. *Prereq: A. E. 100 and any one of the following:* 500, 510, 520. (2 or 3 ea.) I, II (Staff)
May be repeated to maximum of six credits.

620—GENERAL ACAROLOGY. Introduction to study of mites. Classification, morphology, physiology and ecology of mites important to the medical, veterinary and agricultural fields. Lecture, 2 hours; lab, 4 hours. *Prereq: Zoology 1, Entomology 100 and consent of instructor.* (4) II (Rodriguez)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

780(201a, b)—ENTOMOLOGICAL PROBLEMS. Investigations of chosen insect problems including original work. Discussion and assignment of current insect subjects. *Prereq: A. E. 100, 510, 520, and 550.* (2 or 3 ea.) I, II (Staff)
May be repeated to a maximum of six credits.

AGRICULTURE AND HOME ECONOMICS EXTENSION

The University offers a graduate program in Extension Education leading to the degrees of Master of Science in Agriculture and Master of Science in Home Economics.

With the three exceptions listed below, the requirements for this major are the same as those for all masters' degrees offered by the University (see the introductory portion of this Bulletin) and for other programs leading to the degrees of Master of Science in Agriculture and Master of Science in Home Economics. To those following the program in Extension Education the following regulations apply: (1) except under rare circumstances, students will be expected to complete 24 semester hours and prepare a thesis; (2) instead of the work being concentrated in one department, 15 semester-hours will be considered as a minimum to be taken from the applied and theoretical subject matter areas of Education, Psychology, Economics, Sociology, English, Speech, Journalism and Extension Methods; and (3) no set schedule of required courses will be established for all students, but instead a complete program will be worked out in advance between the student and his adviser, subject to the approval of the Director of Graduate Programs in Extension Education.

501(101)—METHODS OF EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS. History, philosophy and development of Extension Work. Legislative background, organizing forces, administration, financing, program building, leader training, relationships, 4-H clubs. Lecture, 3 hours. (3) II

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

790(202a-d)—SPECIAL PROBLEMS IN EXTENSION RESEARCH. Research in various areas of special interest directly related to the administration, program development and functions of Extension workers. Lecture, 3 hours by appointment. (1 to 3) I, II, S
May be repeated to a maximum of twelve credits.

AGRONOMY

General Courses

599—SPECIAL PROBLEMS IN AGRONOMY. Directed independent study of selected agronomic problems. *Prereq: Consent of instructor.* (1-4) I, II, S (Staff)
May be repeated to a maximum of nine credits.

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

770(200a-d)—AGRONOMY SEMINAR. Reports and discussions of problems and investigations of problems in soils, crops and plant pathology. (1) I, II (Staff)
May be repeated to a maximum of four credits.

799—RESEARCH IN AGRONOMY. Directed research on selected agronomic problems. *Prereq: Consent of instructor.* (1-4) I, II, S (Staff)
May be repeated to a maximum of twelve credits.

Courses in Crops

501(101)—PASTURE PRODUCTION AND MANAGEMENT. The selection of pasture crops and their establishment, fertilization, and management for temporary or permanent pastures. Lecture and recitation, 3 hours. *Prereq: Bot.* 100; *Agron.* 206 *or consent of instructor.* (3) I, II, S* (Sigafus)

502(102)—FIELD CROP ECOLOGY. A study of the environmental factors affecting the yield and quality of field crops. Lecture and recitation, 3 hours. *Prereq: Bot.* 100; *Agron.* 206 *or equiv.; Agron.* 266 *or equiv.; consent of instructor.* (3) I (Taylor)

503(103)—WEEDS. The important characteristics, identification, and control of weeds, with emphasis on identification and control of Kentucky weeds. Lecture and discussion, 2 hours. *Prereq: Bot.* 100. (2) I, S* (Sigafus)

504—LABORATORY TO ACCOMPANY 503. Two hours. (0)

506(106)—FIELD CROP IMPROVEMENT. A study of the principles involved and the techniques used in breeding crop plants. Lecture and recitation, 3 hours. *Prereq: Bot.* 100; *Agron.* 206, *or consent of instructor; A.I.* 260 *or Bot.* 530. (3) II (Loeffel)

507—LABORATORY TO ACCOMPANY 506. Two hours. (0)

508(107)—ADVANCED CROPS: TOBACCO. The phylogeny of Nicotiana, botany, physiology, genetics, pathology and culture of tobacco with emphasis on burley. Lecture and discussion, 2 hours. *Prereq: Bot.* 100; *Agron.* 206, *or consent of instructor.* (3) I (Stokes)

509—LABORATORY TO ACCOMPANY 508. Two hours. (0)

512(105)—ADVANCED CROPS: CEREALS. A study of the grain crops in the world in respect to adaptation, culture and uses. Lecture and recitation, 3 hours. *Prereq: Bot.* 100; *Agron.* 206, *or consent of instructor.* (3) II, S* (Sigafus)

Courses in Plant Pathology

541(141)—PLANT PATHOLOGY. Significance, nature, causes, and methods of control of plant diseases. Lecture and discussion, 2 hours. *Prereq: Bot.* 100 (*Same as Bot.* 541, *PLANT PATHOLOGY.*) (3) I, II (Diachun, Chapman)

542—*LABORATORY TO ACCOMPANY* 541. Two hours. (0)

543(142)—DISEASES OF PLANTS. Symptoms, causes, and control of some of the more common representative plant diseases. Students may select disease problems in their major field of interest. Discussion, 1 hour. *Prereq: Agron.* 541 *or equiv., and consent of instructor.* (3) II (Hampton)

544—LABORATORY TO ACCOMPANY 543. Four hours. (0)

656(241)—VIRUS DISEASES OF PLANTS. Characteristics and properties of viruses that cause plant diseases; host-virus relationships; identification and control of some important virus diseases; consideration of research methods. Lecture and discussion, 2 hours. *Prereq: Agron.* 542 *or Bot.* 542 *or Zool.* 534 *or equiv.* (4) II (Diachun)

657—LABORATORY TO ACCOMPANY 656. Four hours. (0)

658(242)—NEMATODE DISEASES OF PLANTS. The importance, effects, recognition and control of nematodes that cause plant diseases; the physiology of plant parasitic nematodes and their relations with other nematodes and plant pathogens. Lecture, 1 hours. *Prereq: Agron.* 542 *or Bot.* 542 *or Zool.* 534 *or equiv.* (3)** I (Chapman)

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* Not offered every summer.
** Offered only in odd numbered years.

659–LABORATORY TO ACCOMPANY 658. Four hours. (0)

784–SPECIAL PROBLEMS IN PLANT PATHOLOGY. Directed study of selected plant pathology problems. *Prereq:* 541 *and consent of instructor.* (1 to 3) I, II, S (Staff) May be repeated to a maximum of six credits.

794(245a-d)–RESEARCH IN PLANT PATHOLOGY. *Prereq: Agron.* 141 *or equiv., and consent of instructor.* (1 to 3) I, II, S (Staff) May be repeated to a maximum of twelve credits.

Courses in Soils

568(111)–SOIL CONSERVATION. The scope and nature of the soil conservation problem, and the application of soil conserving methods in the planning and management of farms. Lecture and discussion, 2 hours. *Prereq: Agron.* 266. (3) II, S* (Survant)

569–LABORATORY TO ACCOMPANY 568. Two hours. (0)

570(114)–FERTILIZERS AND SOIL FERTILITY. Sources, manufacture, evaluation, and use of fertilizers and lime materials; soil organic matter and nitrogen. Lecture and recitation, 3 hours. *Prereq: Agron.* 266. (3) II, S* (Hutcheson)

571(116)–SOIL CHEMISTRY. Chemical methods applicable to soil fertility and productivity; determination of plant nutrients in soil; study of chemical characteristics of soil by means of modern instrumentation. Lecture and discussion, 2 hours. *Prereq: Agron.* 266. *Prereq. or concur: Chem.* 220 *or* 226. (4) II (Ragland)

572–LABORATORY TO ACCOMPANY 571. Four hours. (0)

573(119)–SOIL ORIGIN, CLASSIFICATION AND MAPPING. Classification of Kentucky soils, use of soil survey equipment, preparation of soil maps and development of a land use plan of an assigned area. Lecture and recitation, 2 hours; lab, 3 hours. *Prereq: Agron.* 266 *and Geol.* 100 *or consent of instructor.* (3) I (Bailey)

575(120)–SOIL PHYSICS. Physical properties of soils in relation to soil management and conservation. Lecture and discussion, 2 hours. *Prereq: Agron.* 266 *and consent of instructor.* (4) I, S* (Beuoit)

576–LABORATORY TO ACCOMPANY 575. Four hours. (0)

712(213)–ADVANCED SOIL FERTILITY. Utilization of native and applied plant nutrients by crops. Experimental methods related to soil fertility research. Lecture and discussion; 3 hours. *Prereq: Agron.* 570; *Agr. Econ.* 530; *or consent of instructor.* (4)*** (Hutcheson)

713–LABORATORY TO ACCOMPANY 712. Two hours. (0)

Courses in Botany

501(105)–PLANT PHYSIOLOGY. A study of basic principles of plant physiology; water relations including internal movement, transpiration, and absorption; photosynthesis. Lecture, 2 hours. *Prereq: Bot.* 101 *or* 125, *Chem.* 104 *or* 112 *or equiv.* (3 to 5) I, S* (Henrickson)

502–LABORATORY TO ACCOMPANY 501. Four hours. (0)

534(134)–CYTOGENETICS. Chromosome aberrations and their importance in heredity and evolution. Three lectures and one two-hour laboratory period per week. *Prereq: Bot.* 530 *or equivalent.* (4) I (Riley)

701(201)–ADVANCED PLANT PHYSIOLOGY. A study of elementary metabolism; mineral nutrition; plant hormones; the physiology of vegetative and reproductive growth. Lecture and discussion, 3 hours. *Prereq: Bot.* 501, *Chem.* 236 *or* 432 *or equiv.* (4) II, S* (Henrickson)

702–LABORATORY TO ACCOMPANY 701. Two hours. (0)

ANIMAL SCIENCE

Courses in Animal Science

500(100)–ANIMAL BREEDING. History of animal improvement; survey of hereditary traits in livestock; inbreeding and outcrossing; progeny tests and herd analysis. Lecture, 3 hours. *Prereq: A.S.* 100 *and* 260. (3) II (Steele)

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* Not offered every summer.
*** Offered only in even numbered years.

502(101)—APPLIED LIVESTOCK NUTRITION. A discussion of the specific nutritional concepts, feed formulation, and economic considerations. *Prereq: A.S. 280 and approval of instructors.* (3) S (Barnhart, Woolfolk, Bradley)

504(104)—SHEEP PRODUCTION. History and importance of the sheep industry; selection, breeding, feeding, and management of sheep; production and handling of wool. Lecture, 2 hours. *Prereq: A.S. 100 and 280.* (3) II (Woolfolk)

505—LABORATORY TO ACCOMPANY 504. Two hours. (0)

506(105)—BEEF PRODUCTION. History and importance of the beef cattle industry; selection, breeding, feeding, and management of swine. Lecture, 2 hours. *Prereq: A.S. 100 and 280.* (3) II (Bradley)

507—LABORATORY TO ACCOMPANY 506. Two hours. (0)

508(106)—PORK PRODUCTION. History and importance of the swine industry; selection, breeding, feeding and management of beef cattle. Lecture, 2 hours. *Prereq: A.S. 100 and 280.* (3) I, II (Barnhart)

509—LABORATORY TO ACCOMPANY 508. Two hours. (0)

771—ANIMAL SCIENCE SEMINAR. (1) I, II (Staff)
May be repeated to a maximum of three credits.

780(109a-c)—SPECIAL PROBLEMS IN ANIMAL SCIENCE. Approval of instructor required. (3) I, II, S (Animal Science Staff)
May be repeated to a maximum of nine credits.

790(201a-c)—RESEARCH IN MEATS. Problems involving original investigation. (3) I, II, S (Kemp)
May be repeated to a maximum of nine credits.

791(203a-c)—RESEARCH IN HORSE HUSBANDRY. Problems involving original investigation. (3) I, II, S
May be repeated to a maximum of nine credits.

792(204a-c)—RESEARCH IN SHEEP HUSBANDRY. Problems involving original investigation. (3) I, II, S (Woolfolk)
May be repeated to a maximum of nine credits.

793(205a-c)—RESEARCH IN BEEF CATTLE HUSBANDRY. Problems involving original investigation. (3) I, II, S (Bradley)
May be repeated to a maximum of nine credits.

794(206a-c)—RESEARCH IN SWINE HUSBANDRY. Problems involving original investigation. (3) I, II, S (Barnhart)
May be repeated to a maximum of nine credits.

Courses in Animal Nutrition

580(181)—PRINCIPLES OF ANIMAL NUTRITION. The chemistry and physiology of animal nutrition and the nutritive requirements for growth, fattening, reproduction, lactation and other body functions. Lecture, 3 hours. *Prereq: Chem. 236 or equivalent.* (3) I (Mitchell)

680(282)—LABORATORY METHODS IN ANIMAL NUTRITION AND MEATS. The use of laboratory techniques and equipment in the solution of fundamental problems of nutrition and meats. Lecture and recitation, 1 hour. *Prereq. or concur: A.S. 580.* (4) I (Little)

681—LABORATORY TO ACCOMPANY 680. Six hours. (0)

682—NUTRIENT METABOLISM. Present concepts of the metabolic roles of the individual nutrient components of feeds and their relation to practical feeding problems. Lecture. *Prereq: A.S. 580 or equivalent, one course in introductory physiology or biochemistry and consent of instructor.* (5) S (Mitchell, Little)

684—ADVANCED RUMINANT NUTRITION. Introduction of principles of ruminant metabolism in the utilization of feedstuffs for meat, milk and wool production. Lecture, 3 hours. *Prereq: approval of instructor.* (3) II (Mitchell)

686—SWINE NUTRITION. A study of the nutritional requirements of the non-ruminant animal with special reference to swine and their various stages of growth, lactation and reproduction. An evaluation of the relative value of feed ingredients and mixed feed formulation. *Prereq: A.S. 580, Chem. 430.* (3) I (Barnhart)

784(289a-c)—SPECIAL PROBLEMS IN ANIMAL NUTRITION. Approval of instructor required. (3) I, II, S (A.N. Staff)
May be repeated to a maximum of nine credits.

798(284a-c)—RESEARCH IN ANIMAL NUTRITION. Problems involving original investigation. (3) I, II, S (A.N. Staff)
May be repeated to a maximum of nine credits.

Courses in Genetics

560—GENETICS. Lectures of A.S. 260 and assigned readings. Primarily for graduate students. Lecture, 3 hours. *Prereq: one course in biology.* (3) I, II, S (Steele)

561—GENETICS LABORATORY. Similar to A.S. 261 but additional work required. Primarily for graduate students. Lab, 2 hours. Concurrently with A.S. 560 at student's option. (1) I, II, S (Steele)

562(163)—ADVANCED GENETICS. Concerned chiefly with the physical basis of heredity, mutations, chromosomal aberrations, linkage, genetics and development, and reports on current literature. Lecture, 3 hours. *Prereq:* A.S. 260. (3) II (Steele)

660(260)—PHYSIOLOGY OF REPRODUCTION. Physiological processes of reproduction in farm animals; gonadal functions; endocrine relationships; fertility; and factors affecting reproductive efficiency. Lecture, 3 hours. *Prereq: A.S. 500 or D.S. 524; or P.S. 540 and A.P. 501.* (3) II (Dutt)

662(262)—POPULATION GENETICS. Introduction to principles of static and dynamic populations; statistical concepts and tools applied to quantitative inheritance. Lecture, 3 hours. *Prereq: One course each in statistics and genetics and consent of instructor.* (3) I (Walton)

783(169a-c)—SPECIAL PROBLEMS IN GENETICS. Approval of instructor required. (3) I, II, S (Genetics Staff)
May be repeated to a maximum of nine credits.

797(261a-c)—RESEARCH IN GENETICS. Problems involving original investigation. (3) I, II, S (Genetics Staff)
May be repeated to a maximum of nine credits.

See also A.S. 500 Animal Breeding; D.S. 524 Dairy Cattle Breeding; P.S. 540 Poultry Breeding; and A.S. 771 Animal Industry Seminar.

Courses Applicable to All Divisions

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

DAIRY SCIENCE

The Department of Dairy Science offers the master's degree in either dairy production or dairy manufacturing and the Ph.D. degree in dairy production. As a prerequisite to pursuing graduate study in this department, it is expected that the student will have had preparatory training equivalent to an undergraduate major in dairy manufacturing or dairy production, whichever is appropriate.

Graduate work in dairy manufacturing will usually involve the application of chemistry and microbiology to the solution of problems in processing and distributing dairy products. In dairy production, graduate work for either the M.S. or Ph.D. degree may be taken in the fields of nutrition, genetics, or reproduction as they apply to dairy science, with emphasis on chemistry, statistics, and physiology.

520(121)—DAIRY CATTLE FEEDING AND MANAGEMENT. Application of principles of nutrition to dairy cattle feeding; current methods contributing to maximum production of quality dairy products on the farm. Lecture, two hours. *Prereq: A.H.* 280.
(3) I (Seath, Jacobson)

521—LABORATORY TO ACCOMPANY 520. Two hours. (0)

524(120)—DAIRY CATTLE BREEDING. Application of genetics to problem of breed and herd improvement; progeny testing of sires; type classification, selective registration; prominent families and strains within the leading dairy breeds. Lecture, two hours. *Prereq: A.H.* 260. (3) II (Walton)

525—LABORATORY TO ACCOMPANY 524. Two hours. (0)

526(132)—REPRODUCTION IN DAIRY CATTLE. A study of male and female reproductive processes in dairy cattle and the application of artificial breeding to the improvement of dairy herds. Lecture, one hour. *Prereq: D.S.* 120; *A.H.* 260; *Zool.* 100 or *consent of instructor.* (2) II (Olds)

527—LABORATORY TO ACCOMPANY 526. Two hours. (0)

530(123)—DAIRY BACTERIOLOGY. Application of bacteriological principles to production and processing of dairy products, entrance of miccroorganisms into dairy products, effects of their growth and methods for control. Lecture, two hours. *Prereq: MIC.* 200 or 400. (2) I (Glenn)

531—LABORATORY TO ACCOMPANY 530. Four hours. (2)

533(126)—ADVANCED DAIRY BACTERIOLOGY. Bacteriological principles and problems relating to specific dairy products and processing. Lab, six hours. *Prereq: D. S.* 530, 531. (3) II (Glenn)

534(134)—PRINCIPLES OF DAIRY TECHNOLOGY. Chemical and physical characteristics of dairy products; chemical, physical and physico-chemical principles involved in dairy processing; special methods of analysis. Lecture, one hour. *Prereq: Math.* 101; *Chem.* 236; *D.S.* 235. (4) II (Freeman)

535—LABORATORY TO ACCOMPANY 534. Six hours. (0)

536(135)—DAIRY PROCESSING AND PLANT MANAGEMENT. Methods used for processing milk, butter, ice cream, cheese, and concentrated milk; fundamentals of dairy plant management. Lecture, two hours. *Prereq: D.S.* 235. (6) II (Rudnick, Freeman)

537—LABORATORY TO ACCOMPANY 536. Eight hours. (0)

572(139)—DAIRY SEMINAR. (1) I, II (Dairy Science Staff)
May be repeated to a maximum of four credits.

622(222)—CURRENT DEVELOPMENTS IN DAIRY SCIENCE. A course designed to acquaint the advanced student with the more significant problems and scientific developments of current interest in the dairy field. Lecture, three hours. (3) II or S (Dairy Science Staff)

624(262)—POPULATION GENETICS. Introduction to principles of static and dynamic populations; statistical concepts and tools applied to quantitative inheritance. Lecture, three hours. *Prereq: One course each in statistics and genetics, and consent of instructor.* (3) I (Walton)

684—ADVANCED RUMINANT NUTRITION. Introduction to principles of ruminant metabolism in the utilization of feedstuffs for meat, milk and wool production. Lecture, three hours. Prereq: One course each in nutrition, physiology and biochemistry, and/or consent of instructor. (Same as A.H. 684) (3) II (Jacobson, Mitchell)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE.
(1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.
(1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

771(200a-c)—ANIMAL INDUSTRY SEMINAR. (Same as Animal Industry 771)
(1) I, II (Animal Industry Staff)
May be repeated to a maximum of three credits.

781(129a-f)—SPECIAL PROBLEMS IN DAIRYING.
(1-3) I, II, S (Dairy Science Staff)
May be repeated to a maximum of twelve credits.

795(221a-c)—RESEARCH IN DAIRYING. Problems involving original investigation in either dairy production or dairy manufacturing. (3) I, II, S (Dairy Science Staff)
May be repeated to a maximum of twelve credits.

POULTRY SCIENCE

540(140)—POULTRY BREEDING. Genetic principles involved in poultry breeding; disease resistance; inheritance of egg production and related characters; development of breeding programs. Lecture, 3 hours. *Prereq: P.S.* 140, 141, *A.H.* 260. (3) I (MacLaury)

542(141)—ADVANCED POULTRY PRODUCTION. Studies of control measures in poultry diseases, nutrition, marketing; flock management and replacement. Lecture, 2 hours. *Prereq: P.S.* 140. (3) I (Abbott)

543—LABORATORY TO ACCOMPANY 542. Two hours. (0)

544(146)—A SURVEY OF THE POULTRY INDUSTRY. A travel course involving expense for travel and maintenance. (3) S (Staff)

548(147)—POULTRY NUTRITION. A study of nutrients, feed ingredients, deficiencies, formulation, and feeding practices for broilers, replacement stock, and layers. Lecture, 2 hours. *Prereq: Chem.* 236, 237, *P.S.* 140 *and consent of instructor.* (3) II (Begin)

549—LABORATORY TO ACCOMPANY 548. Two hours. (0)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

771(200a-c)—ANIMAL INDUSTRY SEMINAR. (Same as A.I. 771) (1) I, II (A.I. Staff)
May be repeated to a maximum of 3 credits.

782(149a-c)—SPECIAL PROBLEMS IN POULTRY. *Prereq: Permission of instructor.* (1 to 3) I, II, S (Insko, Begin, MacLaury, Abbott)
May be repeated to a maximum of nine credits.

796(241a-c)—RESEARCH IN POULTRY. Problems involving original investigation. (3) I, II, S (Insko, Begin, MacLaury, Abbott)
May be repeated to a maximum of nine credits.

ANIMAL PATHOLOGY

501(101)—ANATOMY AND PHYSIOLOGY OF DOMESTIC ANIMALS. A study of anatomy and physiology as related to courses in livestock judging, nutrition, butchering, breeding, and infectious diseases. Lecture, 3 hours. (3) I (Behlow)

502(102)—INFECTIOUS DISEASES OF DOMESTIC ANIMALS. Distribution, general nature, manner of dissemination, method of control, prevention and eradication of infectious and parasitic diseases of animals. Lecture, 3 hours. (3) II (Behlow)

HOME ECONOMICS

Courses in Foods and Nutrition

401(101)—PRINCIPLES OF NUTRITION. Fundamental facts of nutrition presented as basis for planning adequate diets for people of different ages, activities and needs and at different income levels. Practical aspects are emphasized. Lecture and discussion, three hours. Not open to home economics majors. (3) I, II, S (Clemmons)

402(102)—DIETETICS. Daily food requirements at different age levels and different economic levels. Practice is given in setting up normal dietaries for individuals, families, and other groups. Lecture, two hours. *Prereq: H.E.* 106, 211. (3) I, II, S (Taylor)

403—LABORATORY TO ACCOMPANY 402. Two hours. (0)

503(103a,b)—COMMUNITY NUTRITION. Study of nutrition education programs on a community level. Experience is provided for presenting nutrition in health clinics, schools and state institutions. Lecture, two hours. *Prereq. or Concur: H.E.* 402. (3) I, II (Clemmons)
May be repeated to a maximum of six credits.

504—LABORATORY TO ACCOMPANY 503. Two hours. (0)

505(105)—EXPERIMENTAL COOKERY. Study of factors that affect results obtained in cooking and food preparation processes. Experimental work under controlled conditions. Lecture, one hour. *Prereq: H.E.* 104, 211. (3) II, S (Brownlie)

506—LABORATORY TO ACCOMPANY 505. Four hours. (0)

507(107)—WORKSHOP IN APPLIED NUTRITION. The application of scientific knowledge of nutrition to the promotion of positive health. Emphasis is given to communications techniques and their use in field work. (2) (Clemmons)

508(108a-c)—SEMINAR IN NUTRITION. Investigations of recent research in nutrition. *Prereq: Senior or graduate standing.* (1) I, II, S (Marlatt)
May be repeated to a maximum of three credits.

510(111)—ADVANCED NUTRITION. Application of biochemistry to understanding of the utilization of nutrients for body processes. Laboratory work includes analysis of digestive juices, blood and urine; balance experiments. Lecture, two hours. *Prereq: H.E.* 211, *CHE* 236 *or approval of instructor.* (4) I (Marlatt, Skerski)

511—LABORATORY TO ACCOMPANY 510. Six hours. (0)

512(112)—NUTRITION IN DISEASE. Metabolic processes of the body in normal and diseased conditions, correlating the metabolic changes due to disease with diet therapy. Lecture, one hour. *Prereq. or Concur: H.E.* 510, 402. (2) II (Marlatt)

513—LABORATORY TO ACCOMPANY 512. Two hours. (0)

514(114)—FOOD PRESERVATION. Principles of home food preservation. Canning, dehydration and freezing of fruits, vegetables and meats: pickling of fruits and vegetables: making of jams, jellies and preserves; brining. Lecture, two hours. *Prereq: Mic.* 200, *H.E.* 104. (3) I, S (Brownlie)

515—LABORATORY TO ACCOMPANY 514. Two hours. (0)

516(158)—FOOD FOR CHILDREN. Experience in selection, preparation and serving of food to young children. Emphasis is placed on the preschool age and the factors important in establishing good food habits. *Prereq: H.E.* 106, 211, 255. (3) II, S (Staff)

517(115)—FOOD FOR SPECIAL OCCASIONS. Advanced work in culinary arts and skills. Preparation of attractive and appetizing dishes to help the homemaker in planning buffet suppers, receptions, picnics, wedding parties, formal meals. Lab, six hours. *Prereq: H.E.* 104, 106. (3) I, S (Barkley)

590(106a-d)—FIELD WORK IN NUTRITION. Nutrition problems at different age levels, correlated with surveys and experimental studies to show the relation between diet-selection and its physical and mental effects. Lecture and lab. *Prereq: H.E.* 503 *or approval of instructor.* (1) I, II, S (Clemmons)
May be repeated to a maximum of four credits.

591(119a-c)—SPECIAL PROBLEMS IN FOODS AND NUTRITION. Intensive work on a specific phase of the field. (2) I, II, S (Clemmons, Marlatt)
May be repeated to a maximum of six credits.

603(203)—ADVANCED COMMUNITY NUTRITION. Study of nutrition surveys and of bases for judging community nutrition. Emphasis is placed on economic, geographic, social and educational causes of malnutrition. Experience is given in development of nutrition programs. *Prereq: H.E.* 503. (3) I, II, S (Clemmons)
May be repeated to a maximum of six credits.

771—SEMINAR IN NUTRITION. (2) II, S (Marlatt)
May be repeated to a maximum of six credits.

781(219a-c)—SPECIAL PROBLEMS IN FOODS AND NUTRITION. Independent advanced work on a specific problem. (2) I, II, S (Clemmons, Marlatt, Erikson)
May be repeated to a maximum of six credits.

Courses in Clothing, Textiles, Costume Design, and Interior Design

520(125)—ADVANCED TEXTILES. Individual semester reports with emphasis on new developments in textile industry. Class project to determine color fastness, tensile strength, and other quality factors, of various types of textiles. Lecture, one hour. *Prereq: H.E.* 120, 561. (2) I, S (Guenther)

521—LABORATORY TO ACCOMPANY 520. Two hours. (0)

522(134)—ECONOMICS OF CLOTHING. The clothing industry, its influence and economy. Field trips to study mass production class project and individual semester reports. Lecture, one hour; lab, two hours. *Prereq: H.E.* 227, 561 *or approval of instructor.* (2) I, S (Guenther)

523(133)—FASHION. How the fashion world works. Study of French, Italian and American designers who have greatest influence on current trends. Field trips to augment lectures. Lecture, two hours. *Prereq: H.E.* 227 *or approval of instructor.* (2) II, S (Guenther)

524(126)—COSTUME DESIGN. The arts of costume today and throughout the past. Costumes are designed to meet today's needs. Lecture, one hour. *Prereq: H.E.* 227, *ART* 105. (3) I, S (Kidd)

525—LABORATORY TO ACCOMPANY 524. Four hours. (0)

526(127)—ADVANCED CLOTHING. The making of foundation and creative pattern designs; also creative design through draping, with emphasis on accurate fittings. Lecture, one hour. *Prereq: H.E.* 227. (3) II, S (Guenther)

527—LABORATORY TO ACCOMPANY 526. Four hours. (0)

528(137)—TAILORING. Analysis of tailoring technique in the shop and in the home. Tailored garments are planned and constructed. Lab, four hours. *Prereq: H.E.* 328. (2) I, S (Guenther)

529(155)—THE CHILD AND HIS CLOTHING. A detailed study of the selection, cost and care of the preschool child's clothing in relation to his needs. Lectures and occasional field trips. *Prereq: H.E.* 255. (3) I, S (Staff)

530(139)—ADVANCED INTERIOR DESIGN. The art of interior decoration throughout the past and today. Interiors are planned to meet today's needs. Lecture, one hour. *Prereq: H.E.* 330. (2) II, S (Kidd)

531—LABORATORY TO ACCOMPANY 530. Two hours. (0)

534(135)—DECORATIVE TEXTILES. Survey of techniques used in applying color and design to fabrics. Individual problems, demonstrating techniques, developed. Lecture one hour: *Prereq: H.E.* 120, *ART* 105. (2) II, S (Guenther)

535—LABORATORY TO ACCOMPANY 534. Two hours. (0)

536—INTERIOR DESIGN PROJECTS. Selected projects in furnishing the home, including furniture refinishing, upholstering and slip cover making. Cost in terms of time and money are considered. Lab, four hours. *Prereq: H.E.* 330 *or approval of instructor.* (2) I, II (Kidd)

537—HISTORY OF FURNITURE. Furniture design from antiquity to the present, including effects upon design of social and economic conditions, and uses of historic furnishings in contemporary interiors. Lecture, 3 hours. *Prereq: H.E.* 330 *or approval of instructor.* (3) I (Kidd)

592(128a-c)—SPECIAL PROBLEMS IN CLOTHING AND COSTUME DESIGN. Intensive work on specific phases of the field. (2) I, II, S (Guenther, Kidd)
May be repeated to a maximum of six credits.

593(138a-c)—SPECIAL PROBLEMS IN INTERIOR DESIGN. Intensive work on specific phases of the field. (2) I, II, S (Kidd)
May be repeated to a maximum of six credits.

597(136a-c)—SPECIAL PROBLEMS IN TEXTILES. Intensive work on specific phases of the field. (2) I, II, S (Guenther)
May be repeated to a maximum of six credits.

772(237a-c)—SEMINAR IN TEXTILES, CLOTHING, COSTUME DESIGN AND INTERIOR DESIGN. Investigation of special textile, clothing, costume design or interior design problems. Lecture, two hours. (2) I, II, S (Guenther, Kidd)
May be repeated to a maximum of six credits.

782(228a-c)—SPECIAL PROBLEMS IN CLOTHING AND COSTUME DESIGN. Independent advanced work on a specific problem. (2) I, II, S (Guenther, Kidd)
May be repeated to a maximum of six credits.

783(238a-c)—SPECIAL PROBLEMS IN INTERIOR DESIGN. Independent, advanced work on a specific problem. (2) I, II, S (Kidd)
May be repeated to a maximum of six credits.

787(236a-c)—SPECIAL PROBLEMS IN TEXTILES. Independent advanced work on a specific problem. (2) I, II, S (Guenther)
May be repeated to a maximum of six credits.

Courses in Institution Management

540(140)—THE SCHOOL LUNCH. Designed for teachers who manage the lunchroom. Consideration will be given to equipment, menus, purchase, storage, preparation and service of food. Lecture, two hours. *Prereq: H.E.* 104 *and Econ.* 251. (3) II (Brownlie)

541—LABORATORY TO ACCOMPANY 540. Two hours. (0)

542—INSTITUTION EQUIPMENT. Selection arrangement, cost and care of equipment; problems of lighting, heating, ventilation and refrigeration. Two field trips taken to neighboring cities to see equipment in institutions. Lecture, two hours. *Prereq: H.E.* 242. (3) I (Brownlie)

543—LABORATORY TO ACCOMPANY 542. Two hours. (0)

546(141)—INSTITUTION ORGANIZATION AND MANAGEMENT. Principles of institution organization, types of institution service, personnel and financial management. Legal aspects of institution management. Personal and professional qualifications of an institution manager. *Prereq: H.E.* 240, 242. (3) II (Brownlie)

548(142a-c)—INSTITUTION ADMINISTRATION. Application of scientific principles of institution management. Practical principles are developed in various aspects of food service management. *Prereq: Approval of instructor.* (3) S (Brownlie)
May be repeated to a maximum of nine credits.

594(149a-c)—SPECIAL PROBLEMS IN INSTITUTION MANAGEMENT. Intensive work on specific problems. (2) I, II, S (Brownlie)
May be repeated to a maximum of six credits.

784(249a-c)—SPECIAL PROBLEMS IN INSTITUTION MANAGEMENT. Independent, advanced work. I, II, S (Brownlie)
May be repeated to a maximum of six credits.

Courses in Child Development and Family Living

552(181)—NURSERY SCHOOL ORGANIZATION. Organization and administration, including housing, equipment, program, records, parent cooperation. Field trips to nursery schools. Lecture, three hours. *Prereq: H.E.* 350. (3) I, S (Newsom)

553(182)—THE CHILD IN HIS FAMILY. Preparation and presentation of reports of studies of family influences on the personality and development of children. Lecture, three hours. *Prereq: H.E.* 153, 350 *or consent of instructor.* (3) II, S (Newsom)

555(156)—PLAY AND PLAY MATERIALS. Play activities of young children, relation of play equipment to development, and characteristics of good play materials. Construction of toys suitable for the preschool child. Lecture, one hour. *Prereq: H.E.* 255. (2) II, S (Staff)

556—LABORATORY TO ACCOMPANY 555. Two hours. (0)

557(157)—INFANT DEVELOPMENT. Study of development, care and guidance of the child during prenatal, natal, and infant periods. Lecture, two hours. *Prereq: Phy.* 206. (2) I, S (Newsom)

595(159a-c)—SPECIAL PROBLEMS IN CHILD DEVELOPMENT AND FAMILY LIVING. Intensive work on specific problems. (2) I, II, S (Newsom)
May be repeated to a maximum of six credits.

775(258)—SEMINAR IN CHILD DEVELOPMENT. Preparation and presentation of reports of current investigations in child development. (2) I, II, S (Newsom)
May be repeated to a maximum of six credits.

785(259a-c)—SPECIAL PROBLEMS IN CHILD DEVELOPMENT AND FAMILY LIVING. Independent advanced work. (2) I, II, S (Newsom)
May be repeated to a maximum of six credits.

Courses in Home Management

561(161)—CONSUMER PROBLEMS. Consumer buying, its social and economic aspects. Analysis of problems of the manufacturer, merchant and consumer in order to understand the needs and responsibilities of each group. Lecture, three hours. *Prereq: Econ.* 251, *HE* 261. (3) I, II, S (Magruder, Wilmore)

562(162a)—HOME MANAGEMENT AND FAMILY RELATIONSHIPS. Philosophy and principles of home management. Study of the mechanics of time, energy and money management; personal development and social and family relationships. Lecture, two hours. *Prereq: Econ.* 251, *HE* 261. (2) I, II (Wilmore)

563(162b)—HOME MANAGEMENT AND FAMILY RELATIONSHIPS. A residence period in the Home Management House is required of seniors in home economics. Experience in the application of principles presented in other courses. *Prereq: HE* 562, *Prereq. or concur: HE* 402. (3) I, II, S (Wilmore, Combs)

564—LABORATORY TO ACCOMPANY 563. (0)

568(168)—HOUSEHOLD EQUIPMENT. Electric and gas household equipment and small appliances; their selection, maintenance, operation and cost. Lecture, two hours. *Prereq. or concur: PHY* 151, 152, *or* 281; *HE* 261. (3) I, II, S (Combs)

569—LABORATORY TO ACCOMPANY 568. Two hours. (0)

596(169a-c)—SPECIAL PROBLEMS IN HOME MANAGEMENT. Intensive work on specified phases of home management. (2) I, II, S (Wilmore)
May be repeated to a maximum of six credits.

662(262)—ADVANCED HOME MANAGEMENT AND FAMILY RELATIONSHIPS. A course affording opportunity for special study of social and economic problems affecting family life. Lecture, three hours. *Prereq: HE* 563. (3) II, S (Wilmore)

786(269a-c)—SPECIAL PROBLEMS IN HOME MANAGEMENT. Independent advanced work. (2) I, II, S (Wilmore)
May be repeated to a maximum of six credits.

General Courses

575(175)—RURAL COMMUNITY ANALYSIS. The nature of the town-country community, with special emphasis on the function of institutional and agency programs and their leaders in relation to the community. Same course as R.S. 513. (3) I

768—RESIDENCE CREDIT FOR MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

HORTICULTURE

500(102)—PRINCIPLES OF SPRAY PRACTICE. A study of the principles and practice of spraying for the control of pests of horticultural crops. Lecture, one hour. *Prereq: Hort.* 100, *Chem.* 102, *Ag. Ent.* 100. (2) I (Waltman)

501—LABORATORY TO ACCOMPANY 500. Two hours. (0)

502(103)—POMOLOGY: DECIDUOUS TREE FRUITS. A course dealing with the theory and practice of commercial tree fruit production, with major emphasis on apple and peach growing. Lecture, two hours. *Prereq: Hort.* 100. (3) I (Waltman)

503—LABORATORY TO ACCOMPANY 502. Two hours. (0)

504(105)—POMOLOGY: SMALL FRUITS. A detailed study of the care and management of commercial plantings of strawberries, raspberries, and other bush fruits and grapes. Lecture, one hour, first half; lectures, two hours, last half. *Prereq: Hort.* 100. (2) II (Waltman)

505—LABORATORY TO ACCOMPANY 504. Two hours. (0)

510(110)—THE PRINCIPLES OF VEGETABLE GARDENING. A study of the fundamental principles underlying commercial production of vegetables. Lectures, two hours. *Prereq: Hort.* 100, *Agron.* 266. (3) I (Knavel)

511—LABORATORY TO ACCOMPANY 510. Two hours. (0)

512(111)—GROWING VEGETABLE CROPS IN PLASTIC AND GLASS GREENHOUSES. Production of commercial vegetables and plants grown for transplanting; types of plastic and glass structures will be studied. Lectures, two hours. (3) II (Cotter)

513—LABORATORY TO ACCOMPANY 512. Two hours. (0)

520(120)—LANDSCAPE GARDENING. The adaptation of principles of landscape architecture; coordination of buildings with surroundings; identification and uses of decorative materials and their requirements. Lectures, two hours. *Prereq: Hort.* 100, *Bot.* 103. *Offered* 1962-63 *and alternate years.* (3) II, S (Abernathe)

521—LABORATORY TO ACCOMPANY 520. Two hours. (0)

522(121)—ADVANCED LANDSCAPE. A continuation of Horticulture 520, 521, with special emphasis on design and the use of materials. Lectures, two hours. *Prereq: Hort.* 520, 521. *Offered* 1961-62 *and alternate years.* (3) II (Abernathie)

523—LABORATORY TO ACCOMPANY 522. Two hours. (0)

524(122)—FLORICULTURE. A detailed study of specific groups of flowers such as bulbs, iris, and roses. Lectures, two hours. *Prereq: Hort.* 102. *Offered* 1962-63 *and alternate years.* (2) II (Abernathie)

525(123)—PLANT PROPAGATION. A detailed study of the methods of propagating certain horticultural plants. Includes cuttings, grafting, and budding. Lecture, two hours. *Prereq: Hort.* 100, 520, 521; *Bot.* 101, 103. *Offered* 1961-62 *and alternate years.* (3) I (Kelley)

526—LABORATORY TO ACCOMPANY 525. Two hours. (0)

527(125)—PLANTS AND PLANTING MATERIALS. A study of woody and herbaceous plants and their identification, suitability for landscape uses and the effects produced. Lecture, one hour. *Prereq: Hort.* 520, 521 *or approval of instructor. Offered* 1962-63 *and alternate years.* (2) II (Kelley)

528—LABORATORY TO ACCOMPANY 527. Two hours. (0)

768—RESIDENCE CREDIT FOR MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

770(200a-c)—SEMINAR. (1) I, II, S (Cotter)
May be repeated to a maximum of three credits.

780(106a-c)—SPECIAL PROBLEMS IN POMOLOGY. This course is designed to meet the need for advanced work. *Prereq: Hort.* 100 *and one of the following:* 502, 503; *or* 504, 505; *and approval of instructor.* (1 to 3) I, II, S (Waltman)
May be repeated to a maximum of nine credits.

781(112a-c)—SPECIAL PROBLEMS IN VEGETABLE CROPS. This course is designed to meet the need for advanced work. *Prereq: Hort.* 100, 510, 511; *and approval of instructor.* (3) I, II, S (Emmert, Cotter)
May be repeated to a maximum of nine credits.

782(124a-d)—SPECIAL PROBLEMS IN ORNAMENTAL HORTICULTURE. This course is designed to meet the need for advanced work. *Prereq: Hort.* 100, 520, 521, 522, 523; *Bot.* 100, 103; *and approval of instructor.* (1 to 3) I, II, S (Kelley)
May be repeated to a maximum of twelve credits.

790(201a-c)—RESEARCH IN HORTICULTURE. *Prereq: approval of instructors.* (1 to 3) I, II, S (Staff)
May be repeated to a maximum of nine credits.

FORESTRY

400(110)—WOOD IDENTIFICATION AND TECHNOLOGY. General anatomy of wood, identification of commercial species of the United States based on gross and microscopic features. Properties and uses. Lectures, two hours. *Prereq: For.* 100 *or* 104; *Bot.* 101; *and approval of instructor.* (3) II (Davenport)

401—LABORATORY TO ACCOMPANY 400. Two hours. (0)

410(111)—LUMBER AND OTHER FOREST PRODUCTS. Manufacture, grading, and seasoning of lumber. Forest products other than logs or lumber, their methods of utilization and markets. Lectures, three hours. *Prereq: For.* 100 *or* 104 *and approval of instructor.* (3) II (Davenport)

415(115)—WOOD CONDITIONING. The methods and principles involved in seasoning, changes in physical properties, and preservation of wood. *Prereq: For.* 100 *or* 104. (3) I, S (Davenport)

780(120a-c)—SPECIAL PROBLEMS IN FORESTRY. This course is designed to meet the need for advanced work. *Prereq: For.* 400, 401; 410; *and approval of instructor.* (1 to 3) I, II, S (Davenport)
May be repeated to a maximum of nine credits.

RURAL SOCIOLOGY

(For description of degrees and activities, see Sociology, p. 105)

513(160)—RURAL COMMUNITY ANALYSIS. The nature of the town-country community, with special emphasis on the function of institutional and agency programs and their leaders in relation to the community. (3) I (Ford)

514(125)—RURAL MOVEMENTS AND SOCIAL POLICY. Social factors in selected rural movements, their organization and development, influence upon governmental policy, and the social needs met. *Prereq: an introductory course or consent of instructor.* (3) (Brown)

517(180)—ADVANCED RURAL SOCIOLOGY. Systematic study of the structure and function of family, informal and locality groups, social strata, religious, educational, political and occupational groups in rural society. (3) II (Schwarzweller)

541(115)—GROUP ORGANIZATION AND LEADERSHIP. A study of the dynamics of organized groups; leadership, membership participation, and program planning in agricultural organizations and other organized rural groups. *Prereq: an introductory course or consent of instructor.* (3) II (Coughenour)

565(190a-c)—SPECIAL PROBLEMS IN RURAL LIFE. Supervised individual study in selected sub-fields of rural sociology. Population, standards of living, neighborhood and community change, and rural institutions are among the available fields for investigation. (1-3) I, II, S (Staff)

May be repeated to a maximum of six credits.

615(230)—RURAL URBAN RELATIONS. Interdependence of city and country; solidary and antagonistic relationships of city and country; the process of urbanization, and problems of rural adjustment to urban influences. (3) (Brown)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

773(250a,b)—TOPICAL SEMINAR. Analysis of topics of scientific interest in rural sociology, selected from such fields as the following: criticism of research; sociological factors in land use; migration; rural social ecology of the South; highland societies. (3) I, II, S (Staff)

May be repeated to a maximum of six credits.

776(210)—SEMINAR IN RURAL ORGANIZATION. Basic theories of social organization, comparative study of selected systems of rural social organization, examples of purposeful organization. (3) (Staff)

778(220)—SEMINAR IN RURAL ATTITUDES. The nature and genesis of rural attitudes and their relation to rural social control; analysis of contemporary rural attitudes and opinion. (3) (Staff)

790(200a-c)—RESEARCH IN RURAL SOCIOLOGY. Individual graduate research with correlated study of rural social research types and methods. (1-3) I, II, S (Staff)
May be repeated to a maximum of six credits.

SOCIOLOGY *(See page 105)*

II. ARTS AND SCIENCES

ANCIENT LANGUAGES AND LITERATURES

The Department of Ancient Languages and Literatures requires, as a prerequisite for the master's degree 18 semester credits (or the equivalent) in the area of ancient languages and civilization. Students having a deficiency will plan, in consultation with the Head of the Department, a program that will make up this deficiency.

The Department offers the master's degree in four areas: (1) Latin, (2) Greek, (3) ancient languages and civilizations, and (4) the teaching of Latin and/or Greek. Both Plan A and Plan B are available.

The candidate for the master's degree must complete with a grade of B or better, 30 semester hours (or 24 semester hours and a thesis) of graduate work approved by the Department. Of these hours two-thirds must be in the Department, and at least 9 semester hours must be in courses numbered 600 or above. The candidate must also show in his course work that he has a good reading knowledge of Latin and Greek.

A preliminary oral examination (in history, civilization, and literature) must be taken at a date to be determined in conference with the student's Graduate Adviser but not later than approximately two months before the final oral examination. A final oral examination (in history, civilization, and literature) must be taken not later than 8 days before the final day of the semester (or summer session) in which the degree is to be granted. If the student has done approved work in a minor area, he may take one-fourth of his oral examination in this area.

Latin

509,510(109a,b)—LATIN LITERATURE. Courses in various authors, periods, or types to suit the needs of the class. *Prereq:* 12 *semester hours of Latin.* (3 ea.) I, II, S

511,512(152a,b)—STUDIES IN LATIN PHILOLOGY. Courses to meet the needs of students in various areas of Roman philology, *e.g.,* in Latin literature, in Roman civilization, in Latin linguistics, etc. *Prereq: premission of instructor.* (3 ea.) I, II, S

514,515(114a,b)—LATIN COMPOSITION. The writing of Latin prose of moderate difficulty. *Prereq: permission of instructor.* (1 ea.) I, II, S

521(121)—ROMAN CIVILIZATION. Topics in the political, social, economic, and cultural life of ancient Rome down to Justinian, with special reference to the relation to modern life. *No knowledge of Latin necessary.* (2) II, S

530(150)—THE TEACHING OF LATIN. The place of Latin in general education. Developments in the teaching of Latin. The reading approach to learning Latin. Evaluation of textbook and other teaching materials. (3) II, S

Note: See also "Classics in General" below.

Greek

520(120)—GREEK CIVILIZATION. Topics in the political, social, economic, and cultural life of ancient Greece, with special reference to the relation to modern life. *No knowledge of Greek necessary.* (2) II, S

556(156)—GREEK TRAGEDY. Selected plays from Aeschylus, Sophocles, and Euripides. Lectures on Greek tragedy and its effort on the Western World. *Prereq:* 12 *semester hours of Greek.* (3) I

559(157)—GREEK COMEDY. Selected plays of Aristophanes. Lectures on Greek comedy and its effect on the Western World. *Prereq:* 12 *semester hours of Greek.* (3) II

561,562(153a,b)—STUDIES IN GREEK PHILOLOGY. Courses to meet the needs of students in various areas of Greek philology, *e.g.*, in Greek literature, in Greek civilization, in Greek linguistics, etc. *Prereq: permission of instructor.* (3 ea.) I, II, S

652(204)—THE GREEK OF THE NEW TESTAMENT. Class and/or individual work to suit the needs of the students. Reading and research to suit the needs of the student. *Prereq: 12 semester hours of College Greek.* (3) I, II, S

Note: See also "Classics in General" below.

Semitics

Note: Courses in elementary Hebrew and Arabic will be offered on the graduate level for students in the Department (or in other departments of the University) who may have need for such courses in their graduate work. The Head of the Department should be consulted about such arrangements.

574(180a)—ISAIAH. Selections with attention to the literary, historical, and general cultural background. *Prereq: 12 semester hours of Hebrew or permission of instructor.* (3) I

575(180b)—THE PSALMS. Selections with attention to the literary, historical, and general cultural background. *Prereq: 12 semester hours of Hebrew or permission of instructor.* (3) II

576, 577—STUDIES IN SEMITICS. Courses to meet the needs of students in various areas of Semitics, *e.g.*, in literature, in civilization, in linguistics, etc. (3 ea.) I, II

Note: See also 580, 636 and 637 under "Classics in General" below.

Classics in General

522(122a)—GREEK LITERATURE IN ENGLISH TRANSLATION: HOMER TO XENOPHON. Extensive reading in the most important works. Discussion of the significance of the works in their own and later times to the present. No knowledge of Greek necessary. (3) I

523(122b)—GREEK LITERATURE IN ENGLISH TRANSLATION: PLATO TO PROCOPIUS. Extensive reading and discussion as in 522. (3) II

580(151a-b)—INDEPENDENT WORK IN ANCIENT LANGUAGES. Courses to meet the needs of the student will be arranged in various areas of classical philology, *e.g.*, in Greek or Latin writers, in classical civilization, in Greek or Latin linguistics. *Prereq: Permission of instructor.* (3) I, II, S
May be repeated to a maximum of twenty-four credits.

632(201)—COMPARATIVE GREEK AND LATIN GRAMMAR. Studies and research in comparative linguistics, historical syntax, semantics, and other aspects of linguistics in the Greek and Latin area. *Prereq: Necessary comand of languages involved.* (3) I, II, S

633(205)—INTENSIVE STUDY OF AN AUTHOR. Studies and research in the work of an author (*e.g.*, Plato, Aristotle, Lucretius, Caesar, Ovid, or Horace): sources, milieu, purposes, language, and his influence on later periods. *Prereq: Necessary command of languages involved.* (3) I, II, S

636(206)—INTENSIVE STUDY OF A PERIOD. Studies and research in a period (Age of Pericles, Hellenistic Age, Ciceronian Age, Augustan Age, Silver Age, Christian Latin, or Medieval Latin): literary, social, and linguistic trends, sources, and influence on later periods. *Prereq: Necessary command of languages involved.* (3) I, II, S

637(207)—INTENSIVE STUDY OF A LITERARY GENRE. Studies and research in a genre (lyric, epic, tragedy, comedy, satire, history, or the novel) in the ancient world, with some attention to its effect on later periods. *Prereq: Necessary command of languages involved.* (3) I, II, S

638(210)—THE TRANSMISSION OF CLASSICAL TEXTS. Preservation and transmission of Greek and Latin texts. Introduction to epigraphy and palaeography. Introduction to the history of Classical scholarship. *Prereq: Reading knowledge of Greek and Latin.* (3) I, II (Thompson)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

790(200)—RESEARCH IN THE TEACHING OF CLASSICAL LANGUAGES. Research may be done (with reference to secondary and/or higher education) in methods, in preparation of materials, in curricula, or in the place and history of classical study in education. *Prereq: A.L.* **150.** **(3) I, II, S**

ANTHROPOLOGY

402(127)—HUMAN IDENTIFICATION. A systematic and detailed study of human morphology (bones and soft parts) for purposes of identification. Two hours laboratory, one hour lecture. (2) (Snow)

500(125)—PHYSICAL ANTHROPOLOGY. Lecture-laboratory course on the biological nature of man; the primates, fossil man, races, race mixture, constitutional anthropology and human growth. *Prereq: Anthro.* 100 *or three hours in any other Bio. Science.* (4) (Snow)

501(126)—HUMAN ANCESTRY. A lecture-laboratory course on human origins and the fossil remains of Pleistocene man throughout the world; the lineage, formation and inter-breeding of modern races. *Prereq:* 500 *or special permission.* (4) (Snow)

510—HISTORY OF ANTHROPOLOGICAL THEORY. Description and analysis of significant anthropological ideas in their historical context; the growth of the theoretical concepts in physical anthropology, archaeology, and ethnology. (3) (Schwartz)

515(185b)—DESCRIPTIVE LINGUISTICS. Phonemics. An investigation of speech-sounds and systems of speech-sounds. Also attention to both speech and writing as communication systems. (Same as English 515). *Prereq: consent of instructor* (3) (Faust)

516(185a)—DESCRIPTIVE LINGUISTICS: Morphemics. An explanation of some of the ways speech-sounds are put together in patterns so as to form languages. (Same as English 516). *Prereq: Anthro.* 515. (3) (Faust)

521(107)—ETHNOLOGY OF THE NEW WORLD. Cultures and physical types of the American Indians during and after white settlement. (Northwestern North America is not included.) (3) (Essene)

522(130)—NORTH PACIFIC COAST CULTURES. Ethnology of the maritime peoples of western North America and Northeast Asia. Cultural connections between America and Asia will be stressed. (3) (Essene)

523(131)—ETHNOLOGY OF OCEANIA. A survey of the various cultures on the islands of the Pacific. Both aboriginal and modern acculturated societies will be considered. (3) (Essene)

524(140)—MYTHOLOGY. The unwritten literature of primitive peoples: themes, diffusion, style, literary devices, and function of myths. (3) (Essene)

525(141)—APPLIED ANTHROPOLOGY. Application of anthropological methods to contemporary practical problems such as acculturation, colonial administration, intercultural education, and race relations. (3) (Essene)

526(142)—CULTURE AND PERSONALITY. The cultural basis of personality. Personal character considered as the result of culturally fostered patterns. The ideal personality in several selected societies. (Same as Sociology 526) (3) (Essene)

533—SOCIAL ANTHROPOLOGY. History and theory of social anthropology with special emphasis on the comparative approach to analysis of structure, function, and change in social and cultural systems. *Prereq: Consent of instructor.* (Same as Sociology 533) (3) II (Pearsall)

541(111)—ARCHAEOLOGICAL THEORY AND METHODS. The concepts and aims of archaeology, its history as a scientific discipline, and its present role in the social sciences. (3) (Schwartz)

542(115)—NORTH AMERICAN ARCHAEOLOGY. A study of the origin and growth of prehistoric American Indian cultures north of Mexico as revealed by archaeological data. (3) (Schwartz)

543(116)—BEGINNINGS OF CIVILIZATION. Prehistory of the Near East, the earliest evidences of agriculture, pottery, smelting, writing, law codes, kingship, priesthood, and science. (3) (Schwartz)

544(117)—DIFFUSION OF CIVILIZATION. Prehistory, ethnology of primitive tribes, and spread of Near Eastern civilization in Europe, the Far East, and Negro Africa. *Prereq: Anthro.* 543 *or equivalent courses on the Near East.* (3) (Essene)

545(112)—ARCHAEOLOGY OF KENTUCKY. A rapid survey of the more important prehistoric cultures in North America and the sequence of cultures in Kentucky to the time of the white settlers. (3) (Schwartz)

546(114)—PREHISTORIC MESOAMERICA AND PERU. An intensive study of the native American civilizations: their origins, development and achievements. (3) (Schwartz)

547(118)—CULTURES OF THE SOUTHWESTERN UNITED STATES. Development of sedentary and nomadic Indian peoples, from earliest times to the present. Emphasis on Puebloan, Mogollon, and Hohokam Archaeology and continuity with modern Indians. (3) (Schwartz)

561(180)—ANTHROPOLOGY: MAN AND HIS WORKS. Survey of the major fields of anthropology: physical, prehistory, and ethnology and a guide to source material. Designed for students not contemplating further work in anthropology. (3) (Staff)

581(103a-d)—INDEPENDENT WORK IN ANTHROPOLOGY. Individual research problems in archaeology, ethnology, or physical anthropology. (3) (Staff)
May be repeated to a maximum of twelve credits.

582(150a-d)—TUTORIAL SEMINAR. Anthropological methods and theory. (2) (Staff)
May be repeated to a maximum of eight credits.

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

770(201a,b)—SEMINAR. Intensive work in particular fields of anthropology. All students during a given semester will be assigned related phases of the same problem. Designed primarily for students working toward a master's degree in Anthropology. (2) (Staff)
May be repeated to a maximum of four credits.

790(203a-d)—RESEARCH PROBLEMS IN ANTHROPOLOGY. Intensive study in the fields of Physical Anthropology, Archaeology, and Ethnology with qualified staff members. Research papers required. (3) (Staff)
May be repeated to a maximum of twelve credits.

ART

As prerequisite to graduate work in art, the Department requires that the student shall have had preliminary work in art equivalent to that required of its majors in art. In general this means the completion of an undergraduate sequence of six to eight full semester courses in drawing, design and painting, balanced by four to six courses in the history of art, and a reading knowledge of either French or German. The graduate program in art provides for creative work in painting, design, etc., study and research in history and criticism of art, and also in the field of art education. Any of these may be emphasized. A written thesis on a research project is required for a master's in art history or in art-education, and a descriptive paper for creative projects in painting, etc.

The department is housed in a modern building with special equipment. Studios for practical work are designed to meet professional standards. An art library adjoins the classrooms. There are extensive collections of photographs, color reproductions, and related art reference materials. An exhibition gallery provides for the study of original works of art. The Department itself has a working collection of paintings, prints and drawings.

500(151)—CRITICISM OF ART. History and theory of criticism in the visual arts. Contemporary problems in criticism. Analyses, interpretations, evaluations. (3) I (Amyx)

509(160a,b)—SEMINAR IN ART. Current problems in Art; correlations of theory and practice; discussions and reports. For Seniors and Graduates majoring in Art. Two credits in seminar is prerequisite to comprehensive examination. (1) I, II (Staff)
May be repeated to a maximum of four credits.

510(165a-c)—ADVANCED PAINTING. Individual development in creative painting. *Prereq:* 311. (3) I, II, S (Thursz)
May be repeated to a maximum of nine credits.

554(135)—ANCIENT ART. The art of the ancient cultures of the Mediterranean and West-Asian world through Greek and Roman times. Emphasis on classical art. (3) I (Rannells)

556(136)—MEDIEVAL ART. The art of Byzantium and the Near East and of the Latin and Germanic cultures in the West; Romanesque and Gothic Art in Northern Europe. Emphasis on Christian Art. (3) II (Rannells)

558(140)—RENAISSANCE ART IN ITALY. The arts of the Renaissance in Italy from the late middle ages through the sixteenth century. Italian humanism; analyses of style; study of individual masters. (3) I (Rannells)

559(138)—RENAISSANCE ART IN NORTHERN EUROPE. The arts of the Renaissance and Reformation outside Italy from the late middle ages through the sixteenth century. Northern humanism; analyses of style; study of individual masters. (2) II (Rannells)

560(141)—BAROQUE ART. The arts of the Reformation and Counter-Reformation in Europe from the mid-sixteenth century in Italy through the eighteenth century in France and Germany. The Baroque and Rococo styles; study of individual masters. (3) II (Rannells)

562(142)—NINETEENTH CENTURY ART. The arts in Europe and America from the mid-eighteenth century through the nineteenth century. Consideration of social and economic changes in relation to art; study of individual artists. (3) I (Amyx)

563(147)—ART IN AMERICA. A survey of American architecture, sculpture, painting, illustration, handicrafts, industrial design, etc., from Colonial times to the present. (2) II (Amyx)

564(143)—TWENTIETH CENTURY ART. The arts of the twentieth century in Europe and the Americas. Consideration of social and technological changes in relation to art; study of individual artists. (3) II (Amyx, Thursz)

575(155)—ART IN ELEMENTARY SCHOOLS. An advanced course for in-service teachers in elementary schools. Programs of instruction related to the development levels of vision and expression in the child. Lectures, conferences and reports. **(2) I, S** (Rannells)

577(157)—ART IN SECONDARY SCHOOLS. Art for teachers in secondary schools. The literature of art education. Courses of study. Teaching materials. Lectures, conferences and reports. (3) II, S (Rannells, Amyx)

592(153)—AESTHETICS. Problems of method in aesthetics; major types of aesthetic theory. Aesthetic materials of the arts, in literature, music and the space arts. Form and types of form. Meaning in the arts. Interrelations of the arts. (3) II (Amyx)

615(267)—TRADITIONAL AND EXPERIMENTAL MEDIA IN PAINTING. A survey of historical and contemporary procedures and materials with sustained problems in mural and easel painting. Preparation of grounds and consideration of permanency in pigments, vehicles and supports. *Prereq:* 3 *credits in advanced painting and consent of the instructor.* (3) II, S (Barnhart, Thurz)

664(243)—STUDIES IN CONTEMPORARY ART. Intensive study of the content of selected 19th and 20th century works. Emphasis, according to works chosen, upon parallels with contemporary theory and procedure in the sciences, psychology and philosophy; consideration of psychology, mathematical and social theory. *Prereq: Art* 564, *and* 500 *or* 592. (3) I, II, S (Amyx)

670(210)—SCHOOL AND COMMUNITY ART. Analyses of the social function of art; organization of school and community programs in art; case studies of existing programs. Emphasis on relation of school programs to community needs. *Prereq: Art* 564, 575 *or* 577; *Sociology* 220; *Education* 732 *or* 661; *or consent of the instructor.* (3) S (Rannells, Amyx)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

780(179a-d)—PROBLEMS IN SCULPTURE, CERAMICS AND DESIGN. Sustained individual problems and experimental work in the technical and theoretical problems of design. *Prereq:* 12 *credits in upper division studio work and consent of the instructor.* (3) I, II, S (Barnhart, Green, Wiggs)
May be repeated to a maximum of nine credits.

781(175a-d)—PROBLEMS IN ART HISTORY AND CRITICISM. Sustained individual research and interpretation in history, criticism, aesthetics. *Prereq:* 12 *hours in art history and criticism and the consent of the instructor.* (3) I, II, S (Amyx)
May be repeated to a maximum of nine credits.

783(177a-d)—PROBLEMS IN PAINTING AND PRINTMAKING. Sustained individual problems in drawing, painting and printmaking. Prereq: 12 credit in upper division studio *work and consent of the instructor.* (3) I, II, S (Thursz)
May be repeated to a maximum of nine credits.

THE BIOLOGICAL SCIENCES

The Departments of Anatomy, Physiology, Botany, Plant Pathology, and Zoology jointly provide a program in *biology* leading to the degree Doctor of Philosophy. Besides courses offered in these five departments, the program draws upon various curricula and faculty members in several of the other biological sciences, such as Microbiology, Animal Husbandry, Agronomy, Entomology, Psychology, and Pharmacy. The purpose of this graduate program is to train well-rounded biologists who will be familiar with the main branches of the biological sciences and who will have adequate training in mathematics, physics, chemistry and statistical methods. A student who receives his degree under this program would be sufficiently well-trained in one of the major branches of biology that he would be prepared to teach and carry out research in that field. He should also have a broad enough training in the entire field of the biological sciences that he would be familiar with the important principles underlying plant and animal life and would be able to teach in a unified department of biology. Students would be expected to have courses in general botany, general zoology, elementary physiology, comparative anatomy and general chemistry as prerequisites before starting their doctoral work and all students under this program would be required to have elementary courses in genetics and cellular physiology. Major work within the biological sciences would be in cytogenetics and evolution, in zoology with emphasis in ecology and genetics, vertebrate zoology or embryology and histology, in plant pathology, and in botany with emphasis on plant physiology, plant morphology, systematic botany or mycology. Other curricula such as cellular biology and radiation biology can be arranged to suit the preparation, needs and interests of individual students. Laboratory facilities and equipment are adequate for doctoral work in all these branches of biology. An excellent biological library containing over 10,000 volumes and including many of the important and less important American and foreign periodicals is available and is supplemented by over 200,000 volumes concerned with biology in the libraries of the experiment station, the medical school and departments of chemistry, physics and geology.

For appropriate courses see Departments of Physiology, Botany, Plant Pathology, and Zoology.

BOTANY

400—FUNDAMENTALS OF BIOLOGY FOR SECONDARY SCHOOL TEACHERS. A course designed to aid the teacher in the selection of subject matter and in the presentation of modern biology to high school students. Lectures, discussions, 3 hrs. per wk. *Prereq: Employment as a high school teacher.* (*Same as Zoology* 400) (4) S (Carpenter and others)

401—LABORATORY TO ACCOMPANY 400. Seven hours. (0)

402—ADVANCED TOPICS IN BIOLOGY FOR SECONDARY SCHOOL TEACHERS. A treatment of selected topics from the point of view of modern developments designed to aid the high school teacher to keep abreast of changes in theory and practice, to increase his knowledge of subject matter, and to provide better motivation for his students. Lectures, discussions, and demonstrations, 7 hrs. per wk. *Prereq: Employment as high school teacher and consent of instructor.* (*Same as Zoology* 402) (4) S

501—PLANT PHYSIOLOGY. Basic principles of the physiological processes of green plants and the effect of the environment on these processes. *Prereq: Botany* 101-102 *or* 125, *Chemistry* 112-113 *or* 104-105 *or equivalent.* (3 to 5) I (Henrickson) (3) S (Henrickson)

502—LABORATORY TO ACCOMPANY 501. Four hours. (0)

506(106a-d)—SPECIAL PROBLEMS. Independent work in some phase of advanced Botany. *Prereq: consent of instructor.* (3) I, II (Staff) May be repeated to a maximum of twelve credits.

507(107)—MORPHOLOGY OF ALGAE. A study of the structure, life histories, genetics and relationships of the various groups comprising the algae, with the main emphasis upon the green algae. *Prereq: Botany* 103-104. (3) I (Warden)

513(114)—ECOLOGY. The relationships which exist between plants and their environment, including a study of the past and present distribution of vegetation. Lectures, three hours. *Prereq: 6 credits of botany.* (4) I (Warden)

514—LABORATORY TO ACCOMPANY 513. Two hours. (0)

515—SEMINAR. Readings and reports of special topics. (1) I, II (Staff)
May be repeated to a maximum of two credits.

521(124)—ANATOMY OF VASCULAR PLANTS. The nature and origin of primary and secondary tissues and their distribution in plant organs; the use of anatomical information in phylogeny, pathology, ecology and other research areas. Lectures, two hours. *Prereq: 6 credits of botany.* (4) II (Browne)

522—LABORATORY TO ACCOMPANY 521. Four hours. (0)

524(125)—MYCOLOGY. The structure and classification of the fungi with emphasis on their relationships and effects on plants and animals. Two lecture-discussions. *Prereq: Botany* 101 *or equivalent. Botary* 103-104 *recommended.* (4) I (Garner)

525—LABORATORY TO ACCOMPANY 524. Four hours. (0)

526(126)—ADVANCED MYCOLOGY. Detailed examination of the structure, classification and physiology of specific groups of fungi. *Prereq: Botany* 524-525 *or equivalent.* (4) II (Garner)

527—LABORATORY TO ACCOMPANY 526. Four hours. (0)

528(129)—PLANT CYTOLOGY. The structure of plant cells; mitosis and meiosis. Lectures, two hours. *Prereq: 3 credits in the Biological Sciences.* (4) I (Riley)

529—LABORATORY TO ACCOMPANY 528. Four hours. (0)

530(130)—INTRODUCTION TO HEREDITY. The principles of heredity and their physical basis; three lectures per week. *Prereq: 3 credits of biological sciences.* (3) II (Riley)

532(132)—GENES AND THEIR ACTION. The nature and action of genes. Physiological genetics. Three lectures per week. *Prereq: Botany* 530 *or equivalent.* (3) II (Riley)

534(134)—CYTOGENETICS. Cytological and genetic evidence for the chromosome theory. Chromosome aberrations and their importance in heredity and evolution. Three lectures per week. *Prereq: Botany* 528-529, 530 *or equivalent.* (3) II (Riley)

541(141)—PLANT PATHOLOGY. Significance, nature, causes, and methods of control of plant diseases. Lectures and discussion, two hours. *Prereq: Botany* 101-102. (3) II (Diachun)

542—LABORATORY TO ACCOMPANY 541. Two hours. (0)

551(151)—TAXONOMY OF VASCULAR PLANTS. A study of the principles and practices of taxonomy and a detailed consideration of the families of vascular plants. Lectures, two hours. *Prereq: Botany* 101-102 *and* 103-104. (4) I (Browne)

552—LABORATORY TO ACCOMPANY 551. Four hours, including field trips. (0)

560(160)—PLANT MICROTECHNIQUE. The principal methods used in the preservation and preparation of plant materials for microscopic examination; basic microscopy; techniques for measurement and illustration. Six hours of laboratory per week. *Prereq: Botany* 101-102 or 125. (3) I (Browne)

701(201)—ADVANCED PLANT PHYSIOLOGY. A study of metabolism, mineral nutrition and hormones in green plants. The physiology of growth and development. Lectures and discussions, three hours. *Prereq: Chemistry* 236-237 *or* 432-433; *Botany* 501-502 *or consent of instructor.* (4) II (Henrickson)

702—LABORATORY TO ACCOMPANY 701. Two hours. (0)

735(235)—BIOSYSTEMATICS. Principles in the application of data from the fields of ecology, genetics, cytology, morphology, phytogeography, and physiology to the solution of taxonomic problems. Lectures, two hours. *Prereq: Botany* 551-552 *and* 530; *Botany* 534 *suggested.* (3) I (Riley)

736—LABORATORY TO ACCOMPANY 735. Two hours. (0)

738(220)—RADIATION GENETICS. Type of ionizing radiations and their effects on the hereditary mechanism; the induction of gene mutations and chromosomal aberrations by radiation. Two lectures or discussions. *Prereq: Botany* 528-529 *and* 530 *or equivalent.* (4) I (Riley)

739—LABORATORY TO ACCOMPANY 738. Four hours. (0)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (In Biological Sciences) (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

770(230a-f)—SEMINAR. Reports and discussions on various topics in botany. (1) (Staff)
May be repeated to a maximum of six credits.

790(206a-d)—RESEARCH IN PLANT MORPHOLOGY. Graduate students prepared for independent work will be assigned to investigations in anatomy, histology, or special morphology of plants. (4) (Browne)
May be repeated to a maximum of twelve credits.

791(207a-d)—RESEARCH IN MYCOLOGY. For those desiring to carry on investigations in mycology. Suitable problems will be suggested to students desiring to enter this field. *Prereq: Botany* 524-525. (4) (Garner)
May be repeated to a maximum of twelve credits.

792(210a-d)—RESEARCH IN PLANT PHYSIOLOGY. Graduate students with adequate preparation in plant physiology, physics, and chemistry may carry on independent investigations in plant physiology. (4) (Henrickson)
May be repeated to a maximum of twelve credits.

793(213a-d)—RESEARCH IN SYSTEMATIC BOTANY. Graduate students may carry on independent work that may be used in the preparation of their theses. *Prereq: Botany* 201-202; *Botany* 513-514 *and* 530 *recommended.* (4) (Browne)
May be repeated to a maximum of twelve credits.

794(215a-d)—RESEARCH IN CYTOGENETICS. Independent investigations in cytogenetics. In connection with his investigations, the student will be expected to master the literature and present a report. (4) (Riley)
May be repeated to a maximum of twelve credits.

CHEMISTRY

Work leading to the master's degree and to the doctor's degree with a major in chemistry must conform to the general rules and regulations of the Graduate School.

For the degree of Master of Science, twenty-four semester hours in graduate courses exclusive of the thesis, one academic year (36 weeks) in residence, and an acceptable thesis are required. A good reading knowledge of scientific German is required. It is strongly recommended that the candidate be able to read scientific French or Russian also.

A maximum of one-third of the work may be taken in courses outside of the department which are approved by the student's committee.

The degree of Doctor of Philosophy is conferred upon a candidate who, after completing not less than three years of graduate work in chemistry and allied fields, presents sufficient evidence of scholarly attainments. Evidence is based on course work, research, examinations, and the dissertation.

402,404(101a,b)—ORIENTATION IN MODERN CHEMISTRY FOR TEACHERS. A review of the fundamentals of chemistry and a study of recent developments. The relation of chemistry to various aspects of modern life is considered. Lectures and discussions. *Prereq: employment as high school science teacher.* (3 ea.) S (Staff)

406—FUNDAMENTALS OF CHEMISTRY FOR HIGH SCHOOL TEACHERS. A course to aid the teacher in the selection of subject matter and in the presentation of modern chemistry to high school students. Lectures, discussions, six hours. *Prereq: Employment as a high school teacher.* (4) S (Hammaker and Staff)

407—LABORATORY TO ACCOMPANY 406. Six hours. (0)

430,432(130a,b)—ORGANIC CHEMISTRY. Lectures, three hours. *Prereq: Chemistry* 112, 113 *or* 108, 109. (4 or 5 ea.) I, II, S (Smith)

431,433—LABORATORY TO ACCOMPANY 430, 432. Three or six hours each. (0)

440,442(140a,b)—PHYSICAL CHEMISTRY. The fundamental principles of chemistry are studied with emphasis upon the applications of these in the correlation of natural phenomena. Lectures, three hours. *Prereq: Analytical Chemistry, Mathematics* 212 *and Physics* 232. (3 ea.) I, II, S (Staff)

441,443(144a,b)—PHYSICAL CHEMISTRY LABORATORY. Laboratory to accompany 440, 442. Six hours. (2 ea.) I, II (Staff)

444(143)—PHYSICAL CHEMISTRY. For students in Agriculture and the Biological Sciences. Lectures and recitations, three hours. *Prereq: Chemistry* 112, 113 *or* 104, 105 *and* 226, 227; *and Physics* 213, 214. (5) I (Dawson)

445—LABORATORY TO ACCOMPANY 444. Six hours. (0)

446,448(147a,b)—PHYSICAL CHEMISTRY FOR ENGINEERS. The principles of physical chemistry are studied with emphasis upon the application of these in mining and metallurgical engineering. Lectures and recitation, three hours. *Prereq: Chemistry* 226, 227, *Mathematics* 212, *and Physics* 232. (4 ea.) I, II (Staff)

447,449—LABORATORY TO ACCOMPANY 446, 448. Three hours each. (0)

506—ADVANCED TOPICS IN CHEMISTRY FOR HIGH SCHOOL TEACHERS. A course in selected topics and modern developments to enhance the competence of the high school teacher. Lectures and discussions, twelve hours. *Prereq: Employment as a high school teacher and consent of instructor.* (4) S (Staff)

510(110)—ADVANCED INORGANIC CHEMISTRY. A systematic course in inorganic chemistry with special emphasis upon the preparation and reactions of various types of inorganic compounds. Lectures, three hours. *Prereq: Analytical chemistry and organic chemistry.* (3) I, S (Sears)

520(115)—ELEMENTARY RADIOCHEMISTRY. An introductory study of the radioactive elements and other substances involved in nuclear reactions. Lectures, laboratory and discussions, three hours. *Prereq: Chemistry* 226, 227, *or equivalent.* (2) II, S (Ehmann)

522(122)—INSTRUMENTAL ANALYSIS. The applications of microscopic, colorimetric, spectrophotometric, polarographic and electrometric methods. Lecture, one hour. *Prereq: Chemistry* 222, 223. (3) II, S (Wagner)

523—LABORATORY TO ACCOMPANY 522. Six hours. (0)

532(133)—QUALITATIVE ORGANIC ANALYSIS. A systematic study of the separation and identification of organic compounds. Lecture, one hour. *Prereq: Chemistry* 430, 433 *or* 232, 233. (3) I, S (Fort)

533—LABORATORY TO ACCOMPANY 532. Six hours. (0)

535(136)—SYNTHETIC ORGANIC CHEMISTRY. A critical comparison of preparation methods accompanied by laboratory work and reports. Laboratory, nine hours. *Prereq: Chemistry* 432, 433 *or* 232, 233. (3) II, S (Smith)

542(141)—CHEMICAL THERMODYNAMICS. Principles and applications of chemical thermodynamics. Lectures, three hours. *Prereq: Chemistry* 442, 443. (3) II (Eckstrom)

544(145)—COLLOID CHEMISTRY. Lectures, recitations and assigned readings in the chemistry of colloids. Two hours. (2) II (Staff)

550,552(150a,b)—PHYSIOLOGICAL CHEMISTRY. A study of the chemistry of living processes. Lectures and recitations, three hours. *Prereq: Chemistry* 112 *or* 104; 220, 221, 432 *and* 433. (4 ea.) I, II (Smith)

551,553—LABORATORY TO ACCOMPANY 550, 552. Three hours. (0)

572—SEMINAR. Reports and discussions about recent research and current chemical literature. Required of all seniors. (1) II (Staff)

582(181)—CHEMICAL LITERATURE. Training in the use of chemical literature. One hour per week. *Prereq: Junior or Senior standing.* (1) I (Black)

583(182)—LABORATORY ARTS. The fabrication of chemical apparatus of glass, metal, and plastics. *Prereq: Major in the Department of Chemistry with Junior standing.* (2) I (Staff)

616(215)—RADIOCHEMISTRY. An advanced study of nuclear chemistry and radiochemistry. Lectures, two hours. *Prereq: Chemistry* 442, 443 *and* 520. (2) I (Ehmann)

622(221)—QUANTITATIVE ORGANIC ANALYSIS. A study of the determination of elements and functional groups in organic compounds. Lecture, one hour. *Prereq: Chemistry* 522, 523, *and* 442. (3) II (Smith)

623—LABORATORY TO ACCOMPANY 622. Six hours. (0)

625(223)—OPTICAL METHODS OF ANALYSIS. An intensive study of the theory and applications of the following methods: emission spectroscopy, absorption spectorphotometry, and x-ray diffraction. Lectures and laboratory, seven hours. (3) I (Hammaker)

628(228)—PRINCIPLES OF ANALYTICAL CHEMISTRY. An advanced study of the theory and practice of quantitative analysis. Lectures and discussions, three hours. *Prereq: Chemistry* 442, 443. (3) II (Hammaker)

630,632(230a,b)—SYNTHESIS OF ORGANIC COMPOUNDS. A thorough study of the types of reactions used in organic synthesis with emphasis on the conditions and reagents that can be used. Lectures, three hours. *Prereq: Chemistry* 432, 433. (2 ea) I, II (Smith)

634(234)—THE ELECTRONIC THEORY AS APPLIED TO ORGANIC REACTIONS. A study of the modern viewpoints of valence and their application to the interpretation of organic reactions. Lectures, two hours. *Prereq: Chemistry* 432, 433, 442 *and* 443. (2) I (Patterson)

636(232)—STEREOISOMERISM OF CARBON COMPOUNDS. Optical isomerism; polarimetry; stereochemistry of biphenyls and related compounds; cistrans isomerism; and stereochemistry of the sugars. Lectures, three hours. *Prereq: Chemistry* 432, 433. (3) II (Smith)

638(238)—PRINCIPLES OF ORGANIC CHEMISTRY. A general survey of the field of organic chemistry. Lectures, four hours. *Prereq: Chemistry* 432, 433. (4) I (Brown)

644(244)—PHASE RULE. Lectures and assigned readings on the theory and applications of the phase rule. Lectures, two hours. *Prereq: Chemistry* 442, 443. (2) II (Eckstrom)

646(246)—CHEMICAL KINETICS. Studies of chemical reactions from the standpoint of velocity and mechanism. Lectures, three hours. *Prereq: Chemistry* 442, 443. (3) (Plucknett)

648(248)—PRINCIPLES OF PHYSICAL CHEMISTRY. An advanced course dealing with the fundamental principles of physical chemistry. *Prereq: College physics, integral calculus, and one course in physical chemistry.* (4) I (Dawson)

710(310)—TOPICS IN INORGANIC CHEMISTRY. The chemistry of the rare earths and other less common elements. Selected topics dealing with recent advances in the field. Lectures, two hours. *Prereq: Chemistry* 510. (2) II (Sears)

714—NON-AQUEOUS SOLUTIONS. A study of the properties of non-aqueous solutions and reactions in non-aqueous media. Lectures, two hours. *Prereq: Chemistry* 442, 443. (2) II (Sears)

720—ADVANCED INSTRUMENTAL ANALYSIS. The theory and applications of the following methods to chemical analysis: chromatography, solvent extraction, ion-exchange, infra-red spectroscopy, coulometry and non-aqueous titrimetry. Lectures and laboratory, seven hours. *Prereq: Chemistry* 522, 523 *and* 442. (3) I (Wagner)

726—TOPICS IN ANALYTICAL CHEMISTRY. Selected topics which may include nuclear magnetic resonance, mass spectrometry, x-ray diffraction and spectroscopy, microscopy, and recent advances in analytical chemistry. Lectures, two hours. *Prereq: Chemistry* 522, 523 *and* 442. (2) I (Staff)

732(335)—MOLECULAR REARRANGEMENTS. A study of the various mechanisms which have been proposed for reactions which produce change in the structural arrangement of the molecule. Lectures, two hours. *Prereq: Chemistry* 634. (2) (Staff)

734(336)—HETEROCYLIC COMPOUNDS. Occurrence, preparation, and properties of cyclic compounds containing oxygen, sulfur, and nitrogen. Lectures, two hours. *Prereq: Chemistry* 432, 433. (2) (Staff)

736,738(339a,b)—TOPICS IN ORGANIC CHEMISTRY. Selected topics which may include heterocylic organic compounds, natural and synthetic dyes, carbohydrates, nitrogen compounds, and other recent advances in the field of organic chemistry. Lectures, two hours. *Prereq: Chemistry* 432, 433. (2 ea.) I, II (Staff)

740(340)—ELECTROCHEMISTRY. Modern theories of solutions. Applications of electrochemical methods in determining the properties of solutions. Polarization. Electrolysis. Equilibrium in solutions of electrolytes. Lectures, three hours. *Prereq: Chemistry* 442, 443. (3) I (Staff)

742(341)—QUANTUM CHEMISTRY. An introduction to quantum mechanics with emphasis on the aspects closely related to chemistry. Lectures, two hours. *Prereq: Chemistry* 442, 443, *and differential equations.* (2) (Plucknett)

744(342)—STATISTICAL THERMODYNAMICS. The study of chemical thermodynamics from the viewpoint of the statistical treatment of systems rather than from the classical approach. Lectures, two hours. *Prereq: Chemistry* 542 *and differential equations.* (2) (Plucknett)

746,748(349a,b)—TOPICS IN PHYSICAL CHEMISTRY. Selected topics which may include photochemistry, structure of crystals, molecular spectra, and other recent advances in the field of physical chemistry. Lectures, two hours. *Prereq: Chemistry* 442, 443 *and Mathematics* 531. (2 ea.)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

776,778—GRADUATE SEMINAR. Reports and discussions on recent research and current literature. Required of all graduate students. (1 ea.) I, II (Staff)

780—INDIVIDUAL WORK IN CHEMISTRY. (1 to 5) I, II, S (Staff)
May be repeated to a maximum of six credits.

790—RESEARCH IN CHEMISTRY. (1 to 5) I, II, S (Staff)
May be repeated to a maximum of twenty-four credits.

DIPLOMACY AND INTERNATIONAL COMMERCE

The Patterson School is primarily a graduate department, offering training in the following interrelated fields:

1. International Relations, Law and Organization
2. Diplomacy
3. Comparative Government
4. International Economics, Trade and Commercial Policies
5. Area Studies

Admission to candidacy for advanced degrees in the Patterson School is governed by the regulation of the Graduate School. Graduates of accredited colleges may become candidates for a master's degree in the Patterson School. Students who are deficient in background must make up their deficiencies by taking such additional courses as may be recommended. The graduate work must include courses in at least three of the five fields listed below. At least 16 of the 24 semester hours required for the master's degree must be taken from the list; the remaining semester hours may be taken in one or more related fields upon approval of the major professor. Nine semester hours of the work must be in courses open only to graduate students. A reading knowledge of a modern foreign language, an acceptable thesis and a final oral examination on the course work and the thesis complete the requirements for the master's degree. In exceptional cases a candidate may substitute six additional credits of work for a thesis.

Candidates for the doctor's degree must pass qualifying examinations which must be taken during the second year of graduate work. These examinations are oral and written and will cover five of the fields listed below. A minor in a related field may be substituted for two of the fields. Candidates for the doctor's degree in a related department desiring a minor in the Patterson School must pass qualifying examinations in two of the fields. At least nine

semester hours of the work in the Patterson School must be in courses not open to undergraduates.

A reading knowledge of two modern foreign languages, a dissertation and an oral examination on the thesis and the field of the thesis complete the requirements for the doctor's degree.

I. International Relations, Law and Organization

Diplomacy and International Commerce 541 (169)—The Soviet Union in World Affairs. A survey of the Soviet record in foreign affairs and an introduction to the guiding concepts and the principal techniques of Soviet foreign policy. Prereq: Political Science 556 (3) (Rodes)

Geography 542(140)—Geographic Foundation of World Power (3)

Law 565(195)—International Legislation (3)

Philosophy 511(110)—The Making of the Modern Mind (3)

Philosophy 540(120)—Great Religions (3)

Political Science 265(165)—World Politics (3)

Political Science 501(101)—Latin American Relations (3)

Political Science 550(150)—International Law (3)

Political Science 566(166)—The United Nations (3)

Political Science 774(204)—International Relations and Organization (3)

II. Diplomacy

Diplomacy and International Commerce 530(160)—The Conduct of American Foreign Relations. The formulation, conduct, and control of American foreign policy, basic principles, comparison with other countries. Prereq: Political Science 151(3) (Rodes)

Diplomacy and International Commerce 600(201)—Problems of Soviet Foreign Policy. Prereq: Political Science 556, Dipl. 541 (3) (Rodes)

History 500100a)—The Diplomacy and Foreign Policy of the United States to 1898 (3)

History 501(100b)—The Diplomacy and Foreign Policy of the United States since 1898 (3)

History 565(135a)—The British Empire to 1860 (3)

History 566(135b)—The British Empire and Commonwealth (3)

History 569(139)—British History Since 1815 (3)

History 581(119b)—Europe, 1814-1870 (3)

History 582(119c)—Europe, 1870-1918 (3)

History 583(120)—Europe since 1919 (3)

History 595(190a)—The Far East to 1900 (3)

History 596(190b)—The Far East since 1900 (3)

History 620(320a-d)—Seminar in Modern European History (3)

Political Science 775(217)—Contemporary American Diplomatic Problems (3)

III. Comparative Government

Diplomacy and International Commerce 540(167)—Government and Politics of South Asia. A study of the political institutions of South Asia and their position in world politics. Prereq: Political Science 265 (3) (Vandenbosch)

History 509(106b)—Latin American Republics (3)

History 561(131a)—English Constitutional History to 1603 (3)

History 562(131b)—English Constitutional History Since 1603 (3)

Political Science 555(155a)—Comparative Government—Parliamentary Democracy (3)

Political Science 556(155b)—Comparative Government—Contemporary Dictatorships (3)

Political Science 568(168)—Governments and Politics of Eastern Asia (3)

Political Science 761(211)—The Constitution and Civil Rights (3)

Political Science 762(213)—Federal Centralization (3)

IV. International Economics, Trade and Commercial Policies

Diplomacy and International Commerce 520(130)—International Investment. The long-term capital accounts in the balance of payments; reasons for investments abroad: Investment and economic development. Prereq: Economics 527. (3) (Wasserman)

Diplomacy and International Commerce 521(131)—International Finance. Short-term capital accounts on the balance of payments; financing international transactions; the money markets; international payment systems. Prereq: Economics 527. (3) (Wasserman)

Diplomacy and International Commerce 522(133)—Underdeveloped Areas, and Economic Policy. Description and definition of underdeveloped areas, their economic growth and development, factors in economic development, policies adapted to economic development. Prereq: Economics 252 and 527. (3) (Hultman)

Diplomacy and International Commerce 523(132)—International Commercial Policy. America's position in the world economy and its international accounts; United States financial policies, war debts, financial cooperation and investment policy. Prereq: Economics 527. (3) (Zsoldos)

Diplomacy and International Commerce 524—Exporting and Importing Techniques. A study of the methods and procedures involved in the import and export of goods. Prereq: Economics 527. (3) (Zsoldos)

Diplomacy and International Commerce 601(231)—Theory of International Trade, history of theories of international trade; theories of international equilibrium and the mechanism of equilibrium adjustments; tariff and other trade barriers; customs union. Prereq: Economics 527. (3) (Hultman)

Diplomacy and International Commerce 602(232)—Analysis of International Trade. The balance of payments and its analysis; determination of international payments equilibrium; analysis of world trade in merchandise; patterns of world trade; the computation and analysis of the terms of trade. Prereq: Economics 527, Diplomacy and International Commerce 601. (3) (Wasserman)

Diplomacy and International Commerce 603—Balances of Payment; construction and analysis. A study of the balances of payments as tools used in the analysis of international economics. Prereq: Economics 527, Diplomacy 520 and 521, or permission of instructor. (3) (Wasserman)

Economics 107(7a)—Principles of Accounting (3)

Economics 108(7b)—Principles of Accounting (3)

Economics 503(103—Transportation (3)

Economics 505(105)—Money and Banking (3)

Economics 515(115)—Intermediate Economic Analysis (3)

Economic 516(110)—Business Cycles (3)
Economics 527(127)—International Economics (3)
Economics 534(134)—Advanced Economic History of the United States (3)
Economics 565(165)—Comparative Economic Systems (3)
Economics 603(203)—History of Economic Thought (3)
Economics 604(204)—Survey of Economic Theory Since the Austrian School (3)
Economics 611(211)—Advanced Money and Banking (3)
Economics 618(218a)—Economic Theory (3)
Economics 619(218b)—Economic Theory (3)
Geography 538(112)—Conservation of Natural Resources (3)
Sociology 561(107)—Comparative Sociology (3)

V. Area Studies

ASIA

Diplomacy and International Commerce 540(167)—Governments and Politics of South Asia. (See III above)
Geography 528(104)—Regional Geography of Asia (3)
Geography 534(105)—Regional Geography of Australia and the Pacific Islands (3)
History 595(190a)—The Far East to 1900 (3)
History 596 (190b)—The Far East Since 1900 (3)
Political Science 568(168)—The Governments and Politics of Eastern Asia (3)

LATIN AMERICA

Geography 524(102)—Regional Geography of Latin America (3)
History 508(106a)—Colonial Latin America (3)
History 509(106b)—Latin American Republics (3)
Political Science 501(101)—Latin American Relations (3)

EUROPE

Diplomacy and International Commerce 541(169)—The Soviet Union in World Affairs (See I above)
Geography 526(103)—Regional Geography of Europe (3)
History 581(119b)—Europe, 1814-1870 (3)
History 582(119c)—Europe, 1870-1918 (3)
History 583(120)—Europe Since 1919 (3)
History 584—Russian Revolutions and the Soviet System, I (3)
History 587—Russian Revolutions and the Soviet Systems, II (3)
History 589—History of Russian Social and Political Thought, 1789-1914 (3)
History 591—Political and Diplomatic History of East Central Europe from the French Revolution to the End of World War I (3)
History 594—Political and Diplomatic History of East Central Europe Since World War I (3)
Political Science 555(155a)—Comparative Government (3)
Political Science 556(155b)—Comparative Government (3)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

DRAMATIC ARTS *(See English)*

DEPARTMENT OF ENGLISH, SPEECH, AND DRAMATIC ARTS

The Department of English, Speech, and Dramatic Arts requires as a prerequisite for the master's degree attainment in English equivalent to that required of an undergraduate English major at the University of Kentucky. For the master's degree, a minimum of twenty-four semester hours of English and closely allied subjects must be offered, including the introductory Bibliographical Studies. A maximum of six of these twenty-four semester hours may be taken in other subjects, provided these courses have the approval of the Graduate Committee of the Department of English. All candidates for the master's degree in English will be required to attain a reading knowledge of one modern foreign language (ordinarily French or German) before receiving the degree.

The Department offers the master's degree according to both Plan A and Plan B. (See pages 16-18.)

Applicants for the doctor's degree are required to complete at least two years of residence work beyond the M.A. The applicant's program must include, among other courses, a minimum of six hours in American literature and a total of six hours in Old English and Linguistics. A knowledge of French and German is required of all applicants. For requirements concerning the qualifying examinations, the final examination, and the dissertation, see the discussion of these elsewhere in this bulletin or consult the Department.

501(117a)—FICTION WORKSHOP. Chief attention is directed to the short story, but time is also given to the novel. Manuscripts are analyzed, but primary attention is given to the theory and convention of fiction writing. *Prereq: consent of instructor.* (2)

502(117b)—FICTION WORKSHOP. Emphasis on application of fictional techniques in student writing. Designed to bring about a fuller understanding of the conventions set forth in 501 and to bring practice closer to theory. *Prereq: consent of instructor.* (2)

504(172)—WRITING THE ONE-ACT PLAY. This course is designed for those students interested in creative drama. The completion of at least one one-act play is required during the semester. (3) (Robinson)

505(174)—WRITING THE FULL-LENGTH PLAY. The writing of a full-length play is required during the semester. (3) (Robinson)

509(180)—COMPOSITION FOR TEACHERS. The basic studies helpful to high school teachers of composition. The teaching of grammar, punctuation, usage, etc., and of theme planning, correction, and revision. Students are required to do quite a bit of writing. (3) (Crabb, Hatch)

510(102)—MODERN BRITISH AND AMERICAN ENGLISH. A survey of modern British and American English with respect to pronunciation, syntax, spelling, and usage. Historical developments will be examined insofar as doing so sheds light on modern practice. (3) (Cutler)

512(101)—GRAMMAR OF STRUCTURE AND USAGE. Descriptive grammar for advanced students. Analysis of sentence structure; consideration of standards of usage; investigation of current practice. (3) (Faust)

515(185b)—DESCRIPTIVE LINGUISTICS: PHONEMICS. An investigation of speech-sounds and systems of speech-sounds. Also attention to both speech and writing as communication systems. (Same as Anthropology 515.) Prereq: *Consent of instructor.* (3) (Faust)

516(185a)—DESCRIPTIVE LINGUISTICS: MORPHEMICS. An explanation of some of the ways speech sounds are put together in patterns so as to form languages. (Same as Anthropology 516.) *Prereq: English* 515. (3) (Faust)

520(105)—CHAUCER. Extensive readings in the principal works of Chaucer, with particular attention to *The Canterbury Tales* and *Troilus and Criseyde.* (3) (Moore, Cutler)

522(124a)—ENGLISH LITERATURE: 1500-1600. Literature of the Elizabethan period exclusive of the drama. Foreign sources of the English Renaissance. Major writers such as More, Ascham, Wyatt, Sidney, Spenser, Raleigh, and Marlowe. (3) (Stroup, Evans)

523(124b)—ENGLISH LITERATURE: 1600-1660. Selected non-dramatic works of such writers as Bacon, Donne, Ben Jonson, George Herbert, Izaak Walton, Herrick, Sir Thomas Browne, Vaughan, Traherne, and Milton (3) (Stroup, Evans)

524(109)—PRE-SHAKESPEAREAN DRAMA. A course in English origins, beginning with the Quem Quaeritis Trope and extending through the works of the early Elizabethans. (3) (Stroup)

525(145)—ELIZABETHAN DRAMA, EXCLUSIVE OF SHAKESPEARE. A survey of English drama from the early Elizabethans until the closing of the theatres. (3) (Stroup)

526(110a)—SHAKESPEARE: THE COMEDIES. Shakespeare's comedies will be studied in detail. (3) (Black, Evans, Rickey)

527(110b)—SHAKESPEARE: THE TRAGEDIES. Shakespeare's tragedies will be studied in detail. (3) (Black, Evans)

528(104)—MILTON. A study of all of Milton's poetry and of his more important prose; readings from contemporary thinkers; studies in thought currents of the time and Milton's relation to them. (3) (Stroup)

530(152)—AGE OF POPE. Addison and Steele, Swift, Pope, Defoe, and other contemporary figures. (3) (Cooke)

531(147)—AGE OF JOHNSON. Johnson and his circle; Burke, Goldsmith, Gray, Walpole, Cowper. The Pre-Romantic movement. (3) (Cooke)

532(153)—RESTORATION AND EIGHTEENTH-CENTURY DRAMA. A study of the dramatic types that arose between the closing of the theatres in 1642 and the death of Sheridan. (3) (Cooke)

533(111a)—EIGHTEENTH-CENTURY BRITISH NOVEL. Study of the novel from its beginnings in English literature through the eighteenth century. (3) (Cooke)

535(106a)—ENGLISH ROMANTIC POETRY. The philosophical, critical, social, and political backgrounds of romanticism are examined. The emphasis is on Wordsworth, Coleridge, Byron, Shelley, and Keats. (3) (Ward)

536(106b)—ENGLISH ROMANTIC PROSE. The emphasis is on the essays and critical prose of Lamb, Hazlitt, and DeQuincey; the critical prose of Wordsworth, Coleridge, and Shelley; and the letters of Keats. (3) (Ward)

538—VICTORIAN LITERATURE: 1830-1860. Poets and essayists—Macaulay, Mill, Carlyle, Newman, Tennyson, Mrs. Browning, Browning, Ruskin, and Arnold—in their historical setting. (3) (Shine, Axton)

539—VICTORIAN LITERATURE: 1860-1900. Poets and essayists—Rossetti, Swinburne, Meredith, Huxley, Pater, Wilde, Davidson, Henley, Stevenson, Housman, Hardy, Kipling, and some others—in their historical setting. (3) (Shine, Axton)

540(111b)—NINETEENTH-CENTURY BRITISH NOVEL. Study of the novel in English literature from Jane Austen through Thomas Hardy. (3) (Axton)

541(156b)—TWENTIETH-CENTURY BRITISH NOVEL. A study of the content and technique of the best twentieth-century British novels, with some consideration of these in relation to significant social, philosophical, and literary trends. (3) (Evans)

542(155b)—TWENTIETH-CENTURY BRITISH POETRY. Close study of major British poetry of the twentieth century, with attention to literary movements and critical theory. (3) (Moore)

551(123a)—AMERICAN LITERATURE BEFORE 1860. A survey of the development of American life, thought, and letters from the beginnings to 1860. (3) (Jacobs, Westbrook, White)

552(123b)—AMERICAN LITERATURE AFTER 1860. A survey of the development of American life, thought, and letters from 1860 to the present. (3) (Jacobs, Westbrook, White)

554(113)—AMERICAN NOVEL BEFORE 1900. Study of the American novel from the beginnings to Henry James. (3) (White)

555(156a)—MODERN AMERICAN NOVEL. Novels chosen for their enduring value rather than historical importance. Attention to shifting techniques of fiction and to contrasting interpretation of the American scene. (3) (Jacobs, Westbrook)

556(155a)—MODERN AMERICAN POETRY. Examination of the forces which brought about the revolutionary changes in technique and idea in twentieth-century poetry; study of the major American poets from 1890 to the present. (3) (Jacobs)

560(130a)—COMPARATIVE LITERATURE I. A study of Western World literature. From Homer to Montaigne. (3) (Brady)

561(130b)—COMPARATIVE LITERATURE II. A study of Western World literature. From Montaigne to Anatole France. (3) (Brady)

563(116)—MODERN DRAMA. Continental, British, and American dramatic literature from Ibsen to the present. (3) (Adler)

565(165)—THE LYRIC IN ENGLISH. A critical examination of selected lyrics from the Middle Ages to the present. (3) (Moore)

568(108a)—HISTORY OF LITERARY CRITICISM I. Literary criticism in the Western World from Plato through the eighteenth century. Application of critical principles to literary works. (3) (Adler)

569(108b)—HISTORY OF LITERARY CRITICISM II. Literary criticism in Europe and America from Wordsworth to the present. Application of critical principles to literary works. (3) (Adler)

570(127a)—LITERATURE OF THE OLD TESTAMENT. Critical analysis of the canonical and apocryphal Old Testament in English, with particular attention to Biblical ideas and symbols helpful to students of literature. (3) (Jansen)

571(127b)—LITERATURE OF THE NEW TESTAMENT. Critical analysis of the canonical and apocryphal New Testament in English, with particular attention to Biblical ideas and symbols helpful to students of literature. (3) (Rickey)

573(148)—GENERAL INTRODUCTION TO FOLKLORE. An introduction—on a world-wide scope— to the types of folklore. Emphasis upon folklore as a cultural phenomenon in its own right and upon its relations to literary types. The development of the science of folklore. (3) (Jansen)

574(149)—AMERICAN FOLKLORE. A study of the major materials in American folklore. The use of this material in other forms. Experience in actual collecting and in the cataloging of materials. (3) (Jansen)

580(146a)—DISCUSSION. The essentials of discussion, with emphasis upon the thinking process as it operates in group situations. Participation in the various forms of discussion. (3) (Blyton, Patterson)

581(146b)—ADVANCED DISCUSSION. An intensive study of discussion as democracy in action. Ample time devoted to practice discussions. (3) (Blyton)

582(159)—PERSUASION. The principles and methods of persuasion. Of particular benefit to teachers, lawyers, business majors, and other persons whose work is concerned with motivating human conduct. (3) (Blyton, Patterson)

583(158)—ADVANCED ARGUMENTATION AND DEBATE. The function of argumentation and debate in a democracy, plus a much more detailed and critical examination of logic and argument than in English 283. (3) (Blyton)

584(157)—TEACHING OF SPEECH. An analysis of the field of speech education as related to the teacher of speech. (3) (Blyton, Patterson)

588(138)—ORAL INTERPRETATION OF DRAMA. The cutting and adapting of the three-act play for oral presentation. (3) (Sterrett)

589(164)—SPEECH COMPOSITION. A study of speech structure and its characteristic oral style. Both the analysis of contemporary speeches and the preparation of speech manuscripts. (3) (Sterrett)

590(160)—ACTING. Development of skill and grace in the use of the body. Attention to establishing mood, reactions between characters, suspense through voice modulations, pause and other modes of emphasis, projecting voice and characterization. (3) (Briggs)

591(161)—THEATRE DIRECTING. Study of movement, interpretation of lines, creation of atmosphere, use of stage areas, use of levels, methods of achieving a climax, handling of groups, planning of mob scenes. (3) (Briggs)

592(162)—THEATRE PRODUCTION. Application of modern aesthetic principles and theories of the theatre. Attention to coordination of the playwright, designer, technical director, electrician, stage manager, actor. (3) (Smith)

593(163)—SCENIC DESIGN. A study of form, line, and color as applied to the stage. Practical work in building model sets and in the application of these models to the major production. (3) (Smith)

596(134)—HISTORY OF THE STAGE. Designed to give the student a knowledge of the problems of staging from ancient to modern times. Theatre and stage architecture, scenic effects, costuming, and acting styles of all major periods are discussed and their relation to dramatic literature analyzed. (3) (Dickens)

597(137)—SURVEY OF THEATRE PRINCIPLES. A course designed to introduce teachers and community theatre workers to the problems of staging under circumscribed conditions; minimum essentials of play production and the means of supplying these needs. (3) (Briggs)

600—BIBLIOGRAPHICAL STUDIES. An introduction to graduate work, with particular attention to the monuments of literary scholarship, reference works, and use of the library. The preparation of an extensive bibliography is required. Must be taken by all candidates for the M.A. in English. (3) (Ward)

610(203)—OLD ENGLISH. Introduction to Old English language and literature. (3) (Moore)

611(212a)—BEOWULF. Chiefly a study of *Beowulf*, though with some reference to allied literature and the Germanic background. (3) (Moore)

612(204)—HISTORY OF THE ENGLISH LANGUAGE. A survey tracing the development of modern standard English from its Indo-European origin. Emphasis will be placed on the history of sounds, inflections, and vocabulary and on varying concepts of "correctness." (3) (Cutler)

620(205)—MIDDLE ENGLISH LITERATURE. Survey of Middle English literature, exclusive of Chaucer, with collateral reading of non-English monuments in English translation. (3) (Moore)

622(224a-b)—STUDIES IN ENGLISH LITERATURES: 1500-1600. Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole. (4) (Stroup)

623(224c-d)—STUDIES IN ENGLISH LITERATURE: 1600-1660. Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole. (4) (Stroup)

630(213a-b)—STUDIES IN ENGLISH LITERATURE: 1660-1720. Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole. (4) (Cooke)

631(213c-d)—STUDIES IN ENGLISH LITERATURE: 1720-1780. Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole. (4) (Cooke)

635(206a-d)—STUDIES IN ENGLISH LITERATURE: 1780-1830. Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole. (4) (Ward)
May be repeated to a maximum of eight credits.

638(214a-b)—STUDIES IN ENGLISH LITERATURE: 1830-1860. Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole. (4) (Shine)

639(214c-d)—STUDIES IN ENGLISH LITERATURE: 1860-1900. Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole. (4) (Shine)

651(216a-b)—STUDIES IN AMERICAN LITERATURE BEFORE 1860. Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole. (4) (Jacobs)

652(216c-d)—STUDIES IN AMERICAN LITERATURE SINCE 1860. Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole. (4) (Jacobs)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE.
(1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.
(1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

770—SEMINAR IN ENGLISH LITERATURE. Intensive study and research centering upon such subjects as the following: a particular author or group of authors, a literary *genre*, a literary movement, a restricted period of time. (3) (Graduate Staff)
May be repeated to a maximum of twelve credits.

772(217a-d)—SEMINAR IN AMERICAN LITERATURE. Intensive study and research centering upon such subjects as the following: a particular author or group of authors, a literary *genre*, a literary movement, a restricted period of time.
(3) (Graduate Staff)
May be repeated to a maximum of six credits.

774—SEMINAR IN COMPARATIVE LITERATURE. Intensive study and research centering upon the relationship between English or American literature and that of some other country. (3) (Graduate Staff)
May be repeated to a maximum of six credits.

780(131a-d)—DIRECTED STUDIES. Independent work devoted to study and research on specific subjects and problems according to the interests and needs of individual students. (3) (Graduate Staff)
May be repeated to a maximum of nine credits.

782(247b)—SPECIAL TOPICS IN SPEECH. Study and research on specific topics and problems according to the interests and needs of individual students. Normally offered as an independent work course. (3) (Staff)

784(247a)—SPECIAL TOPICS IN DRAMATIC ARTS. Study and research on specific topics and problems according to the interests and needs of individual students. Normally offered as an independent work course. (3) (Staff)

FRENCH *(See Modern Foreign Languages)*

GEOGRAPHY

520(100)—REGIONAL GEOGRAPHY OF ANGLO-AMERICA. A regional study of the physical, economic, and cultural characteristics of the various areas of the United States, Canada, and Alaska. *Prereq: one geography course.* (2) I, S (Withington)

522(101)—GEOGRAPHY OF KENTUCKY. A study of how the people of Kentucky adjust themselves to the location, surface, climate, and other natural resources of their state. *Prereq: one geography course.* (2) II, S (Schwendeman)

524(102)—REGIONAL GEOGRAPHY OF LATIN AMERICA. Study of the countries and geographic regions of Mexico, Central America, and South America. *Prereq: one geography course or permission of instructor.* (2) I (Schwendeman)

526(103)—REGIONAL GEOGRAPHY OF EUROPE. A study of Western Europe's major geographic regions, climate, soil, terrain, mineral, and biotic factors. Population problems, economic adjustments, and political significance of resources. *Prereq: one geography course or permission of instructor.* (2) II (Karan)

528(104)—REGIONAL GEOGRAPHY OF ASIA. A regional study of the countries of Asia including European U.S.S.R., China, Japan, and India. Role of the Orient in the international landscape. *Prereq: one geography course or permission of instructor.*
(2) I (Karan, Withington)

530(130a,b)—INTERMEDIATE FIELD STUDIES. An intensive study of a particular geographic area with emphasis on such specific skills as recording data for map composition and report, and filling in a base map. *Prereq: Geography* 151 *and* 547 *or* 548 *for Geography students, or permission of instructor for students offering field experience in allied subjects such as Geology.* (3) S (Staff)
May be repeated to a maximum of six credits.

534(105)—REGIONAL GEOGRAPHY OF AUSTRALIA AND THE PACIFIC ISLANDS. A study made of the geographic problems and adjustments of the peoples and countries of the Pacific area. *Prereq: one geography course or permission of instructor.*
(2) II (Field)

536(106)—REGIONAL GEOGRAPHY OF AFRICA. A study of Africa as a complete continent and not as an example of European imperialist policy; as a series of geographic regions. *Prereq: one geography course or permission of instructor.* (2) II (Field)

538(112)—CONSERVATION OF NATURAL RESOURCES. A general study of the needs for and problems of conserving the natural resources including the development of the conservation movement and resource use. *Prereq: Geography* 155 *or permission of instructor.* (2) II (McElhoe, Withington)

540(114)—GEOGRAPHY OF URBAN AREAS. A study of the location and growth of cities and urban communities in relation to environmental factors. *Prereq: Geography* 155 *or permission of instructor.* (2) II (McElhoe, Withington)

542(140)—GEOGRAPHICAL FOUNDATION OF WORLD POWER. The influence of such factors as location, size, form, surface, climate, and natural resources, on the rise and fall of nations. Consideration given to geopolitics. *Prereq: one geography course or permission of instructor.* (2) I (Schwendeman)

521, 523, 525, 527, 529, 535, 537, 539, 541, 543 (133a-k)—SPECIAL PROBLEMS. Students registered in any two-credit upper division course in geography may earn a third credit in this course by registering for the special problems course related to the two-credit course. (A Special Problems course can be elected only by students regularly or previously enrolled in an upper division two-credit course.) (1 ea.) I, II, S (Staff)

544(120)—CLIMATOLOGY. A study of the elements and controls of climate and of world climatic patterns. *Prereq: Geography* 151, *Elements, or permission of instructor.* (3) II (Karan)

545(132a-d)—INDEPENDENT WORK IN GEOGRAPHY. Individual research involving such problems as: (a) materials and methods in teaching geography; (b) the historical evolution of geography; (c) map reading and interpretation; (d) special areas studies; (e) other topics may be elected by consent of instructor. *Prereq: Major and a standing of* 3.0 *in the department.* (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

547(134)—CARTOGRAPHY. A course in the construction and interpretation of maps. (3) I (Field)

548(136)—APPLIED CARTOGRAPHY. Map compilation techniques as directed by Army Map Service specifications. Enrollment by permission. (3) II (Field)

650(200a,b)—REGIONAL STUDY OF SPECIAL AREAS. The application of the methods of regional interpretation to special areas such as the U.S.S.R., Mediterranean Basin, Caribbean Region, Mexico, Central Europe, etc. *Prereq: A prior major or minor in Geography.* (3) (Staff)
May be repeated to a maximum of six credits.

660(230a,b)—ADVANCED FIELD STUDIES. Advanced field study and preparation of a report which shall include both manuscript and graphic material. *Prereq: Geography* 151, 547 *or* 548, *and* 530 *for Geography students, or permission of instructor for students* offering field experience in allied subjects such as Geology. (3) (Staff)
May be repeated to a maximum of six credits.

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

770(250)—SEMINAR—DEVELOPMENT OF GEOGRAPHIC THOUGHT. This course will consist of a series of topics selected in order to acquaint the graduate students of geography or related subjects with the basic literature and evolution of the broad field of geography. (3) II (Staff)

GEOLOGY

400(120)—GEOLOGY OF KENTUCKY. A study of the geological features of the state. These include the major events in its geological history, the development of regional characteristics, an explanation of its scenic and natural wonders, and its mineral resources. (3) (McFarlan)

500(101a)—PALEONTOLOGY. A study of fossil invertebrates, their nature, classification, and geological distribution. One lecture, four hours laboratory per week. *Prereq: Geology* 210, 211; *and general zoology or background in zoology.* (3) I (Campbell, McFarlan)

501(101b)—PALEONTOLOGY. The study of geological faunas. Practice in determining stratigraphic horizons. One lecture, four hours laboratory per week. *Prereq: Geology* 500. (3) II (McFarlan, Campbell)

502(112)—ECONOMIC GEOLOGY. Mineral deposits other than petroleum and natural gas. Distribution, mode of occurrence, origin, methods of search for, and uses. *Prereq: Geology* 210, 211, 212, 213. (4) (Brown)

503(127)—PETROLEUM GEOLOGY. The origin and accumulation of petroleum and natural gas. A study of geological methods used in exploratory work. Geology of the principal producing fields. *Prereq: Geology* 210, 11; *and general elementary physics.*
(2) (Roberts)

504(129)—ELEMENTARY PETROLOGY. A megascopic study of the common rocks with emphasis on the sedimentary rocks. (3) (Fisher)

505(130)—ELEMENTARY STRUCTURAL GEOLOGY. An introduction to earth structures. Advanced geological map interpretation. (3) (Nelson)

506(135)—ADVANCED PRINCIPLES OF GEOLOGY. A general study of geological processes. Lecture, three hours; lab, one hour conference. *Prereq: Restricted to senior major students in geology or by permission of the instructor.* (4) (Fisher)

520,521(107a,b)—ADVANCED FIELD GEOLOGY. A field course in geological mapping involving problems of local structure and stratigraphy. Six hours a week in the field. *Prereq: Geology* 220. (2 ea.) I, II (McFarlan)

522,523(107c,d)—ADVANCED FIELD GEOLOGY. A field course in geological mapping involving problems of local structure and stratigraphy. Six hours a week in the field. *Prereq: Geology* 220. (2 ea.) I, II (McFarlan)

524,525(118a,b)—FIELD WORK IN REGIONAL GEOLOGY. Eight weeks in the field in Colorado. The course is an effort to bring the student into contact with diverse geological phenomena and problems. Geological field methods. See special announcement. Required of major students. *Prereq: Geology* 210, 211. (7 ea.) S (McFarlan, Lyons)

526,527(119a,b)—REPORT ON FIELD WORK IN REGIONAL GEOLOGY, 524.
(1 ea.) (McFarlan, Lyons)

530,531(126a,b)—SEMINAR. (1 ea.)

532(105a-d)—INDEPENDENT WORK IN GEOLOGY. Directed work in independent investigations. Thesis required. (8)
May be repeated to a maximum of twelve credits.

600(208)—STRUCTURAL GEOLOGY. A study of the structural features of the earth's crust with an analysis of the mechanics involved. Three lectures and recitations, or two lectures and one laboratory per week. *Prereq: Physics* 211, 213, *Geology* 505 *and* 506.
(3) (Nelson)

601(210a)—STRATIGRAPHY. Regional Stratigraphy. Succession of faunas and the use of fossils for stratigraphic correlation. Lecture, two hours; laboratory, two hours.
(3) I (McFarlan)

602(210b)—STRATIGRAPHY. A continuation of 601. Lecture, two hours; laboratory, two hours. (3) II (McFarlan)

603(212a)—OPTICAL MINERALOGY. A study of the optical properties of minerals, in thin sections by means of the petrographic microscope. One lecture, four hours laboratory per week. *Prereq: Geology* 212, 213 *and Physics* 211, 213. (3) (Brown)

604(212b)—SEDIMENTARY PETROLOGY. The classification and interpretation of sedimentary rocks with emphasis on those aspects which relate to the occurrence of petroleum. (3) (Roberts)

605(212c)—PETROLOGY OF THE IGNEOUS ROCKS. The occurrence, origin and classification of igneous rocks. Identification with the petrographic microscope. An introduction to the metamorphic rocks. One lecture, four hours laboratory per week. *Prereq: Geology* 603. (3) (Brown)

606(213)—ADVANCED ECONOMIC GEOLOGY. Lecture, two hours; laboratory, two hours. *Prereq: Geology* 502. (3) (Nelson)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE.
(1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

770(217a-d)—SEMINAR. (1)
May be repeated to a maximum of four credits.

GERMAN *(See Modern Foreign Languages)*

GREEK *(See Ancient Languages)*

HISTORY

The Master's Degree with a Major in History

Students should submit evidence of good undergraduate preparation in the specific subject in which they propose to take the degree. In general, sixteen semester hours in history will suffice.

Unity of purpose and coherence in planning the program are essential. At least one course should be of the seminar type, with some training in methods of graduate study.

Of the total number of hours, two-thirds will be required in history when a minor is offered in addition to the thesis.

An acceptable thesis which conforms to sound rules of historical research is required of every candidate. This thesis should indicate knowledge of sources, synthesis and bibliography. An examination will include courses, thesis topic, and generally related materials.

The Doctorate with a Major in History

Those who seek the doctorate in history should follow carefully the general directions governing the subjects of residence and courses as stated in the first part of this Bulletin.

The *applicant* does not become a candidate until he has satisfied the language requirements, passed the qualifying examinations and has been approved by the Graduate School.

All further work for the doctorate in history is under the direction of a committee composed of members of the staffs of the candidate's major and minor departments appointed by the Dean of the Graduate School. The chairman will be the major professor under whose direction the candidate expects to write his dissertation. The student should consult this person at his earliest convenience. This committee with the student will outline his course of study, advise with him throughout his residence, conduct the comprehensive examination, and generally supervise the writing of his dissertation.

The candidate must submit to examinations in five fields in at least three areas of history, and he must offer two fields from the area of his major interest.

Area I. European History
- a. Ancient and Medieval
- b. Europe to 1789
- c. Europe since 1789

Area II. British History
- a. the history of England
- b. the British empire

Area III. American History
- a. American history to 1865
- b. American history since 1865

Area IV. Oriental History
- a. the Far East
- b. the Near East

Area V. Latin America

Area VI. Minor Subjects

I. American History

500,501(100a,b)—THE DIPLOMACY AND FOREIGN POLICY OF THE UNITED STATES TO 1898. A survey designed to acquaint the student with the principles of American foreign policy. *Prereq: History* 108, *or equivalent.* (3 ea.) (Hopkins)

505(105a)—COLONIAL AMERICA. A study of the foundation of the English colonies; their political, social, and economic development; extension of their frontiers, inter-colonial wars, and external relations. *Prereq: one year of American or European history.* (3) (Gilliam)

506(105b)—THE AMERICAN REVOLUTION AND THE CONSTITUTION, 1763-1800. *Prereq: one year of American or European history.* (3) (Taylor)

508(106a)—COLONIAL LATIN AMERICA. A survey of the founding and development of the Latin American Colonies and their struggle for independence. (3) (Staff)

509(106b)—LATIN AMERICAN REPUBLICS. This course will involve a study of the political, economic and social institutions, and problems of the Latin American Republics from attainment of independence to the present. (3) (Staff)

524(124a)—SOCIAL AND CULTURAL HISTORY OF THE UNITED STATES TO 1865. This course deals with changing phases of social and cultural life in America. (3) (Nagel, Eaton)

525(124b)—SOCIAL AND CULTURAL HISTORY OF THE UNITED STATES SINCE 1865. This course is a continuation of 524. (3) (Nagel, Eaton)

532(132)—HISTORY OF AMERICAN AGRICULTURE. A survey of American agricultural history from 1800 to 1941. (3) (Wall, Hopkins)

540(140a-d)—INDEPENDENT WORK. Under special conditions selected students may investigate special problems, with weekly reports to the instructor. (2) (Staff)

545(141)—TUTORIAL READING. (1) (Staff)

546(146a)—THE MIDDLE PERIOD OF AMERICAN HISTORY, 1800-1950. A study of powerful personalities and pivotal events during this period: presidential influence of Jefferson; War of 1812; the impact of Marshall and Jackson; sectional differences and similarities; Mexican War, Compromise of 1850. Emphasis is placed on national growth, party battles, social cleavage, and industrial change. *Prereq: History* 105, 109. (3) (Hamilton)

547(146b)—THE CIVIL WAR AND RECONSTRUCTION, 1850-1877. An intensive study of constitutional theories as a background for secession. The political, social and constitutional history of the Confederacy and the Reconstruction of the Southern States. *Prereq: History* 109 *or equivalent.* (3) (Eaton, Kirwan)

548(146c)—RECENT HISTORY OF THE UNITED STATES, 1877-1920. American history from the end of reconstruction to the turn of the century. (3) (Hamilton, Wall)

549(147)—RECENT HISTORY OF THE UNITED STATES, 1920 TO THE PRESENT. An intensive study of the principal movements and episodes in the history of the people of the United States from 1920 to the present. *Prereq: one year of American history.* (3) (Clark, Wall)

551(151a)—THE AMERICAN FRONTIER. A course dealing specifically with American expansion westward from the original colonies. *Prereq: History* 108, 109 *or equivalents.* (3) (Clark, Eaton)

552(151b)—THE AMERICAN FRONTIER. A continuation of 551. It will consider the Trans-Mississippi West. *Prereq: as for History* 551. (3) (Clark, Eaton)

555(180a)—HISTORY OF THE OLD SOUTH. A study of the colonial beginnings and expansion of southern life, economics, and society. *Prereq: History* 108 *or equivalent.* (3) (Eaton, Wall)

556(180b)—HISTORY OF THE NEW SOUTH. The evolution of southern life and society, agrarian politics, relationships with other sections, industrial growth, and new leadership. *Prereq: History* 555. (3) (Clark)

II. England and the British Empire

561(131a)—ENGLISH CONSTITUTIONAL HISTORY TO 1603. A study of the backgrounds of the English constitution; the Anglo Saxon contribution; the Norman conquest and development of governmental and legal institutions. (3) (Cone)

562(131b)—ENGLISH CONSTITUTIONAL HISTORY SINCE 1603. A continuation of 131a. The constitutional struggle between the Stuart kings and Parliament; triumph of constitutional monarchy; rise of the Cabinet; effect of the spread of democracy in recent times. (3) (Cone)

564(134)—HISTORY OF CANADA. A brief survey of Canada under the French; increasing emphasis on the development of Canada under British control; evolution of the Dominion; relation with the United States and British Commonwealth of Nations. *Prereq: one year of college history.* (3) (Cone)

565(135a)—THE BRITISH EMPIRE TO 1860. Review of the various elements affecting Great Britain and its Empire between 1783 and 1860. (3) (Cone)

566(135b)—THE BRITISH EMPIRE AND COMMONWEALTH. A continuation of 135a. Great Britain and the growth of the Dominions and the Commonwealth since 1860. (3) (Cone)

568(138)—BRITISH SOCIAL HISTORY DURING THE TUDOR PERIOD, 1485-1603. A study of British life, manners, and customs in town and country. Particular emphasis will be placed upon the age of Elizabeth, with political events subordinated to social changes. Lectures, discussion and reports. (3) (Cone)

569(139)—BRITISH HISTORY SINCE 1815. A detailed study of Britain's political, social, diplomatic and industrial development during the modern period. Special consideration will be given the part played by Britain in World War I and World War II and to her position in the contemporary world. (3) (Cone)

III. European History

570(110a)—EARLY MIDDLE AGES. The political, economic and cultural aspects of medieval development from the fourth to the twelfth centuries. (3) (Lunde, Claster)

571(110b)—LATER MIDDLE AGES. Emphasis will be placed on the significant political and intellectual developments of the "High Middle Ages" through the "Later Middle Ages." (3) (Lunde, Claster)

572(111)—MEDIEVAL CIVILIZATION. A topical study of the main currents of medieval social and cultural life. The chief emphasis will be placed on the "High Middle Ages" of the twelfth and thirteenth centuries. (3) (Claster)

573—HISTORY OF CLASSICAL GREECE. The first semester will cover the major political, economic, social, and intellectual developments in Greece from the Persian Wars to the close of the war between Athens and Sparta. Emphasis will be placed on the reading of primary source material in translation. (3) (Claster)

574—FOURTH CENTURY GREECE. The second semester will trace the intellectual and social developments of Greece in the fourth century; the decline of the city-state system, and the rise of Macedon. The semester will end with the conquests of Alexander the Great. *Prereq: History* 573 *or consent of the instructor.* (3) (Claster)

575(115)—THE RENAISSANCE AND REFORMATION. The course is designed for a study of the birth of modern spirit and institutions. *Prereq:* 104. (3) (McCloy)

576—THE ROMAN REPUBLIC FROM 133 B.C. to 27 B.C. The first semester will stress the effects of Rome's political expansion on her republican institutions, and the history of the Roman Revolution. The use of ancient source materials (in translation) will be emphasized. (3) (Claster)

577—HISTORY OF THE ROMAN EMPIRE FROM 27 B.C. TO A.D. 117. The second semester will cover the founding of the Roman Empire by Caeser Augustus, the political history of the Empire through the reign of the Emporer Trojan, and the social and intellectual history of the Graeco-Roman world during the early Empire. *Prereq: History* 576 *or the consent of the instructor.* (3) (Claster)

578(118)—SOCIAL HISTORY OF EUROPE IN THE EIGHTEENTH CENTURY. A study of the life and manners of the people of Europe in the 1700's. Especial attention will be given to Western and Southern Europe. *Prereq: History* 104, *and* 105. (3) (McCloy)

580(119a)—THE FRENCH REVOLUTION AND NAPOLEON. A study of the period 1789-1815 in Europe, treating of the appearance and manifestation of the spirit of revolt. (3) (McCloy)

581(119b)—EUROPE, 1814-1870. Starting with the fall of Napoleon, this course treats the successive political changes in 1823, 1830, 1848 and 1870. (3) (Lunde, Kraehe)

582(119c)—EUROPE, 1870-1918. A balanced treatment of the political, social, cultural, economic, and intellectual life of Europe in the period indicated. Special emphasis placed on diplomatic and military developments leading to the first World War. (3) (Lunde, Kraehe)

583(120)—EUROPE SINCE 1919. A study of recent and contemporary movements, chiefly in Europe. (3) (Kraehe)

584—RUSSIAN REVOLUTIONS AND THE SOVIET SYSTEM, I. Study of the fundamental factors leading to the collapse of the monarchy, with emphasis upon the reforms and governmental policies, their shortcomings, and the pressures of discontent that generated revolutionary movements. *Prereq: History* 104-105 *or* 285-286. (3) I (Zyzniewski)

587—RUSSIAN REVOLUTIONS AND THE SOVIET SYSTEM, II. A continuation of 584, this course examines the ideological bases and *raison d'etre* of the Soviet state, before undertaking analyses of those conditions and policies which have molded the totalitarian system during the past four decades. *Prereq: History* 104-105 *or* 285-286. (3) II (Zyzniewski)

588(171)—THE AGE OF ABSOLUTISM. The development of the absolute state with special emphasis on France under Louis XIV; the evolution of Russia and Prussia as new European powers. *Prereq: History* 104 *or its equivalent.* (3) (Lunde)

589—History of Russian Social and Political Thought, 1789-1914. A study of the significant trends and concepts which evolved among the Russian intelligentsia is undertaken, with particular attention given to those ideas and doctrines which gave direction to revolutionary movements in Russia. *Prereq: History* 584 *and* 587, *or equivalent with consent of instructor.* (3) I (Zyzniewski)

590(179)—MODERN EUROPE. This course is offered to meet a demand for a broader course which will equip students who are going out to teach European history in the present high school curriculum. *Prereq: History* 104 *and* 105. (3) (Kraehe)

591—POLITICAL AND DIPLOMATIC HISTORY OF EAST CENTRAL EUROPE FROM THE FRENCH REVOLUTION TO THE END OF WORLD WAR I. A survey of the major factors and events which conditioned the political life and identity of the predominantly Slavic peoples inhabiting the region from Poland south to the Balkans, excluding the Eastern Slavs. *Prereq: History* 104-105, *or consent of instructor.* (3) I (Zyzniewski)

592(185a)—CULTURAL HISTORY OF SEVENTEENTH CENTURY EUROPE. A history of the development of culture in various fields. Intended, without serious duplication of the content of other courses, to furnish a background for further study in a number of directions. (3) (McCloy)

593(185b)—CULTURAL HISTORY OF EIGHTEENTH CENTURY EUROPE. This course is designed to give a survey of European cultures during the 1700's, treating the sciences, literature, history, philosophy, the fine arts, and the industrial arts. (3) (McCloy)

594—POLITICAL AND DIPLOMATIC HISTORY OF EAST CENTRAL EUROPE SINCE WORLD WAR I. A comparative study is made of the political institutions and policies of these states located in the north-south corridor stretching from the Baltic to the Aegean-Adriatic seas, their intra-regional relations and roles in European diplomacy. *Prereq: History* 104-105, *or consent of instructor.* (3) II (Zyzniewski)

IV. The Far East

595(190a)—THE FAR EAST TO 1900. The Portuguese, Dutch, French, and British colonial and trading empires in the Central East (India, Burma, Indo-China and the East Indies). *Prereq: History* 104 *or equivalent.* (3) (Chambliss)

596(190b)—THE FAR EAST SINCE 1900. The contacts of Europe and America with the Far East (China, Japan, Korea, and the Philippines) in the 19th and 20th centuries. *Prereq: History* 105 *or equivalent.* (3) (Chambliss)

Courses in the 600(200) Group

These courses are for graduate students. They are content courses presented by the lecture and discussion method and as such are distinct in character from the 600(300) group, which is concerned with problems and the practice of research.

600(280)—EUROPEAN HISTORIOGRAPHY. (3) (Kraehe, McCloy)

603(281)—AMERICAN HISTORIOGRAPHY. (3) (Clark, Eaton)

606(282)—HISTORICAL CRITICISM. Required of every entering graduate student. (3) (Staff)

Courses in the 600(300) Group

SEMINARS—Basically research in character. These are not content courses. They provide special training in historical research (collection and critical analysis of bibliography, note-taking and organization of materials, and the presentation of a properly documented courses.) Two class hours and 1 conference hour.

American Group

610(300a-d)—SEMINAR IN AMERICAN HISTORY. Topics will be chosen in keeping with the interest of the professors in charge. (3) (Staff)

640(342)—SEMINAR IN KENTUCKY HISTORY. The development of Kentucky as a Western commonwealth, with emphasis on economic and political phases from the 18th century to the present, with writing of papers based upon research among documents and other source materials. (3) (Clark)

European Group

620(320a-d)—SEMINAR IN MODERN EUROPEAN HISTORY. (3) (Staff)

630(331)—SEMINAR IN MODERN BRITISH HISTORY. (3) (Cone)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

HISTORY OF EDUCATION *(See Education—Foundations of)*

HYGIENE AND PUBLIC HEALTH

500(100a)—PUBLIC HEALTH. A consideration of environmental sanitation and its relationship to the control of preventable diseases. (3) I, S (Hamilton)

501(100b)—PUBLIC HEALTH. A survey of the various fields of public health; introduction to administration and organization of public health agencies. (3) II, S (Heinz)

510(110)—HEALTH EDUCATION. A course dealing primarily with principles of health education, health service, and health protection. (3) II, S (Heinz)

511(111a-f)—INDEPENDENT WORK IN HYGIENE AND PUBLIC HEALTH. (3) I, II, S (Staff)
May be repeated to a maximum of twelve credits.

515(115)—COMMUNICABLE DISEASES. A study of communicable diseases with reference to causal agents, transmission, and methods of control and prevention. *Prereq: Microbiology 200 or equivalent.* (3) II, S (Hamilton)

520(120a)—MENTAL HYGIENE. An introduction to mental hygiene including a consideration of the cause, treatment, and prevention of mental disorders. (3) I, II, S (Staff)

522(122)—SCHOOL AND COMMUNITY HEALTH. A study of the cooperative nature of school health service with regard to the community resources that may be utilized in health care. (2) I, S (Heinz)

550(150a)—PROBLEMS IN HEALTH EDUCATION. An individual problems course for majors in Public Health, teachers, and public health workers. (2) I, S (Staff)

552(150b)—PROBLEMS IN HEALTH EDUCATION. Individual problems of public health importance not covered or assigned in Hygiene 550. (2) II, S (Staff)

600(200)—EPIDEMIOLOGY. A survey of the principles and methods of epidemiology. (3) I, II, S (Hamilton)

603(203)—PUBLIC HEALTH RECORDS. A survey of the systems used in the registration, compilation, and preservation of public health records. (2) I, II, S (Heinz)

604(204)—MATERNAL AND CHILD HEALTH. A study of the principles of maternal, prenatal, infant and child care. (2) I, S (Staff)

612(212a)—PUBLIC HEALTH ADMINISTRATION. A consideration of the current organization and administrative practices of official and voluntary public health agencies. (3) I, S (Heinz)

613(212b)—PUBLIC HEALTH ADMINISTRATION. A continuation of Hygiene 612. (2) II, S (Heinz)

618(218a)—VITAL STATISTICS. Sources of statistical data; application of the statistics of population, births, deaths, etc. in Public Health. (3) I, S (Staff)

619(218b)—VITAL STATISTICS. A continuation of Hygiene 618. (2) II, S (Staff)

625(225a)—COUNTY HEALTH PRACTICE. (3) I, II, S (Staff)

626(225b)—COUNTY HEALTH PRACTICE. (2) I, II, S (Staff)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis

770(290)—SEMINAR. (1) I, II, S (Staff)

JOURNALISM

The following courses in the School of Journalism are open to properly qualified graduate students who may receive credit for them. No major programs in Journalism are offered for advanced degrees at present.

501(100)—NEWS REPORTING. A reporting course which emphasizes special fields of information, news gathering, and news evaluation. (3) I, II (Ritter)

503(101)—COPYREADING AND EDITING. Instruction and practice in newspaper deskwork. Preparation of local, state, telegraph, and features; picture editing, and page makeup. Lecture, one hour. *Prereq: Journalism* 501. (3) I, II (McCauley)

504—LABORATORY TO ACCOMPANY 503. Four hours. (0)

507(123)—FEATURE WRITING. Instruction and practice in writing features. Lectures, readings, and reports directed toward discovering, gathering, organizing, writing, and marketing feature articles. *Prereq: permission of School.* (3) I, II (Moore)

509(125)—MAGAZINE ARTICLE WRITING. Lectures, personal conferences and practice in writing and submitting material for publication in magazines; study of the markets for this material; free-lance article writing. *Prereq: permission of School.* (3) II, S (Moore)

511(107)—EDITORIAL WRITING. A study of editorials, editorial columns, and editorial pages. Publication of copy encouraged. *Prereq: Journalism* 203. (2) I, II (McCauley)

513(110)—SUPERVISION OF HIGH SCHOOL PUBLICATIONS. A study of the problems that confront the adviser of the high school newspaper or magazine. Open to advisers or prospective advisers with consent of the instructor. (3) S (Ashley, McCauley)

531(105)—LAW OF THE PRESS. A study of the special laws of libel, copyright, and regulatory provisions that pertain to the press. (2) II, S (Plummer)

533(106)—INFLUENCE OF THE NEWSPAPER. A course devoted to the examination of criticism of the modern press and an evaluation of the influence of the press in the twentieth century. *Prereq: permission of School.* (3) I, II, S (Moore)

535(108)—HISTORY OF JOURNALISM. A study of the rise and development of American journalism and newspapers. *Prereq: permission of School.* (3) II (Ritter)

537(120)—SEMINAR IN PUBLIC OPINION. A detailed examination of techniques developed and used by the press in influencing public opinion. Specific cases studied. *Prereq: permission of School.* (3) (Moore, Plummer)

539(127)—REPORTING PUBLIC AFFAIRS. Instruction and practice in reporting the news originating in courts and other public institutions. *Prereq: Journalism* 501 and *permission of School.* (3) II (McCauley)

541(118)—PUBLIC RELATIONS. Lectures and practice dealing with the aims and methods of writing news and special articles for public relations programs of business, schools, colleges, libraries, and of the social service organizations. (3) II, S (McCauley)

561(114)—NEWSPAPER AND MAGAZINE ADVERTISING. Relation of newspapers and magazines with advertisers, with emphasis upon the preparation of local display and national advertising. (3) I, II

563(115)—ADVERTISING TYPOGRAPHY AND LAYOUT. A study of the principles of typographic families and illustrations and decorations that pertain to layout in modern advertising. Practical work with merchants included in the latter part of the course. Lecture, two hours. (3) II

564—LABORATORY TO ACCOMPANY 563. Four hours. (0)

571(102)—COMMUNITY JOURNALISM. A study of the problems which confront the community weekly and the small city daily. (3) I, S

573(103)—NEWSPAPER ADMINISTRATION. A study of the business, circulation, advertising, and accounting divisions of the newspaper with special emphasis on the community newspapers. (3) II

575(109)—TYPOGRAPHY. Instruction and practice in typographic composition. Use of type faces in news editing. Study of typography in the make-up of American newspapers. Laboratory, four hours. (2) I, II (Ashley)

581(130)—INTRODUCTION TO PRESS PHOTOGRAPHY. Use of cameras, printers, enlargers and laboratory equipment in modern press photography, and a study of selected readings on photographic methods and skills. (3) I, II, S (Moore)

591(150)—RADIO NEWS SCRIPTS. Instruction and practice in writing news and features material for radio presentation. *Prereq: Journalism* 203. (2) I, II (Moore)

LATIN *(See Ancient Languages)*

LIBRARY SCIENCE

The Department offers the master's degree according to Plan A and the professional degree of Master of Science in Library Science. (See pages 16-19.) Nine hours of library science at the 500 level are prerequisite to courses counted toward the 24 and 30 hours required in the master's degree programs. With the consent of the Head of the Department these prerequisite hours may be taken concurrently with graduate course work.

518(113)—ORGANIZATION AND ADMINISTRATION OF THE SCHOOL LIBRARY. Philosophy, objectives and administration of the library in elementary and secondary schools. (3) I, II, S (Martin)

521(121)—LIBRARIES AND LIBRARIANSHIP. An orientation course designed to give students a general understanding of libraries and library work. (3) I, S (Leach)

529(129)—CATALOGING AND CLASSIFICATION. A study of the fundamental principles and methods of classification and cataloging books and related materials. (3) I, S (Staff)

538(133)—REFERENCE AND BIBLIOGRAPHY. A study of the essential reference works, including dictionaries, encyclopedias, atlases, yearbooks, and periodical indexes. (3) I, S (Kreuz)

536(136)—LITERATURE AND RELATED MATERIALS FOR YOUNG PEOPLE. Covers types of materials of especial interest to readers of grades 7-12. Consideration given to materials for curricular and recreational reading. Some attention also paid to types of adult materials suitable for more mature students, and to problems of selection for the high school level. (3) I, II, S (Martin)

537(137)—CHILDREN'S LITERATURE AND RELATED MATERIALS. Covers various types of materials for use by and with children of grades 1-6. A study of materials in the fields of recreational nature and those most nearly related to the elementary curriculum. (3) I, II, S (Martin)

539(139)—LIBRARY PRACTICE. Observation and supervised practice in a school library. This course fulfills a requirement for school librarians. *Prereq: L.S.* 513, 529 *and two of the following courses:* 533, 536, 537. (3) I, II, S (Roser)

545(145)—ORGANIZATION OF LIBRARY MATERIALS. A course designed to give the beginning librarian practical instruction in the acquisition and organization of library materials. (3) I, S (Leach)

552(152)—BOOK SELECTION. A general study of book selection principles and methods, with emphasis on printed materials as they interpret modern problems. (3) I, S (Kreuz)

586(186)—VISUAL TEACHING. A course in methods and techniques of visual instruction with emphasis on the effective use of films, film strips, pictures, maps, graphs, slides, and field trips. (3) I, II, S

612(212)—THE PUBLIC LIBRARY. A study of the public library as a functioning institution. (3) I, S (Staff)

613(213)—PROBLEMS IN SCHOOL LIBRARY SERVICE. For experienced school librarians and administrators concerned with improving the program of library services in elementary and junior and senior high schools. *Prereq: Library science courses leading to provisional certification* (18 *hours*). (3) II, S (Staff)

614(214)—THE COLLEGE AND UNIVERSITY LIBRARY. A study of the college and university library as a functioning institution. (3) II, S (Leach)

627(227)—PROBLEMS IN READING FOR CHILDREN AND YOUNG PEOPLE. Considers reading interests and needs of younger readers, especially the retarded and superior, and studies in the field. *Prereq: L.S. 536 and 537 or equivalent.* (3) II, S (Staff)

629(229)—ADVANCED CATALOGING AND CLASSIFICATION. Expansion of the principles and methods of classification and cataloging books and related materials. *Prereq: L.S. 529 or equivalent.* (3) II, S (Lecky)

632(232)—LIBRARY WORK WITH CHILDREN. A study of the origin and present status of library work with children in school and public libraries. (3) I, S (Martin)

633(233)—SUBJECT BIBLIOGRAPHY. A comprehensive study of basic reference materials in the humanities and social and natural sciences, with emphasis on reference services in large libraries. *Prereq: L.S. 533 or equivalent.* (3) II (Lecky)

635(235)—GOVERNMENT PUBLICATIONS. A study of the problems of acquisition, preparation, and use of international, federal, state, and local government publications. *Prereq: L.S. 533 or equivalent.* (3) II, S (Kreuz)

642(242)—HISTORY OF BOOKS. This course considers the records of early man, invention of the alphabet, early writing materials, manuscript books, the invention of printing, and book production in modern times. (3) I, S (Lecky)

650(250)—ADULT READING GUIDANCE. Survey of the significant published studies of adult reading, as a guide to book selection through knowledge of adult needs and interests. (3) II, S (Kreuz)

652(252)—ADVANCED BOOK SELECTION. Emphasis on the more imaginative and creative forms of literature and their place in libraries. *Prereq: L.S. 552 or equivalent.* (3) II, S (Kreuz)

687(287)—NON-BOOK MATERIALS. The function, evaluation, selection, acquisition, preparation for use, and preservation of non-book materials in a library program. *Prereq: L.S. 529, 533, 545 or equivalent.* (3) II, S (Lecky)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

771(254)—SEMINAR. Discussions and reports on current problems and trends in library service, with consideration of methods of investigating library problems and assistance in the initial stages of thesis preparation. (3) II, S (Staff)

781(101a-d)—INDIVIDUAL STUDY IN LIBRARY SCIENCE. Individual conferences, assigned readings, reports, etc. (1) I, II, S (Staff)
May be repeated for a total of four credits.

786(201a-d)—PROBLEMS IN LIBRARY SCIENCE. Individual conferences, assigned readings, and reports on the investigation of chosen problems and areas in library science. *Prereq: 9 hours of library science at the 600 level.* (1-4) I, II, S (Staff)
May not be repeated.

MATHEMATICS AND ASTRONOMY

Graduate students will be able to obtain sufficient work to qualify for the doctor's degree. Twelve semester hours beyond integral calculus are required before counting work toward an advanced degree.

407—COLLEGE GEOMETRY. The geometry of the triangle and the circle. Requires only elementary Euclidean concepts. *Prereq: Consent of instructor.* (3)

421—ELEMENTARY COMPUTATIONAL METHODS. Study of number systems, matrices, determinants, and Boolean Algebra with applications to electrical networks, machine computation, automatic electronic digital computors, and other engineering problems. *Prereq: M&A 212.* (3)

431—DIFFERENTIAL EQUATIONS. First order differential equations, differential equations of higher order, series solutions, special second order equations. *Prereq: M&A 212.* (3)

432—APPLIED CALCULUS. Fourier series and integrals, Laplace Transform, partial differential equations, matrices, Bessel functions, complex variables and conformal mapping, vector analysis, and numerical analysis. *Prereq: M&A* 331. (3)

433—APPLIED CALCULUS. A continuation of M&A 432. (3)

471—ADVANCED CALCULUS. Continuous functions, differentiable functions, infinite series, implicit functions, Riemann integral, the gamma and beta functions, line, surface, and space integrals. *Prereq: M&A* 212 *or equivalent.* (3)

501(161a)—SUMMER SEMINAR IN SELECTED TOPICS. This course is designed for those students who do not usually attend our regular semester courses but who wish to take several of the courses in summer school. The topics covered here will be selected from our present courses. *Prereq: Teaching experience in the field of mathematics and consent of the instructor.* (3)

502(161b)—SUMMER SEMINAR IN SELECTED TOPICS. A continuation of M&A 501. (3)

503(161c)—SUMMER SEMINAR IN SELECTED TOPICS. A continuation of M&A 502. (3)

504(161d)—SUMMER SEMINAR IN SELECTED TOPICS. A continuation of M&A 503. (3)

511(144a)—PROBLEM SEMINAR. Reports on current research papers. Problems from various fields of mathematics. *Prereq: consent of instructor.* (3)

512(144b)—PROBLEM SEMINAR. A continuation of M&A 511. (3)

513(144c)—PROBLEM SEMINAR. A continuation of M&A 512. (3)

514(101a)—INDEPENDENT WORK IN MATHEMATICS. Reading course for upper division students of high standing. *Prereq: Mathematics major and a standing of at least 3.0 in the department.* (3)

515(101b)—INDEPENDENT WORK IN MATHEMATICS. A continuation of M&A 514. (3) (Staff)

521(120)—MATHEMATICAL STATISTICS. Topics considered: averages, coefficients of dispersion and skewness, correlation and regression lines, curve fitting, Bernoulli Theorem, DeMoivre-Laplace Theorem, generating functions, sampling. *Prereq: M&A* 212. (3) (Staff)

522(122)—ACTUARIAL MATHEMATICS. Theory of mortality tables, life annuities, premiums, terminal reserves, joint-life annuities and insurances. *Prereq: M&A* 212. (3) (Eaves)

523(129)—PROBABILITY. Theorems of total compound probability, Bernoulli's Theorem, Bayes' Theorem, Poisson Law, Expected value, Law of large numbers. Distribution functions and characteristics functions. *Prereq: M&A* 212. (3) (Staff)

525(132)—THE CALCULUS OF FINITE DIFERENCES. A study of the methods of differencing, interpolation, finite integration and difference equations. *Prereq: M&A* 212. (3) (Eaves)

531(105b)—PARTIAL DIFFERENTIAL EQUATIONS. Equations in several variables, partial differential equations. *Prereq: M&A* 431. (3) (Staff)

532(144d-f)—DIFFERENTIAL EQUATIONS. This course consists of a thorough study of the linear differential equation of the second order along with its associated Riccati Equations. Attention is given to equations of the Fuchsian Type and other classical equations. Eigenvalue problems are considered along with oscillation theory of the second and fourth order linear differential equations. *Prereq: M&A* 431. (3) (Staff)

535(102)—VECTOR ANALYSIS. Contents: the algebra and calculus of vectors; applications to geometry, electricity, and physics; harmonic functions and potential. *Prereq: M&A* 212. (3) (Staff)

536(128a)—THE OPERATIONAL CALCULUS. The introductory theory and properties of the Laplace Transformation. Applications in differential equations, difference equations and boundary value problems of mechanics, electricity and heat. *Prereq: M&A* 331. (3) (Staff)

537(128b)—THE OPERATIONAL CALCULUS. The theory of the inverse Laplace Transformation. Applications in advanced boundary value problems. Fourier Transforms and applications. *Prereq: M&A.* 536. (3) (Staff)

538(153)—ELEMENTARY NUMERICAL ANALYSIS. Approximate computation, approximate roots of equations, numerical curve fitting, interpolation formulas, numerical differentiation and integration, solutions of systems of linear equations, introduction to numercial solutions of ordinary differential equations. *Prereq: M&A 331, or consent of instructor.* (3) (Staff)

541(107)—PROJECTIVE GEOMETRY. Contents: harmonic forms, projectively related primitive forms, curves and pencils of rays of second order, ruled surfaces of second order, theory of poles and polars, involution, inversion. *Prereq: consent of instructor.* (3) (Pence)

542(123)—CURVE TRACING. A study of various methods for sketching algebraic curves. Emphasis on the analytic polygon in finding approximations to the forms of the curve in the finite portion of the plane and at infinity. *Prereq: consent of instructor.* (3) (Pence)

543(127a)—INTRODUCTION TO HIGHER GEOMETRY. Emphasis on fundamentals common to all geometry. Geometries associated with the projective group and the group of circular-transformations. *Prereq: M&A 301, or its equivalent.* (3) (Pence)

544(127b)—INTRODUCTION TO HIGHER GEOMETRY. A continuation of M&A 543. (3)

545(202a)—ALGEBRAIC CURVES. Topics include general properties of algebraic curves, the theory of residuation, singular points covariant curves, unicursal curves, systems of curves. *Prereq: M&A 544.* (3) (Pence)

546(202b)—ALGEBRAIC CURVES. A continuation of M&A 545. (3)

551(130)—INTRODUCTORY TOPOLOGY. Elementary set theory and general topological phenomens, properties of continuous functions, meteric spaces, the topology of the real line and plane. *Prereq: consent of instructor.* (3) (Goodman, Balcerzyk)

561(126)—INTRODUCTION TO HIGHER ALGEBRA. Integral domains, polynomials, groups, vector spaces, matrices. *Prereq: M&A 361, or consent of instructor.* (3) (Eaves)

565(103)—INTRODUCTION TO MATRICES. The algebra of matrices, linear transformations, determinants of matrices, systems of equations, applications. *Prereq: M&A 211.* (3) (Eaves)

566(141)—INTRODUCTION TO THEORY OF NUMBERS. Divisibility, prime numbers, congruences and residues, Diophantine equations. *Prereq: consent of instructor.* (3) (Eaves)

571(106b)—ADVANCED CALCULUS. A continuation of M&A 471. (3)

601(261a)—SUMMER SEMINAR IN SELECTED TOPICS. Continued fractions, Peano's axioms, matrices and the solutions of systems of equations, machine computation, space curves, groups, rings, and fields. *Prereq: Teaching experience in the field of mathematics and consent of instructor.* (3) S (Eaves, Staff)

602(261b)—SUMMER SEMINAR IN SELECTED TOPICS. A continuation of M&A 601. (3) S

603(261c)—SUMMER SEMINAR IN SELECTED TOPICS. A continuation of M&A 602. (3) S

604(261d)—SUMMER SEMINAR IN SELECTED TOPICS. A continuation of M&A 603. (3) S

611(201a)—INDEPENDENT WORK IN MATHEMATICS. Reading courses in the 600 group for graduate students. (3) (Staff)

612(201b)—INDEPENDENT WORK IN MATHEMATICS. A continuation of M&A 611. (3)

613(201c)—INDEPENDENT WORK IN MATHEMATICS. A continuation of M&A 612. (3)

614(201d)—INDEPENDENT WORK IN MATHEMATICS. A continuation of M&A 613. (3)

615(201e)—INDEPENDENT WORK IN MATHEMATICS. A continuation of M&A 614. (3)

616(201f)—INDEPENDENT WORK IN MATHEMATICS. A continuation of M&A 615. (3)

621(210)—MATHEMATICAL STATISTICS. Theory of sampling, the Chisquare distribution, testing statistical hypotheses. *Prereq: M&A 521.* (3) (Staff)

632(231)—ADVANCED DIFFERENTIAL EQUATIONS. Existence theorems, partial differential equations, linear equations with periodic coefficients, classical equations, equations in infinitely many variables. *Prereq: M&A* 531. (3) (Pignani)

635(221)—TENSOR ANALYSIS. Topics considered: the theory of tensor, quadratic, differential forms, Riemannian geometry, pseudo-Euclidean geometry. *Prereq: consent of instructor.* (3) (Cowling)

638(253)—NUMERICAL ANALYSIS. Advanced methods of solutions of systems of equations, approximation of functions, numerical solution of ordinary and partial differential equations, convergence of iterative processes, error analysis, ligenvalues of matrices. *Prereq: M&A* 421 *or* 538 *or equivalent with consent of instructor.* (3) (Staff)

641(205)—DIFFERENTIAL GEOMETRY. Metric differential geometry of curves and surfaces in 3 dimensional Euclidean space, developable surfaces, curvature, geodesics, mapping of surfaces, absolute geometry of a surface. *Prereq: consent of instructor.* (3) (Staff)

642(227a)—HIGHER GEOMETRY. Topics include: Projective spaces, groups of collineations, invariants and covariants, Cremona transformations, the plane cubic and quartic space curves, the cubic surface. *Prereq: M&A* 544. (3) (Pence)

643(227b)—HIGHER GEOMETRY. A continuation of M&A 642. (3)

651(230)—GENERAL TOPOLOGY. Embedding and metrization, compact spaces, and combinatorial topology. *Prereq: M&A* 551. (3) (Staff)

661(226a)—HIGHER ALGEBRA. Groups, rings, fields, Galois theory, linear algebras, hypercomplex numbers, ideals. *Prereq: M&A* 561, *or consent of instructor.* (3)

662(226b)—HIGHER ALGEBRA. A continuation of M&A 661. (3)

665(236)—THEORY OF MATRICES. Study of matric algebra and canonical forms. *Prereq: M&A* 561 *or consent of instructor.* (3) (Eaves)

666(241)—NUMBER THEORY. Peano's Axioms, continued fractions, quadratic fields, algebraic integers, p-adic numbers. *Prereq: M&A* 561 *and* 566. (3)

667(206)—THEORY OF GROUPS. Permutation groups, isomorphisms, the group postulates, abstract groups, automorphisms, homomorphisms, quotient groups, Abelian groups, Galois groups. *Prereq: M&A* 665 *or consent of instructor.* (3)

671(207a)—FUNCTIONS OF A COMPLEX VARIABLE. Differentiation and integration, contour integration, poles and residues, Taylor and Laurent series, conformal mapping, Riemann mapping theorem, Dirichlet problem, multiple-valued functions, Riemann surfaces, and applications. *Prereq: M&A* 571. (3) (Goodman, Royster)

672(207b)—FUNCTIONS OF A COMPLEX VARIABLE. A continuation of M&A 671. (3)

677(214)—POTENTIAL FUNCTION. Topics considered: Attraction of bodies, Newtonian potential functions, theorems of Green and Gauss, level surfaces, spherical harmonics. *Prereq: M&A* 531. (Staff)

678(204a)—CALCULUS OF VARIATIONS. The ordinary problem for the plane and space cases; the necessary conditions of Euler, Weierstrass, Legendre, and Jacobi. The parametric problem; the isoperimetric problem. Sufficiency conditions. *Prereq: M&A* 531. (3)

679(204b)—CALCULUS OF VARIATIONS. A continuation of M&A 678. (3)

681(208a)—FUNCTIONS OF A REAL VARIABLE. Brief discussion of real numbers; continuous functions, semi-continuous functions, functions of bounded variations; Stieltjes Integral, measure and integration. *Prereq: M&A* 571 *or consent of instructor.* (3) (Cowling, Goodman)

682(208b)—FUNCTIONS OF A REAL VARIABLE. A continuation of M&A 681. (3)

683(212a)—SUMMABLE INFINITE PROCESSES. Fundamental limit ideas applied to infinite sequences, infinite series, infinite products, etc. Summability of Cesaro, Holder, Abel, Borel and Leroy. *Prereq: M&A* 571 *or consent of instructor.* (3)

684(212b)—SUMMABLE INFINITE PROCESSES. A continuation of M&A 683. (3)

685(213)—FOURIER SERIES. Expression of a general periodic function as a Fourier series, sufficient conditions for convergence, Fejer's theorem, applications. *Prereq: M&A* 571. (3) (Cowling)

686(222)—ORTHOGONAL SYSTEMS OF FUNCTIONS. This course supplements 685. Eigen value problems for linear differential equations, systems of orthogonal functions, spherical harmonics, hypergeometric and related functions, completeness. *Prereq: consent of instructor.* (3)

687(223)—INTEGRAL EQUATIONS. Systems of ordinary linear equations, linear operators, orthogonal systems, linear integral equations of the second kind, theorems of Fredholm, Volterra's equation. *Prereq: consent of instructor.* (3)

711(101c)—INDEPENDENT WORK IN MATHEMATICS. Reading course for graduate students of high standing. *Prereq: Mathematics major and a standing of at least* 3.0 *in the department.* (3)

712(101d)—INDEPENDENT WORK IN MATHEMATICS. A continuation of M&A 711. (3)

713(101e)—INDEPENDENT WORK IN MATHEMATICS. A continuation of M&A 712. (3)

714(101f)—INDEPENDENT WORK IN MATHEMATICS. A continuation of M&A 713. (3)

751(233b)—SELECTED TOPICS IN TOPOLOGY. Topological algebras, algebraic topology, topologies in lattices. *Prereq: M&A* 651 *or consent of instructor.* (3) (Goodman, Balcerzyk)

752(233b)—SELECTED TOPICS IN TOPOLOGY. A continuation of M&A 751. (3)

753(232a)—LINEAR SPACES. Topological spaces, metric spaces, vector spaces, Banach space, with applications to summability theory, infinite systems of linear equations, spectral theory. (3) (Cowling)

754(232b)—LINEAR SPACES. A continuation of M&A 753. (3)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

771(209a)—SELECTED TOPICS IN THE THEORY OF COMPLEX VARIABLES. Analytic continuation, functions with natural boundaries, gap theorems, over-convergence, entire functions, Dirichlet series, univalent functions, variational methods, Dirichlet principles. *Prereq: consent of the instructor.* (3)

772(209b)—SELECTED TOPICS IN THE THEORY OF COMPLEX VARIABLES. A continuation of M&A 771. (3)

773(209c)—SELECTED TOPICS IN THE THEORY OF COMPLEX VARIABLES. A continuation of M&A 772. (3)

774(209d)—SELECTED TOPICS IN THE THEORY OF COMPLEX VARIABLES. A continuation of M&A 773. (3)

775(209e)—SELECTED TOPICS IN THE THEORY OF COMPLEX VARIABLES. A continuation of M&A 774. (3)

776(209f)—SELECTED TOPICS IN THE THEORY OF COMPLEX VARIABLES. A continuation of M&A 775. (3)

777(220a)—MATHEMATICAL SEMINAR. (3)

778(220b)—MATHEMATICAL SEMINAR. (3)

ASTRONOMY

591(251a)—COSMOLOGY I. Consideration of observational basis of cosmology, cosmological theories of general relativity, the steady state theory, and kinematic relativity. *Prereq: M&A* 431. (3)

592(251b)—COSMOLOGY II. A study of the universe as a complete physical unit. Consideration of the various relativistic models and theory evaluation in the light of current observations. *Prereq: M&A* 591. (3)

MICROBIOLOGY

(Formerly Bacteriology)

The Department of Microbiology offers the Master of Science degree in the various fields of Microbiology, and the Doctor of Philosophy degree in the fields of morphology and physiology of microorganisms, immunology and serology, and public health bacteriology.

400(102)—GENERAL BACTERIOLOGY. Microorganisms; their morphology, classification, physiology, relation to certain fermentations, to food, to soil fertility, and to disease. Lecture and recitation, two hours. *Prereq: Chem.* 112; *Zoology* 100 *or Botany* 101. (4) I, II, S (Scherago or Edwards and others)

401—LABORATORY TO ACCOMPANY 400. Four hours. (0)

410(104)—APPLIED BACTERIOLOGY. A course in bacteriological analysis to supplement Courses 200 and 400. Laboratory, four hours. *Prereq: Micro.* 400 *or* 200; *or* 102 *and Chem.* 112. (2) I, II, S (Hotchkiss and others)

500(103)—PATHOGENIC BACTERIOLOGY. Human and animal pathogenic microorganisms, especially their morphological, cultural and pathogenic properties. Lecture, two hours. *Prereq: Micro.* 400 *or* 200; *or* 102 *and Chem.* 112. (4) I, S (Scherago or Humphries)

501—LABORATORY TO ACCOMPANY 500. Four hours. (0)

510(110a)—LABORATORY DIAGNOSIS. Laboratory methods employed in diagnostic and public health laboratories. Designed primarily for medical technology students. Examination of sputum, urine, and blood. Lab, six hours. *Prereq: (or to be taken concurrently): Micro.* 500. (3) I, S (Hotchkiss)

511(110b)—LABORATORY DIAGNOSIS. Continuation of 510. Examination of blood continued. Laboratory diagnosis of parasitism and infectious diseases. Lab, six hours. *Prereq (or to be taken concurrently): Micro.* 500. (3) II, S (Hotchkiss)

520(111)—GENERAL PATHOLOGY. Effects of disease will be studied at autopsies and by the examination of fresh and museum specimens and histological sections. Lect., two hours. *Prereq: Physiol.* 502 *and* 503; *Zool.* 200, 513, 515, 506; *Micro.* 500. (4) I (Scherago, McClellan, Hotchkiss)

521—LABORATORY TO ACCOMPANY 520. Four hours. (0)

550(125)—IMMUNOLOGY AND SEROLOGY. The theories and mechanism of infection and immunity; preparation, standardization, and uses of biological products; serology. Lecture, two hours. *Prereq: Micro.* 500. (5) II, S (Scherago, Humphries)

551—LABORATORY TO ACCOMPANY 550. Six hours. (0)

610(206)—BACTERIOLOGY OF FOODS. Dairy and miscellaneous food products; food preservation; food poisoning, standard methods for official food and public health laboratories. Lecture, two hours. *Prereq: Micro.* 400 *or* 200; *or* 102 *and Chem.* 112. (4) I, S (Weaver, Humphries)

611—LABORATORY TO ACCOMPANY 610. Four hours. (0)

620(207)—BACTERIOLOGY OF WATER AND SEWAGE. Microbiology of water; methods of purification. Sewage disposel methods. Operation of swimming pools. Standard and other methods for examination. Lecture, two hours. *Prereq: Micro.* 400 *or* 200; *or* 102 *and Chem.* 112. (4) II, S (Weaver, Humphries)

621—LABORATORY TO ACCOMPANY 620. Four hours. (0)

630(203a)—PUBLIC HEALTH BACTERIOLOGY. Public health aspects of bacteriology including the etiology, epidemiology, immunology and lab. diagnosis of infectious diseases. Lecture, one hour. *Prereq: open only to physicians and health officers or those with equivalent training.* (3) I, S (Scherago and others)

631—LABORATORY TO ACCOMPANY 630. Four hours. (0)

632(203b)—PUBLIC HEALTH BACTERIOLOGY. Continuation of 630. Lectures and recitations, one hour. *Prereq: Micro.* 630. (3) II, S (Scherago and others)

633—LABORATORY TO ACCOMPANY 632. Four hours. (0)

635(210)—CLINICAL MYCOLOGY. Methods and techniques for isolating and propagating pathogenic actinomycetes and fungi. Lab. diagnosis of fungous infections. Lab., four hours a week. *Prereq: Chem.* 432; *Micro.* 550. (2) I, S (Hotchkiss)

640(224)—DISINFECTANTS AND ANTIBIOTICS. Chemical agents injurious to microorganisms. Practical applications and methods of testing. Conference, one hour. *Prereq: Micro.* 102 *or* 200 *and* 410; *Chem.* 432. (3) II, S (Hotchkiss)

641—LABORATORY TO ACCOMPANY 640. Four hours. (0)

651(235)—IMMUNOCHEMISTRY AND ADVANCED IMMUNOLOGY. Chemistry of antigens and antibodies; of the reaction between them in vitro and in vivo; immune and hypersensitive reactions. Lect. and conferences, two hours. *Prereq: Micro.* 550; *Chem.* 432 *and* 444. (4) II, S (Scherago, Humphries)

652—LABORATORY TO ACCOMPANY 651. Four hours. (0)

660(270)—ELECTRON MICROSCOPY. Theory, operation and uses of the magnetic electron microscope and the vacuum unit for metal shadow casting. Lecture, one hour. *Prereq: Physics* 232 *and* 242. (3) II, S (Edwards)

661—LABORATORY TO ACCOMPANY 660. Four hours. (0)

670(272)—VIRUSES AND RICKETTSIAE. Natures, activities, and methods of laboratory cultivation of viruses and rickettsiae; their relation to bacteria, plants, and animals. Lecture, two hours. *Prereq: Micro.* 550. (4) I, S (Sarma)

671—LABORATORY TO ACCOMPANY 670. Four hours. (0)

700(220)—HISTORY OF BACTERIOLOGY. Conferences, two hours. *Prereq: Micro.* 550. (2) II, S (Weaver)

710(222)—ADVANCED GENERAL BACTERIOLOGY. Bacterial cytology; theories of staining. Microbial genetics. Taxonomy and nomenclature. Lectures and conferences, two hours. *Prereq: Micro.* 550 *and Chem.* 432. (4) I, S (Weaver, Humphries)

711—LABORATORY TO ACCOMPANY 710. Four hours. (0)

720(226a)—METABOLISM OF MICROORGANISMS. Chemical changes produced by microorganisms; properties of their enzymes; the physiology of their growth. Lectures or conferences, two hours. *Prereq: Chem.* 432. (4) I (Wiseman)

721—LABORATORY TO ACCOMPANY 720. Four hours. (0)

722(226b)—METABOLISM OF MICROORGANISMS. Continuation of 720. Lectures or conferences, two hours. *Prereq: Micro.* 720. (4) II (Wiseman)

723—LABORATORY TO ACCOMPANY 722. Four hours. (0)

768—RESIDENCE CREDIT FOR MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied towards master's degree with thesis.

769—RESIDENCE CREDIT FOR DOCTOR'S DEGREE. (1 to 18 wks. residence)
May be repeated indefinitely.

770(250a-j)—SEMINAR. Review of current literature in micro.; presentation of papers on work in progress in the department or on assigned topics; reports on meetings of national and international scientific and professional societies and symposia. Required of all graduate students. Two hours. (1) I, II (Staff)
May be repeated to a maximum of ten credits.

790(201a-j)—RESEARCH IN BACTERIOLOGY. Laboratory, six hours. (6) I, II, S (Staff)
May be repeated to a maximum of twelve credits.

795(201a-j)—RESEARCH IN BACTERIOLOGY. Laboratory, six hours. *Prereq:* Master's Degree or equivalent. (6) I, II, S (Staff)
May be repeated to a maximum of twenty-four credits.

DEPARTMENT OF MODERN FOREIGN LANGUAGES AND LITERATURES

The Department of Modern Foreign Languages and Literatures requires, as a prerequisite to candidacy for the master's degree, attainment in the language of specialization equivalent to that required for an undergraduate major in that language. The number of language courses required for the M.A. degree varies, depending in part upon the advanced courses which the student may be asked, or permitted to take in related departments.

French

501(101a,b)—ADVANCED PHONETICS. This course is especially planned for teachers of phonetics both in high school and in college. (3) I, II, S (Staff)
May be repeated to maximum of six credits.

502(102a)—FRENCH LITERATURE OF THE NINETEENTH CENTURY. A study of French Romanticism. Lectures and reading. (3) I, II, S (Walker)

503(102b)—FRENCH LITERATURE OF THE NINETEENTH CENTURY. A study of Realism and Naturalism in France. Lectures and reading. (3) I, II, S (Walker)

504(103a)—FRENCH LITERATURE OF THE SEVENTEENTH CENTURY. A study of the literature of this period, not including Moliere, Corneille and Racine. (3) I, II, S (Staff)

505(103b)—FRENCH LITERATURE OF THE SEVENTEENTH CENTURY. The plays of Moliere, Corneille and Racine. (3) I, II, S (Staff)

506,507(104a,b)—ADVANCED FRENCH GRAMMAR. A study of the finer points of French grammar. (3 ea.) I, II, S (Staff)

508,509(105a,b)—FRENCH LITERATURE OF THE XVIII CENTURY. A study of the representative writers of the XVIII century, with special attention given to Montesquieu, Voltaire, Diderot and Rousseau. (3 ea.) I, II, S (Walker)

510,511(106a,b)—FRENCH LITERATURE OF THE XX CENTURY. A study of the modern writers starting with the Symbolist Group and continuing up to the present. (3 ea.) I, II, S (Staff)

512(107a,b)—ADVANCED FRENCH CONVERSATION. A study of intonation and elocution in French. Three minute speeches in French will be prepared for each recitation. Some reading in French poetry will also be practiced. (2) I, II, S (Staff)
May be repeated to a maximum of four credits.

513(191a,b)—TUTORIAL SEMINAR FOR MAJORS IN THE ROMANCE LANGUAGES. A survey of French literature from 1600 to the present. Required of all majors in French during the senior year. (1) I, II (Walker)
May be repeated to a maximum of two credits.

553(193)—THE TEACHING OF MODERN FOREIGN LANGUAGES. A course for teachers and prospective teachers of Spanish, French, or German. (3) S (Server)

601,602(201a,b)—FRENCH LITERATURE OF THE RENAISSANCE. A course starting with François Villon and including such writers as Marot, Rabelais, Calvin, Montaigne, Ronsard, DuBellay, Belleau and Regnier. To be given in French. (3 ea.) I, II, S (Staff)

603,604(202a,b)—OLD FRENCH. (First semester) a study of the syntax and composition of old French. (Second semester) reading of texts in old French. (3 ea.) I, II, S (Rea)

610(291a,b)—ROMANCE PHILOLOGY. Study of the historical development of the various Romance languages with reading of texts chiefly from the medieval period. Special attention will be given to historical phonology and morphology. (3) I, II, S (Rea)
May be repeated to a maximum of six credits.

770(203a,b)—SEMINAR IN FRENCH LITERATURE. (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

778(295)—SEMINAR—MAIN CURRENTS OF ROMANCE AND GERMAN LITERATURES. A survey course which will attempt to give the student a comprehensive picture of the literary contributions that have been made through French, German, and Spanish cultures. (A reading knowledge of one foreign language required.) (3) II (Duncan, Server, Whitaker)

780—SPECIAL STUDIES IN FRENCH. Selected studies and investigations in the French language and literature, permitting the student to work in areas of special interest, and providing opportunity for original endeavor. *Prereq: consent of dept.* (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

German

522,523(122a,b)—ADVANCED SCIENTIFIC GERMAN. This course is designed for students of the Physical and Biological Sciences. Reading is done in recent German scientific journals and books, the material being selected in line with the student's special interest. (3 ea.) I, II, S (Whitaker)

PROSEMINARS IN 18th, 19th and 20th CENTURY GERMAN LITERATURE. A balanced selection of works from one representative author of a century will be studied in each course, and written reports will be assigned on various subjects related to his writing.

The purpose of the proseminar course is threefold: (1) Study of a representative author and certain of his works in their relation to his period; (2) Acquaintance with basic works of the author; (3) Training in simple research projects and proper form in the writing of papers.

524(123)—PROSEMINAR IN KLEIST. (3) I (Whitaker)

525(124)—PROSEMINAR IN HAUPTMANN. (3) II (Bigge)

526(125)—PROSEMINAR IN SCHILLER. (3) I (Weiss)

527(126)—PROSEMINAR IN GRILLPARZER. (3) II (Whitaker)

528(127)—PROSEMINAR IN THOMAS MANN. (3) I (Bigge)

529(128)—PROSEMINAR IN LESSING. (3) II (Weiss)

530(129)—PROSEMINAR IN HEBBEL. (3) I (Whitaker)

531(130)—PROSEMINAR IN SUDERMANN. (3) II (Whitaker)

534,535(133a,b)—LIFE AND WORKS OF GOETHE. This course follows the unfolding of Goethe's genius from his first lyrics through Faust. His principal literary works will be read and attention devoted to autobiographical material, letters and diaries. (3 ea.) I, II, S (Weiss)

536(134)—ORIGIN AND DEVELOPMENT OF THE GERMAN LANGUAGE. This course in Germanic Philology acquaints the student with the position of German in the European language group and traces the development of the language to the present. Special emphasis is given to the relationship of German and English words. (3) I, II (Binger)

537(135)—INTRODUCTION TO MIDDLE HIGH GERMAN. This is a literary course with a necessary minimum of Middle High German grammar. Selections will be read from epic and lyric poetry of the period and reports will be given on assigned topics. (3) I, II (Binger)

538(136)—ADVANCED GERMAN CONVERSATION AND COMPOSITION. This course is primarily for German majors. It involves intensive practice in speaking and writing German prose, with some review of German grammar. (3) I, II (Weiss)

553(193)—THE TEACHING OF MODERN FOREIGN LANGUAGES. A course for teachers and prospective teachers of Spanish, French, or German. (3) S (Server)

621(221a)—GERMAN DRAMA OF THE 19th CENTURY. This course is a study of the German Drama from Schiller's "Die Braut von Messina" to 1870. (3) I (Whitaker)

622(221b)—THE GERMAN NOVELLE. This course traces the origin and development of the German Novelle from Goethe to Thomas Mann. (3) II (Whitaker)

623,624(222a,b)—20th CENTURY GERMAN LITERATURE. Extensive readings, discussions and comprehensive reports on the leading literary minds and movements of this Century. (3 ea.) I, II (Bigge)

771(223)—THE AGE OF GOETHE. A seminar devoted to the investigation of one or more topics in the literature and social development of German during the period 1750 to 1825. (3) I, II (Weiss)

778(295)—SEMINAR—MAIN CURRENTS OF ROMANCE AND GERMAN LITERATURES. A survey course which will attempt to give the students a comprehensive picture of the literary contributions that have been made through French, German, and Spanish cultures. (A reading knowledge of one foreign language required.) (3) II (Whitaker, Duncan, Server)

781—SPECIAL STUDIES IN GERMAN. Selected studies and investigations in the German language and literature, permitting the student to work in areas of special interest, and providing opportunity for original endeavor. (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

Russian

561,562(171a,b)—SURVEY OF RUSSIAN LITERATURE. An outline of Russian literature in lecture to be accompanied by representative readings in Russian. (3 ea.) I, II, S (Moore)

Spanish

541,542(181a,b)—ADVANCED SPANISH GRAMMAR AND COMPOSITION. A study of the finer points of Spanish grammar. (3 ea.) I, II, S (Server)

543,544(182a,b)—SPANISH LITERATURE OF THE XVII CENTURY. Selected literature of the Golden Age; Cervantes, the picaresque novel, leading dramatists. (3 ea.) I, II, S (Hernández)

545,546(183a,b)—SPANISH LITERATURE OF THE XX CENTURY. A study of the later works of the Generation of 1898 and representative works of recent writers. (3 ea.) I, II, S (Server)

547,548(184a,b)—SPANISH AMERICAN LITERATURE. A study of representative writers and principal literary productions of Spanish America. (3 ea.) I, II, S (Server)

549(185a)—SPANISH LITERATURE OF THE XIX CENTURY. A study of Spanish Romanticism and the works of the leading Costumbristas. (3) I, II, S (Hernandez)

550(185b)—SPANISH LITERATURE OF THE XIX CENTURY. A study of the novel and drama of the second half of the XIX Century. (3) I, II, S (Hernández)

551—TUTORIAL SEMINAR FOR MAJORS IN THE ROMANCE LANGUAGES. A survey of Spanish literature from 1600 to the present. Required of all majors in Spanish during the senior year. (1) I, II (Staff)
May be repeated to a maximum of two credits.

553(193)—THE TEACHING OF MODERN FOREIGN LANGUAGES. A course for teachers and prospective teachers of Spanish, French, or German. (3) S (Server)

610(291a,b)—ROMANCE PHILOLOGY. Study of the historical development of the various Romance languages with reading of texts chiefly from the medieval period. Special attention will be given to historical phonology and morphology. (3) I, II, S (Rea)
May be repeated to a maximum of six credits.

641(281a)—OLD SPANISH. A study of the vocabulary and grammar of Old Spanish, contrasting and comparing it to modern Spanish. (3) I, II, S (Rea)

642(281b)—OLD SPANISH. Reading of texts in Old Spanish. (3) I, II, S (Staff)

772(282a,b)—SEMINAR IN SPANISH LITERATURE. (3) I, II, S (Server)
May be repeated to a maximum of six credits.

778(295)—SEMINAR—MAIN CURRENTS OF ROMANCE AND GERMAN LITERATURES. A survey course which will attempt to give the student a comprehensive picture of the literary contributions that have been made through French, German, and Spanish cultures. (A reading knowledge of one foreign language required) (3) II (Server, Duncan, Whitaker)

782—SPECIAL STUDIES IN SPANISH. Selected studies and investigations in the Spanish language and literature, permitting the student to work in areas of special interest, and providing opportunity for original endeavor. (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

Course Applicable to All Divisions

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

MUSIC

The University offers the Master of Arts degree with a major in music, the Master of Music with a major in Applied Music, Composition, Theory, or Music Education, and the Master of Arts in Education, with emphasis in the field of Music Education. Candidates for these degrees must present the reasonable equivalent of the University of Kentucky undergraduate requirements in music, appropriate to the prospective area of concentration on the master's level. Normally, a candidate should expect to spend a minimum of two semesters and one summer session or the equivalent in residence as a full-time graduate student to complete the requirements for master's degree in music.

Graduate record examination scores must be presented by the end of the first semester or first summer session the student is enrolled. Candidates failing to comply with this requirement will not be permitted to register for further course work until the Graduate Record Examination has been taken. If the results of the Graduate Record Examination reveal deficiencies in the candi-

date's background additional course work may be required, as determined by the departmental Graduate Advisor.

Entrance Examinations—All candidates must qualify through examination in the proposed field of concentration, basic theory and in music history. Any deficiencies must be removed before graduation. For the time and place of these examinations, consult the Music Department.

Foreign Language Requirements—The undergraduate record of Master of Music candidates must show credit for one year of foreign language study. In the event it does not, the candidate will be required to study one year of a foreign language as a graduate student. This credit will not apply toward the Master of Music degree. The Master of Arts with a major in music requires a reading knowledge of one foreign language, preferably French or German.

Thesis Requirements—The Master of Arts and the Master of Music in Theory require theses. A public recital acceptable to the faculty is required in lieu of a thesis for the Master of Music degree in Applied Music. A composition of major proportion, acceptable to the faculty, must be submitted by candidates for the Master of Music in Composition in lieu of a thesis. A thesis is optional in the Master of Music in Music Education and Master of Arts in Education curricula.

Master of Music in Applied Music

A minimum of twenty-four graduate hours.

Eight to twelve graduate hours in Applied Music.

In the event the student is not sufficiently prepared to do graduate work in Applied Music, or if there is a deficiency in repertoire, he must study without credit until fully prepared to do graduate work. Candidates in Applied Music Voice, must have completed one year of study in each of two modern foreign languages.

Twelve to sixteen hours from at least two of the following: Music literature, music theory, music education, or non-music subjects.

A public recital of music major proportion passed upon by the music faculty and a comprehensive examination in the area of concentration.

Master of Music in Music Education

A minimum of twenty-four graduate hours and an acceptable thesis, or a minimum of thirty hours and no thesis requirement.

Twelve hours in the field of music education and closely allied areas.

Two to four hours in graduate theoretical subjects.

Four to six hours in music literature.

Electives in music education, education, applied music, theory or non-music areas.

Comprehensive examination.

Master of Music in Composition

A minimum of twenty-four hours and an acceptable composition of major proportion.

Ten hours of Composition and allied subjects.

Four hours of Advanced Musical Analysis.

Six hours of music literature electives.

A minimum of four hours of approved electives.

Comprehensive examination.

Master of Music in Theory

A minimum of twenty-four hours and an acceptable thesis.
Four hours of Pedagogy of Theory.
Four hours of Advanced Musical Analysis.
Six hours of music literature electives.
Two hours of Sixteenth Century Counterpoint.
A minimum of eight hours of approved electives.
Comprehensive examination.

Master of Arts in Education *(See pages 120-121)*

Master of Arts with a Major in Music

The usual area of concentration for this degree is in the field of music literature or theory of music.

Music Performance Courses

Graduate courses in Music Performance carry credit hours as follows:

Series I, 1 credit hours each semester
Series II, 2 credit hours each semester
Series III, 3 credit hours each semester

All music performance courses may be repeated 3 times for credit.

All music performance courses carry 1 credit hour if taken in the Summer Session.

	Series I Secondary Courses	Series II Major Courses	Series III Major Courses
Piano	501, 601 (C215a-q)	521, 621 (215a-h)	541, 641 (C215a-h)
Voice	502, 602 (C217a-q)	522, 622 (217a-h)	542, 642 (C217a-h)
Organ	503, 603 (C218a-q)	523, 623 (218a-h)	543, 643 (C218a-h)
Violin	504, 604 (C216a-q)	524, 624 (216a-h)	544, 644 (C216a-h)
Viola	505, 605 (C216a-q)	525, 625 (216a-h)	545, 645 (C216a-h)
Cello	506, 606 (C216a-q)	526, 626 (216a-h)	546, 646 (C216a-h)
String Bass	507, 607 (C216a-q)	527, 627 (216a-h)	547, 647 (C216a-h)
Flute	508, 608 (C231a-q)	528, 628 (231a-h)	548, 648 (C231a-h)
Oboe	509, 609 (C231a-q)	529, 629 (231a-h)	549, 649 (C231a-h)
Clarinet	510, 610 (C231a-q)	530, 630 (231a-h)	550, 650 (C231a-h)
Bassoon	511, 611 (C231a-q)	531, 631 (231a-h)	551, 651 (C231a-h)
Trumpet	512, 612 (C232a-q)	532, 632 (232a-h)	552, 652 (C232a-h)
French Horn	513, 613 (C232a-q)	533, 633 (232a-h)	553, 653 (C232a-h)
Trombone	514, 614 (C232a-q)	534, 634 (232a-h)	554, 654 (C232a-h)
Baritone	515, 615 (C232a-q)	535, 635 (232a-h)	555, 655 (C232a-h)
Tuba	516, 616 (C232a-q)	536, 636 (232a-h)	
Saxophone	517, 617 (C231a-q)	537, 637 (231a-h)	
Percussion	518, 618 (C232a-q)	538, 638 (232a-h)	

Music Courses

560(145)—SUPERVISION OF MUSIC. A study of supervision of the school music program through curriculum planning, supervisory techniques, administrative and community relationships, the use of mechanical aids in the improvement of teaching, etc. One lecture and one laboratory each week. *Prereq: Music* 360 *or* 362, 361 *or* 363.
(1) II, S (Nash)

561(104)—MUSIC ACTIVITIES IN THE ELEMENTARY SCHOOL. The study of music and its contribution to child development. An analysis of instructional materials and the development of criteria for the evaluation of these materials. Advanced studies and activities in rhythms, singing, listening, creativity, and reading music to create a musical environment in the classroom. Open to classroom teachers only. *Prereq: Music* 260 *and* 261 *or equivalents and consent of the instructor.* (2) I, II, S (Nash, Holroyd)

562(116a)—CONDUCTING. A study of the technique and practice of the fundamentals of conducting. (2) I (Fitzgerald, Todd)

563(116b)—INSTRUMENTAL CONDUCTING. A continuation of 562. *Prereq:* 562. (2) II (Fitzgerald, Todd)

564(115)—INTERPRETATION OF CHORAL MUSIC. A study of the fundamentals of choral conducting and choral literature, emphasizing materials for the secondary school level. (2) I, II, S (Jenness, Kiviniemi)

565(102)—VOCAL PEDAGOGY. For teachers of voice, supervisors of music and choir directors. The study of physical and psychological problems in the teaching of voice production, the study of breath control, diction, resonance, interpretation and repertoire. (2) I, S (Jenness, Kiviniemi)

570(117a)—ORCHESTRATION. This course includes a study of the individual instruments of the orchestra and band with practice in scoring for these instruments. *Prereq:* 371. (2) I, S (Kinney)

571(117b)—ORCHESTRATION. A continuation of 570. *Prereq:* 570. (2) II, S (Kinney)

572(118a)—COUNTERPOINT. A study of Counterpoint based on 16th Century and 18th Century contrapuntal techniques, original compositions and analysis. *Prereq: Music* 271, 273. (2) I, S (Kinney)

573(118b)—COUNTERPOINT. A continuation of 572. *Prereq:* 572. (2) II, S (Kinney)

574(119a)—COMPOSITION AND ORCHESTRATION. A basic course in original composition and orchestration. *Prereq: Music* 371. (2) I, S (Wright)

575(119b)—COMPOSITION AND ORCHESTRATION. A continuation of 574. (2) II, S (Wright)

580(131)—SEVENTEENTH AND EIGHTEENTH CENTURY MUSIC. A survey of music literature composed c. 1600 — c. 1800. *Prereq: Music* 280, 281. (2) I, II, S (Howell)

581(132)—NINETEENTH CENTURY MUSIC. A study of masterworks of music composed in the nineteenth century. *Prereq: Music* 280, 281. (2) I, II, S (Howell)

582(106a)—PIANO LITERATURE. A survey of music written for the piano, emphasizing problems in performance of standard piano literature. (2) I, S (Karp, Patch)

583(106b)—PIANO LITERATURE. A continuation of 582. (2) II, S (Karp, Patch)

584(107)—VOCAL LITERATURE. A study of the development of the Art Song, Opera, Oratoria, and Cantata. (3) I, S (Jenness, Kiviniemi)

585(108a)—HISTORY AND LITERATURE OF THE ORGAN. A course of study designed to give the organ student a practical knowledge of the development of the organ, its construction, the standard literature, and teaching materials. (2) I, S (Blackburn)

586(108b)—HISTORY AND LITERATURE OF THE ORGAN. A continuation of 585. *Prereq:* 585. (2) II, S (Blackburn)

587(123)—SURVEY OF CONTEMPORARY MUSIC. A stylistic study of representative compositions of the twentieth century. (2) I, S (Kinney)

588(134)—HISTORY AND LITERATURE OF OPERA. The development of opera as an art form, and analysis of representative operas from various eras. (3) I, S (Howell)

589(135)—HISTORY OF AMERICAN MUSIC. A study of music in America from colonial times to the present. (3) II, S (Howell, Kinney, Wright)

590(124a-c)—OPERA WORKSHOP. (1) I, II, S (Jenness, Kiviniemi, King, J.) May be repeated to a maximum of three credits.

591(125)—MUSIC EDUCATION WORKSHOP: CHORAL. An intensive study of choral literature and interpretation through lectures, demonstrations, and participation. Offered according to demand. (1) S (Staff)

592(126)—MUSIC EDUCATION WORKSHOP: GENERAL MUSIC. A study of elementary and secondary school methods and materials, class piano techniques, audio-visual aids in Music Education, and the administration of school music. Offered according to demand. (1) S (Staff)

593(127)—MUSIC EDUCATION WORKSHOP: THE SCHOOL ORCHESTRA. A study of school orchestra methods, materials, and administration, and specific stringed instrument teaching problems. Offered according to demand. (1) S (Staff)

594(128)—MUSIC EDUCATION WORKSHOP: THE SCHOOL BAND. A study of concert and marching band organizations on the secondary school level, with brass, wood-wind, percussion, and conducting clinics. Offered according to demand. (1) S (Staff)

660(214)—ADVANCED INSTRUMENTAL CONDUCTING. This course is intended to further develop the ability to interpret and conduct the larger forms written for the symphony orchestra and concert band. *Prereq: Music* 562, 563 *or* 564. (2) II, S (Fitzgerald, Todd)

661(203)—CHORAL LITERATURE AND TECHNIQUE. A study of Choral literature and its interpretation. *Prereq: Music* 563. (2) I, S (Jenness, Kiviniemi)

662(204)—ADVANCED BAND TECHNIQUE. An advanced course in band techniques with concentration on band organization and materials, the technique of band conducting and intensive study in the field of band arranging. (2) II, S (Fitzgerald)

663(225a-c)—ADVANCED INSTRUMENTAL TECHNIQUES. An advanced technical study of playing string, brass, and woodwind instruments, designed for the needs of school music teachers. (1) S (Staff)
May be repeated to a maximum of three credits.

667(239)—CURRENT PRACTICES IN ELEMENTARY SCHOOL MUSIC. Contemporary philosophies and objectives of music in the elementary school. The in-service training of the classroom teacher; the music specialist as a resource person. Techniques for developing the child's musical interest and capacity for music. The status of music in America's public schools. Open to music teachers only. *Prereq: Music* 360 *or its equivalent.* (2) I, II, S (Nash, Holroyd)

670(202)—THEORY REVIEW. A review of the fundamentals of music theory. (0) I, S (Wright)

671(224a)—ADVANCED MUSICAL ANALYSIS. A course designed to show the changing aspects of musical style through analysis of representative compositions from all periods. (2) I, S (Kinney, Wright)

672(224b)—ADVANCED MUSICAL ANALYSIS. A continuation of 671. (2) II, S (Kinney, Wright)

673(200a-c)—ADVANCED COMPOSITION AND ORCHESTRATION. *Prereq: Music* 574 *and* 575. (2) I, II, S (Wright)
May be repeated to a maximum of six credits.

674(223a)—PEDAGOGY OF THEORY. The teaching of music theory. (2) I, II, S (Wright)

675(223b)—PEDAGOGY OF THEORY. The study of music theory from the standpoint of its function in the college and secondary school curriculum. (2) I, II, S (Wright)

676(226)—SIXTEENTH CENTURY COUNTERPOINT. The study of sixteenth century contrapuntal techniques through analysis and composition in Renaissance Styles. Offered according to demand. (2) (Wright)

680(205)—MEDIEVAL AND RENAISSANCE MUSIC. An advanced study of the musical development during these periods. (3) II, S (Howell)

681(219)—SYMPHONIC LITERATURE. An intensive study of selected orchestral literature from Bach to Hindemith. (3) II, S (Howell, Kinney, Wright)

682(220)—RESEARCH METHODS. A course designed to acquaint the student with the basic research techniques and materials in music. (2) I, S (Howell, Kinney)

742(242)—ADMINISTRATION AND SUPERVISION OF PUBLIC SCHOOL MUSIC. A study of current trends in school music, curricula, testing programs, and other supervisory procedures. (3) II, S (Fitzgerald, Nash)

743(243)—ADVANCED METHODS AND MATERIALS IN MUSIC EDUCATION. Survey and evaluation of new music education methods and materials. (2) I, S (Conner)

744(244)—HISTORY AND PHILOSOPHY OF MUSIC EDUCATION. A course d signed to acquaint the student with the historical development and basic philosophies music education. (2) I, S (Nash)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff) May be repeated. Maximum of six weeks can be applied toward master's degree with thes

780(C222a)—INDEPENDENT WORK IN MUSIC EDUCATION. *Prereq:* 4-6 hou of graduate credit in the area of specialization. (1) I, II, S (Fitzgerald, Nash, Holroyd)

781(222a)—INDEPENDENT WORK IN MUSIC EDUCATION. *Prereq:* 4-6 hours *graduate credit in the area of specialization.* (2) I, II, S (Fitzgerald, Nash, Holroyd)

782(C222a)—INDEPENDENT WORK IN MUSIC EDUCATION. *Prereq:* 4-6 hou *of graduate credit in the area of specialization.* (3) I, II, S (Nash, Holroyd)

783(C222b)—INDEPENDENT WORK IN MUSIC THEORY. *Prereq:* 4-6 hours *graduate credit in the area of specialization.* (1) I, II, S (Kinney, Wright)

784(222b)—INDEPENDENT WORK IN MUSIC THEORY. *Prereq:* 4-6 hours *graduate credit in the area of specialization.* (2) I, II, S (Kinney, Wright)

785(C222b)—INDEPENDENT WORK IN MUSIC THEORY. *Prereq:* 4-6 hours *graduate credit in the area of specialization.* (3) I, II, S (Kinney, Wright)

786(C222c)—INDEPENDENT WORK IN MUSICOLOGY. *Prereq:* 4-6 *hours of grad uate credit in the area of specialization.* (1) I, II, S (Howell, Kinney, Wright)

787(222c)—INDEPENDENT WORK IN MUSICOLOGY. *Prereq:* 4-6 *hours of grad uate credit in the area of specialization.* (2) I, II, S (Howell, Kinney, Wright)

788(C222c)—INDEPENDENT WORK IN MUSICOLOGY. *Prereq:* 4-6 *hours of grad uate credit in the area of specialization.* (3) I, II, S (Howell, Kinney, Wright)

PHILOSOPHY

500(101a)—HISTORY OF PHILOSOPHY—ANCIENT AND MEDIEVAL. A survey o the philosophical thought of ancient Greece and Rome, and of medieval Christendom. (3) I (De Boer)

502(118)—PLATO AND ARISTOTLE. Plato's development of a theory of the worl and of practice, studies in selected dialogues. Analysis of passages in Aristotle's major work on natural philosophy, metaphysics, knowledge, ethics, and politics. (3) (De Boer)

510(101b)—HISTORY OF PHILOSOPHY—MODERN. A survey of modern Europea and American philosophy from the Renaissance to contemporary times. (3) II (Kuiper)

511(110)—THE MAKING OF THE MODERN MIND. A study of the intellectua background of the modern age. Renaissance humanism, 17th and 18th century rationalism 19th century romanticism and idealism are some of the major tendencies to be stressed. (3) (Kuiper)

512(106)—REPRESENTATIVE MODERN PHILOSOPHIES. A study in the origina works of the chief figures in modern philosophy. Special attention will be given t Descartes, Spinoza, Locke, Hume, and Kant. (3) (Kuiper)

515(102)—CONTEMPORARY PHILOSOPHY. A study of contemporary philosophica tendencies, notably pragmatism, idealism, the analytic movement (e.g., logical atomism logical positivism, and philosophical analysis), phenomenology, and existentialism. (3) I (Chacon)

518(140)—EXISTENTIALISM. A systematic study of the fundamental concepts and problems of existentialism. Selected readings in Kierkegaard, Marcel, Heidegger, Jaspers, and Sartre. (3) II (Chacon)

520(115)—INTERMEDIATE LOGIC. A second course in logic including the logic of classes, of relations, of propositions and propositional functions, the theory of deductive systems; and consideration of the rival schools of contemporary logical theory. (3) I (Jack)

540(120)—GREAT RELIGIONS. A descriptive survey of several religions as they developed within their culture, for example: Hinduism, Buddhism, Confucianism, Judaism Christianity. (3) I, S (De Boer)

545(125)—PHILOSOPHY OF RELIGION. A philosophical examination of religious ideas, including such topics as the origin of religion; the nature of religion; the various concepts of God, the soul, immortality; internal and external criticisms of religion. (3) II (De Boer)

550(130)—METAPHYSICS. Study of concepts and problems important for understanding the general or ultimate factors in reality; e.g., space-time, change, causality, substance, matter, life, God. (3) II (De Boer)

555(135)—EPISTEMOLOGY. A study of the origin, nature, kinds, and validity of knowledge, with a consideration of such topics as faith, intuition, belief, opinion, certainty, and probability. Also some discussion of recent developments in semantics. (3) (Chacon)

560(160)—PHILOSOPHY OF SCIENCE. An examination of the logical and epistemological foundations of empirical science, including such topics as the unity and diversity of the sciences, methodology, theory and explanation, and current studies in the language of science. *Prereq: Designed especially for undergraduate and graduate majors in the sciences. Permission of instructor to insure that the student will have an adequate background for the course.* (3) II (Jack)

580(190)—PROBLEMS OF PHILOSOPHY. This course is designed for upper division and graduate students who have had little or no formal training in philosophy but wish to study the presuppositions underlying religion, education, art, morality, and government. (3) (Chacon)

592(158)—AESTHETICS. Problems of method in aesthetics; major types of aesthetic theory. Aesthetic materials of the arts in literature, music, and the space arts. Form and types of form. Meaning in the arts. Interrelations of the arts. Lectures, discussions, reports. (Same as Art 592.) (3) I (Amyx)

620(210a,b)—TYPES OF LOGICAL THEORY. An intensive study of recent and contemporary contributions to logical theory: Whitehead and Russell, C. I. Lewis, R. Carnap, John Dewey, and others. (3) (Kuiper)
May be repeated to a maximum of six credits.

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

770(201a-h)—SEMINAR IN PHILOSOPHY. One two-hour meeting a week for discussion of current developments in philosophy as found in books and periodicals. Readings and reports. (2) (Staff)
May be repeated to a maximum of eight credits.

790(220a,b)—RESEARCH IN PHILOSOPHY. This course is primarily intended for advanced students who desire and are prepared to do research in philosophy. (3) (Staff)
May be repeated to a maximum of twelve credits.

PHYSICAL EDUCATION

The Department of Physical Education offers graduate work toward the Master of Arts or the Master of Science with a major in Physical Education. Candidates may select, subject to the approval of the Department of Physical Education, either of two plans in pursuing their graduate program.

Under Plan A the candidate must complete 24 semester hours of graduate courses with a standing of 3.0 ("B") or better. A minimum of 9 of these hours must be in Physical Education courses numbered 600 or above. The candidates shall complete at least two-thirds of his course work in the field of Physical Education and the other third may be taken in the second teaching area or in the field of Physical Education. The minimum residence required is one academic year of 36 weeks. A thesis and a reading knowledge of a modern foreign language complete the requirements under Plan A.

The modified Plan B has the same minimum requirements as Plan A except that six or more semester hours of course work may be substituted for a thesis and a reading knowledge of a modern foreign language is not required of candidates in the Department of Physical Education. Of the thirty hours of graduate credit indicated above in the modified Plan B, eight hours must be in a subject-matter area other than Physical Education and Education. At

least 12 hours must be in courses numbered 600 or above in Physical Education. The candidate under this plan must also present a major paper approved by his major professor and the director of graduate study as partial fulfillment of his requirements. This major paper may be developed as a part of a particular course requirement, or it may be done as an independent project. A student may follow this plan only with approval of the Department of Physical Education.

Candidates under Plans A and B who are not graduates of the University of Kentucky are required to teach under supervision at least one activity class during their residence. The purpose of this regulation is to provide staff members an opportunity to evaluate their teaching and leadership ability.

In order to meet the needs and interests of graduate students, the Department of Physical Education offers specialization in the following areas:

1. Administration of Physical Education
2. Athletics in Education
3. Physical and Health Education
4. Dance in Education
5. Administration of School, Community, or Private Agency Recreation
6. Rehabilitation Therapy

Each area of emphasis is organized around a central core which contains fundamental and basic knowledge generic and essential to all areas. The following core curriculum is, therefore, recommended for graduate students:

741(241)—Current Studies and Trends ..... 3 hrs.
750(250)—Curriculum and Program Development .... 3 hrs.
770(240)—Seminar ..... 2 hrs.

For details on the graduate programs of the various areas of specialization, write the Department of Physical Education, Graduate Division.

Courses For Men and Women Open to Upper Division and Graduate Students

481(181)—CAMPING IN EDUCATION. Purpose, history, organization, and conduct of camps of various types. One hour lecture and two hours laboratory. *Prereq: Physical Education* 281, *or permission of instructor.* (2) I, S (Kauffman)

482(182)—INTRAMURAL SPORTS. A study of the history and development of intramural sports. Lecture, recitation, and practice in accepted methods of organizing and administering intramural sports. (2) II, S (even years) (McCubbin)

491—DANCE IN EDUCATION. An introduction to the creative approach to dance for elementary, secondary, and college levels. The principle of kinesthetics and rhythmical forms applied to the practice of fundamental movement techniques. Two hours lecture and four hours laboratory. Prereq: Anatomy 204 and Physiology 206, P.E. 572, and a beginning course in dance, or consent of instructor. (4) II (Staff)

520(120)—PHYSIOLOGY OF EXERCISE. A comprehensive survey of the physiological and clinical aspects of exercise. Lectures, demonstrations, three hours. *Prereq: A. & P.,* 206 *or equivalent; Instructor's consent.* (3) I, II (Jokl)

540(140)—ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION. Policies and procedures of administration on the secondary school and collegiate levels. Special emphasis on construction and care of facilities, equipment and supervision of personnel. Three hours per week. (3) I, S—odd years (Clay, Carr)

541(141)—COACHING ADVANCED BASKETBALL. Lecture and recitation on the theory and practice of team play in basketball. Special emphasis is placed upon systems of offense and defense. Two hours per week. *Prereq: P.E.* 141, *or consent of instructor.* (2) I, S (Lancaster, Clay)

542(142)—COACHING ADVANCED FOOTBALL. Lecture and recitation on the theory of football. Special emphasis is placed upon systems of offense and defense. Two hours per week. *Prereq: P.E.* 142, *or consent of instructor.* (2) II, S (Bradshaw, McCubbin)

545(145)—INTRODUCTION TO TESTS AND MEASUREMENTS. The contruction and grading of essay and objective tests, construction and analysis of achievement tests, and testing and measuring in health and physical education. Two hours lecture and two hours laboratory per week. (3) II (Hackensmith)

572—KINESIOLOGY AND ITS APPLICATION. A study of basic principles of bodily movement and their application to sports, rhythmical activities and the correction of functional defects. Three hours lecture and two hours laboratory. *Prereq: Anatomy and Physiology* 206, *or equivalent.* (4) I (Hackensmith)

580(180)—ADMINISTRATION AND ORGANIZATION OF RECREATION. This course is designed to equip students and community leaders with workable procedures for developing and operating recreation programs in communities of various sizes and with varying political and social structures. (3) II, S (Kauffman)

583(183)—INTERPRETATION OF LEISURE AND RECREATION. Designed to provide students interested in recreation as a profession, as an adjunct to other work, or as informed citizens with a basic understanding of the significance of leisure and the objectives of recreation. (3) I, S (Kauffman)

592(192)—DANCE COMPOSITION. Dance choreography, program planning, directing, staging and costuming, formal program required of all students. Two hours lecture and recitation, four hours laboratory per week. *Prereq: P.E.* 491. (4) I (Staff)

595(195)—FOLK DANCE LEADERSHIP FOR SCHOOL AND COMMUNITY. Philosophy, background and methods of folk dance for schools and communities. Leadership, participation and program planning with special emphasis upon field work with community groups. One hour lecture and two hours laboratory. (2) S (Karsner, Lewis)

Courses Open to Graduate Students, Only

644(244)—RESEARCH AND ITS APPLICATION. The theory and practice of tests and measurements in the field of health and physical education. Two hours lecture and two hours laboratory. (3) I, S (Hackensmith)

650(250)—CURRICULUM AND PROGRAM DEVELOPMENT. A study of fundamental principles basic to the development of the over-all curriculum in physical education with special emphasis upon the proper selection and organization of physical education activities to meet the education and recreational needs of all students. Three hours per week. *Prereq: P.E.* 540, 343, 344. (3) I, S (even years) (Carr)

651(251)—FACILITIES, CONSTRUCTION, AND EQUIPMENT. Principles and standards for maintaining facilities, and planning construction; purchase and care of equipment. *Prereq: P.E.* 540. (2) II, S (odd years) (Seaton)

685(285)—ADMINISTRATIVE PRACTICES IN RECREATION. This course deals with such administrative practices as decision making, policy determination, public relations, personnel practices, and routine details that constitute the functions of the chief recreation officer and his staff associates. Three hours per week. *Prereq: P.E.* 580, *or consent of instructor.* (3) I, S (Kauffman)

690(290)—ORGANIZATION AND ADMINISTRATION OF DANCE IN EDUCATION. Special emphasis will be placed upon the organization and administrative program in dance to meet the needs of students from elementary through college levels. Some attention will be given to dance production, festivals and social dance functions in schools. Three hours per week. *Prereq: P.E.* 491, 592, 595. (3) II, S (odd years) (Staff)

741(241)—CURRENT STUDIES AND TRENDS. A study of modern trends in health and physical education and standards of evaluation in relation to the history of the various systems including a review of the principles and objectives. (3) I, S (even years) (Seaton)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

770(240)—SEMINAR. Required of all graduate students upon entrance. A review of current literature and problems in the field. Two hours per week. (2) I, II, S (Carr, Hackensmith)
May be repeated to a maximum of four credits.

780(280)—PROBLEMS IN RECREATION. Current problems in recreation are identified and analyzed by the application of appropriate research techniques. Designed for recreationists, school people, and community workers. (2) II, S (Kauffman)

782(242)—PROBLEMS COURSE IN PHYSICAL EDUCATION. For school administrators and directors of physical education. Students work on individual problems applicable to their situation and interests, as well as upon general school problems. (3) I, S (Hackensmith)

783(243)—PROBLEMS IN THE ADMINISTRATION OF ATHLETICS. For athletic directors; supervisors, and athletic coaches. A study of representative athletic administration procedures for colleges and public school systems. Business management is also stressed. Two hours per week. (2) II, S (Clay)

PHYSICS

The Department of Physics is well equipped with instruments of precision and has adequate laboratory and library facilities necessary to the proper conduct of the following list of advanced and graduate courses:

401—STRUCTURE OF PHYSICAL SYSTEMS. A lecture course introducing the mechanical and electromagnetic principles upon which the analyses of many physical systems rest, with specific discussions of the properties of the following: the atom, crystal structure, the atomic nucleus, and nucleons. Lectures, five hours. *Prereq: Employment as a high school science teacher.* (3) S

501(101a)—ORIENTATION IN MODERN PHYSICS FOR TEACHERS. Review of fundamentals of physics. Discussion of problems associated with High School physics teaching. Recent developments in physics. *Prereq: Employment as High School science teacher.* (3) (Kenney)

502(101b)—ORIENTATION IN MODERN PHYSICS FOR TEACHERS. Review of fundamentals of classical physics; treatment of atomic and nuclear physics, solid state, and other topics of current interest. *Prereq: Employment as High School science teacher.* (3) (Cochran)

504(104)—THEORETICAL MECHANICS. A lecture and problem course covering the fundamental laws of mechanics. Topics include kinematics of a particle, statics and dynamics of particles and rigid bodies, constrained motion, and oscillatory motion. *Prereq: Physics* 232, 242; *and Mathematics* 212. (4) (Shephard)

508(108)—OPTICS. A lecture and problem course covering the basic phenomena of optics. Topics include thick lenses, apertures, wave motion, interference, diffraction, polarization, and the theory of selected optical instruments. *Prereq: Physics* 232, 242; *and Mathematics* 212. (3) (Hanau)

510(110)—SPECTROSCOPY. A lecture and problem course dealing with the production, recording, measuring, and interpretation of atomic and molecular spectra. Topics include basic principles of atomic structure, spectographs, photometry, and spectographic analysis. *Prereq: Physics* 232, 242; *and Mathematics* 212. (3) (Hanau)

511(111)—ELECTRICITY AND MAGNETISM. A lecture and problem course dealing with the fundamental theory of electricity and magnetism. Topics include electrostatic forces and energy, conductors and dielectrics, magnetic forces, and transient and alternating currents. *Prereq: Physics* 232, 242; *and Mathematics* 212. (3) (Kenney)

512(131)—EXPERIMENTAL PHYSICS: ELECTRICITY AND MAGNETISM. An advanced laboratory course in electrical measurements. It includes calibration and use of the quadrant electrometer, the d'Arsonval galvanometer and the Type K Potentiometer; absolute determinations of electrical quantities. *Prereq. or coreq: Physics* 511 *or equivalent.* (2) (Gabbard)

514(114)—VACUUM TUBES AND CIRCUIT THEORY. A lecture and problem course covering the theory of vacuum tubes and associated circuits. It includes the solution of selected electronic circuits by the method of the Laplace transform. *Prereq: Physics* 232, 242; *and Mathematics* 212. (3) (Kern)

515(115)—THEORY OF MEASUREMENTS. A lecture and problem course in the analysis of experimental data. Topics include finding an empirical equation to fit a set of data, approximations, probability distributions, errors and deviations. *Prereq: Physics* 504 *and Mathematics* 212. (3) (Hanau)

519(119)—X-RAYS AND CRYSTAL STRUCTURE. A lecture and problem course dealing with the production and properties of x-rays. Topics include absorption, scattering, polarization, etc.; wave length measurement; the Compton effect and related quantum phenomena. *Prereq: Physics* 232, 242; *and Mathematics* 212. (3) (Gildart)

522(123a)—HEAT AND THERMODYNAMICS. A lecture and problem course stressing some of the fundamental principles of heat phenomena, the laws of thermodynamics, equations of state for ideal and real gases, continuity, derivation of thermodynamic relations. *Prereq: Physics* 232, 242; *and Mathematics* 212. (3) (Gabbard)

523(123b)—HEAT AND THERMODYNAMICS. A continuation of 522, dealing with thermodynamic functions, thermodynamic equilibrium, the phase equilibria, ionic equilibrium, electromotive force and free energy, surface phenomena, radiation. *Prereq: Physics* 522 *or equivalent.* (3) (Gabbard)

524(124)—SOLID STATE PHYSICS. Structure of solids; bonding, solid types; lattice energy; thermal, dielectric, and magnetic properties; electrons in metals and semi-conductors; theory of rectifiers, transistors and solid state devices. *Prereq: Physics* 232, 242; *Mathematics* 212. (3) (Mowat)

525(137)—EXPERIMENTAL PHYSICS: HEAT AND SOLID STATE. Thermal and electrical conductance in solids, photoelectric effect, photoresistive effect, rectification transistor action, diffusion, Hayne's experiment. *Prereq: Physics* 524. (2) (Gildart)

530(130)—EXPERIMENTAL PHYSICS: SPECTROSCOPY. An advanced laboratory course in the use and properties of various light sources, spectographs, photographic materials, and photometric methods; analysis of unknown materials by spectographic methods. *Prereq: Physics* 510 *or* 508. (2) (Hanau)

534(134)—EXPERIMENTAL PHYSICS: VACUUM TUBES. An advanced laboratory course dealing with the measurements of circuit and vacuum tube constants, and the experimental study of amplifiers, oscillators, pulse generators, saw-tooth generators, etc. *Prereq. or concur: Physics* 514 *or equivalent.* (2) (Staff)

535(135)—EXPERIMENTAL PHYSICS: ATOMIC AND NUCLEAR. Measurement of e, e/m, h/e, resonance potentials, x-ray absorption, half-lives, beta-ray and gamma-ray absorption, gamma spectra, specific activity, alpha particle ranges, and radiation dosage. *Prereq: Physics* 555 *or concur.* (2) (Gabbard)

538(138)—EXPERIMENTAL PHYSICS: LIGHT. An advanced laboratory course dealing with the properties of lenses, mirrors, prisms, gratings, and combinations of these elements in optical systems. The important phenomena of optics are studied experimentally. *Prereq: Physics* 508. (2) (Hanau)

554(155a)—FUNDAMENTAL ATOMIC AND NUCLEAR PHYSICS. Atomic models, electromagnetic radiation, special theory of relativity, x-rays and crystal structure. Compton effect, wave nature of matter, atomic spectra, vector model, Zeeman effect. *Prereq: Physics* 232, 242; *Mathematics* 212. (3) (Dardis)

555(155b)—FUNDAMENTAL ATOMIC AND NUCLEAR PHYSICS. Nuclear size; concepts of spin, parity, and statistics; alpha, beta, and gamma decay; natural radioactivity; nuclear reactions; systematics of nuclei; nuclear forces, fission and fusion. *Prereq: Physics* 554. (3) (Shephard)

556(156)—NUCLEAR REACTOR PHYSICS. A lecture and problem course covering nuclear fission and neutron diffusion as they enter into reactor theory; physical principles of reactor design; time behavior of reactors. *Prereq: Physics* 555. (3) (DeMarcus)

598,599—INTRODUCTION TO QUANTUM MECHANICS. A lecture and problem course providing an introduction to quantum mechanics at the undergraduate level. Primary emphasis is on one-dimensional problems so that fundamental ideas can be assimilated without complications of purely mathematical nature. Basic postulates, Schrodinger's wave equation and its applications. *Prereq: Physics* 232, 242; *Mathematics* 431. (3 ea.) (DeMarcus)

604(204)—CLASSICAL MECHANICS. The methods of Lagrange and Hamilton and their application to particles, systems of particles, and continuous media; variational principles; transformation theory. *Prereq: Physics* 504; *Mathematics* 431. (3) (McEllistrem)

605(205)—KINETIC THEORY OF MATTER. A course of lectures covering the classical kinetic theory of gases. Topics include the theorems of Clausius, Joule, Maxwell and Boltzmann; Brownian movements, development of equations of change of state. *Prereq: two* 500 *courses in Physics and Mathematics* 431. (3) (DeMarcus)

608(208)—MICROWAVES. A lecture and problem course reviewing electromagnetic wave theory with emphasis on solutions of Maxwell's wave equations and their applications to the modern problems of microwave transmission. *Prereq: Physics* 511; *Mathematics* 431. (3) (Staff)

612(212)—CONDUCTION OF ELECTRICITY THROUGH GASES. A lecture course covering the basic phenomena of electrical discharge in gases at low pressures. Topics include the formation of ions, their mobility, diffusion, and recombination; representative discharges. *Prereq: Physics* 511, *and either* 510 *or* 554; *and Mathematics* 431. (3) (Cochran)

613(213)—ELECTROMAGNETIC THEORY. A lecture course dealing with the application of classical electromagnetic theory to the optical phenomena of reflection, refraction, polarization, and absorption. *Prereq: Physics* 511 *and* 508; *Mathematics* 431. (3) (Sieckmann)

614(214)—TRANSIENT ELECTRIC AND VACUUM TUBE PHENOMENA. A lecture course dealing with transient currents in circuits containing variable amounts of inductance, capacitance, and resistance. Both the methods of differential equations and of the Laplace transform are used. *Prereq: Physics* 511 *or* 514; *and Mathematics* 431. (3) (Staff)

616(217a)—THEORETICAL PHYSICS. A lecture and problem course presenting the basic aspects of theoretical physics in a unified way. Representative topics: advanced dynamics, hydrodynamics, elasticity. *Prereq: two* 500 *courses in physics; and Mathematics* 431. (4) (DeMarcus)

617(217b)—THEORETICAL PHYSICS. A continuation of 616 dealing with statistical mechanics, themodynamics, electrodynamics, relativity, quantum theory. *Prereq: Physics* 616 *or equivalent.* (4) (DeMarcus)

618(218)—THERMODYNAMICS. A review of the two classical laws of thermodynamics and their dynamical and statistical mechanical support; Nernst's heat theorem; applications of classical thermodynamics to important problems, relativity thermodynamics. *Prereq: Physics* 522, 523; *and Mathematics* 431. (3) (Kern)

624(224)—THEORY OF THE SOLID STATE. A lecture and problem course covering the fundamental theory of the structure and properties of complex atoms, molecules, liquids and solids. Topics include mechanical, chemical and thermal properties of matter. *Prereq: Physics* 714 *or equivalent.* (3) (Gildart)

629(230a)—NUCLEAR PHYSICS. A lecture and problem course dealing with advanced experimental nuclear physics. Topics include properties of nuclei, nuclear transformations, observational methods, radioactivity and interaction of radiation with matter. *Prereq: Physics* 616 *or equivalent.* (3) (Cochran)

630(230b)—NUCLEAR PHYSICS. A lecture and problem course concerned with the theories of the structure of atomic nuclei. Topics include nuclear shell structure, internuclear forces, nuclear binding energies, and theory of nuclear reactions. *Prereq: Physics* 616 *or Physics* 714 *or equivalent.* (3) (McEllistrem)

631(231)—ATOMIC STRUCTURE. A lecture and problem course treating the theory of atomic structure. Topics include atomic and molecular spectra, multiplet structure, interatomic and intermolecular forces, and quantum mechanical treatment of the vector model. *Prereq: Physics* 714 *or equivalent.* (3) (McEllistrem)

632(232)—STATISTICAL MECHANICS. A lecture and problem course dealing with the thermal properties of matter from the standpoint of statistical mechanics. Topics include thermodynamic properties, perfect gases, and Fermi-Dirac statistics. *Prereq: Physics* 523 *and* 616. (3) (Dardis)

639,640(240a,b)—THEORETICAL ASTROPHYSICS. A study of those branches of physics which have thus far proved most useful in astronomical applications and a thorough treatment of several major astronomical problems which have been elucidated by these methods. *Prereq: Physics* 617, 554 *or equivalent.* (3 ea.) (DeMarcus)

650(250)—COSMIC RAYS AND RELATIVISTIC PHENOMENA. A lecture and problem course dealing with the field of cosmic rays. Topics include relativity theory, interaction of cosmic rays with matter, shower theory, properties and production of mesons. *Prereq: Physics* 617 *or equivalent.* (3) (Kenney)

651(251)—PHYSICS OF ELEMENTARY PARTICLES. Lectures and problems on topics which include elementary particles, meson theory, particle interactions (pion-nucleon, nucleon-nucleon, nucleon-nucleus), strange particles. *Prereq: Physics* 555, 617. (3) (Kenney)

706(206)—METHODS OF MATHEMATICAL PHYSICS. Solution of physical problems systematized according to the equations they satisfy. Variational methods, boundary conditions, eigenfunctions, Green's functions, integral representations, approximation procedures, with applications from electromagnetic theory, quantum mechanics, acoustics. *Prereq: consent of instructor.* (3) (Mowat)

714(215a)—QUANTUM THEORY. A lecture course covering a brief review of the origin of quantum theories, mathematical techniques of quantum mechanics, the general aspects of wave mechanics and matrix mechanics, the uncertainty principle. *Prereq: Physics* 617 *or equivalent.* (3) (DeMarcus)

715(215b)—QUANTUM THEORY. A continuation of 714 with extensions into special methods of solving problems in the theory, problems in more than one dimension, and the Pauli and Dirac theories of the electron. *Prereq: Physics* 714 *or equivalent.* (3) (DeMarcus)

768–RESIDENCE CREDIT FOR THE MASTER'S DEGREE.
(1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769–RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.
(1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

770(220a-h)–SEMINAR. A weekly meeting of the staff and graduate students of the department for presentation and discussion of recent developments in physics and of work in progress in the department. (1) (Senior Staff)
May be repeated to a maximum of eight credits.

781(125a-d)–INDEPENDENT WORK IN PHYSICS. (3) (Senior Staff)
May be repeated to a maximum of twelve credits.

790(226a,b)–RESEARCH IN PHYSICS. (3) (Senior Staff)
May be repeated to a maximum of six credits.

791(227a,b)–RESEARCH IN PHYSICS. (5) (Senior Staff)
May be repeated to a maximum of ten credits.

POLITICAL SCIENCE

Graduates of accredited colleges may become candidates for a master's degree in political science. Students who are deficient in social science background must make up their deficiencies by taking such additional courses as may be recommended by the Department. At least one course each in Political Theory and Constitutional Development is required of every candidate. This requirement will be waived in the case of candidates who have had adequate undergraduate courses in these two fields. The graduate work must include at least four of the seven fields of political science listed below. Approximately two-thirds of the twenty-four semester hours required for the master's degree must be taken in political science. The remaining hours may be taken in one or more related fields upon approval of the major professor. Nine semester hours of the work in political science must be in courses open only to graduate students.

Admission to candidacy for the doctor's degree in political science is governed by the regulations of the Graduate School, which require qualifying examinations during the second year of graduate work. Of the total semester hours presented by the candidate approximately eighteen semester hours must be in courses not open to undergraduates. At the end of his course work the candidate must pass a preliminary written and oral examination in the following fields: Political Parties and Public Opinion, Public Administration, Theory, Comparative Government, Public Law, International Law and Diplomacy, and State and Local Government. A minor in a related field may be substituted for two of the seven fields of political science, subject to the approval of the other department and of the candidate's committee. Candidates for either a major or a minor in political science are expected to have a knowledge of the related social studies as a background for the work in political science.

Upon completion of the above requirements the candidate must take an oral examination covering primarily the dissertation and the field in which the dissertation falls.

I. Political Parties and Public Opinion

570(170)–POLITICAL PARTIES. An analysis of the organization and functioning of political parties in the United States, historically and at present, and a survey of the impact of pressure groups on political parties and political action. (3) I (Jewell)

573(173)–PUBLIC OPINION. A study of the nature and function of public opinion together with an analysis of propaganda techniques and the role of the media of communication. (3) II (Jewell)

779—POLITICAL BEHAVIOR. A study of recent research in the field of political behavior, with particular emphasis on voting and legislative behavior studies. *Prereq:* A course in political parties or public opinion. (3) I (Jewell)

Related Courses in Other Departments

Psychology 544(104)—Social Psychology.

II. Public Administration

577(177a)—INTRODUCTION TO PUBLIC ADMINISTRATION. A study of theories of administrative problems of line management and of staff and auxiliary functions, and the problem of administrative responsibility. (3) I, S

578(177b)—PUBLIC PERSONNEL ADMINISTRATION. A survey of the concept of the merit system in public administration, recruitment, position classification, pay policies, employee relations and morale, tenure, promotion, transfer, and training in the public service. (3) II

579(177c)—ADMINISTRATIVE REGULATION. The regulatory movement, legal bases of regulation, problems of administration of regulatory agencies, procedure in rulemaking and administrative adjudication, and judicial control. (3) II

790(206)—SPECIAL PROBLEMS IN PUBLIC ADMINISTRATION. A research course in selected problems of public administration. The problems will be selected in accordance with the needs and desires of students registered for the course. (3) I

Related Courses in Other Departments

Economics 402(102)—Labor Problems.
Economics 504(104)—Public Finance.
Economics 524(124)—State and Local Taxation.
Economics 530(130)—Labor Legislation.
Law 542(167)—Administrative Law.
Social Work 500(100)—Public Welfare Administration.
Social Work 530(130a)—Community Organization.
Social Work 551(151)—Public Assistance.

III. Theory

571(171a)—EARLY POLITICAL THEORY. The political theories of Plato and Aristotle, and Roman political thought. Thomas Aquinas, Dante, Christian political thought. (3) I (Milam)

572(171b)—MODERN POLITICAL THEORY. Study of the writings of Machiavelli, Hobbes, Locke, Burke, Rousseau, Bentham, Mill and Marx. (3) II (Milam)

575(175)—CONTEMPORARY AMERICAN POLITICAL THOUGHT. A study of American ideas of laissez faire and free enterprise; the new nationalism, the new freedom, the new deal, and current ideas of America's role in world affairs. (3) II, S (Milam)

770(271)—SEMINAR IN CONTEMPORARY POLITICAL THEORY. An intensive study of the nature of the contemporary ideologies of socialism, communism, syndicalism, pluralism, anarchism, fascism, political and social democracy. (3) I, S (Milam)

Related Courses in Other Departments

Philosophy 500 & 510(101a,b)—History of Philosophy.

IV. Comparative Government

555(155a)—COMPARATIVE GOVERNMENT—PARLIAMENTARY DEMOCRACIES. A study of the governments of Great Britain and the Dominions, France, and Scandinavia. (3) I, S (Drennon)

556(155b)—COMPARATIVE GOVERNMENT—TOTALITARIAN STATES. A study of the totalitarian states of Europe and Asia. (3) II, S (Drennon)

568(168)—THE GOVERNMENTS AND POLITICS OF EASTERN ASIA. An introductory study of the political institutions of China, Japan, the Philippines, India, and Indonesia. (3) I, S (Chambliss)

V. Public Law

559(159a)—AMERICAN CONSTITUTIONAL DEVELOPMENT. Historical survey of the making of the constitution and its interpretation through principal statutes and judicial decisions down to 1870. (3) I, S (Trimble)

560(159b)—AMERICAN CONSTITUTIONAL DEVELOPMENT. Continuation of the above survey from 1870 to the present. (3) II (Trimble)

576(176)—LEGISLATION. A functional study of legislative bodies and the process of legislation. Emphasis is placed on the organization of legislative assemblies, the operation of the committee system, the actual process of enactment, including the drafting of bills, and the external controls over legislation. (3) II (Jewell)

761(211)—THE CONSTITUTION AND CIVIL RIGHTS. The American conception of civil rights as expounded by the Constitutional Fathers and as interpreted by the courts. The social implications of these rights. (3) I, S (Trimble)

762(213)—FEDERAL CENTRALIZATION. A study of the shifting of power and control from the states to the federal government as a result of the economic development of the country and the alteration of our constitutional system. (3) II (Trimble)

Related Courses in Other Departments

History 561,562(131a,b)—English Constitutional History.
Law 529(161)—Constitutional Law I and II.

VI. International Law and Diplomacy

501(101)—LATIN AMERICAN RELATIONS. The relations between the United States and the Latin American countries, with emphasis on the Monroe Doctrine and Pan-Americanism. (3) II, S (Drennon)

550(150)—INTERNATIONAL LAW. Sources and sanctions of international law, recognition, intervention, jurisdiction; nationality; protection of citizens abroad; diplomatic intercourse of states; treaties; and the treatment of aliens. (3) II (Vandenbosch)

566(166)—THE UNITED NATIONS. Background of the United Nations; functions and development of the chief organs and affiliated agencies; the Great Power Veto; problems; achievements. (3) II, S (Vandenbosch)

774(204)—INTERNATIONAL RELATIONS AND ORGANIZATION. Social and economic factors leading to the establishment of international administrative organs, the International Labor Organization, the League of Nations; the United Nations and related organizations. (3) II (Vandenbosch)

775(217)—CONTEMPORARY AMERICAN DIPLOMATIC PROBLEMS. An examination of the more important current problems of American foreign policy. (3) I, S (Vandenbosch)

Related Courses in Other Departments

Economics 527(127)—International Economics.
History 500 & 501 (100a, b)—The Diplomacy and Foreign Policy of the United States.
History 565 & 566 (135a, b)—The British Empire.
History 583 (120)—Europe Since 1919.
History 584—Russian Revolutions and the Soviet System I.
History 587—Russian Revolutions and the Soviet System II.
History 589—History of Russian Social and Political Thought, 1789-1914.
History 591—Political and Diplomatic History of East Central Europe from the French Revolution to the end of World War I.
History 594—Political and Diplomatic History of East Central Europe since World War I.
History 595 & 596 (190a, b)—The Far East.
Law 540 (164)—Conflict of Laws.
Diplomacy 530 (160)—Conduct of American Foreign Policy.

VII. State and Local Government

540(140)—RURAL LOCAL GOVERNMENT. A study of local government in rural America with particular emphasis upon county government. (3) (Vanlandingham)

552(152)—MUNICIPAL GOVERNMENT. A course in the study of the structure and functions of modern city governments with considerable attention to governments situated within metropolitan areas. (3) I, II (Vanlandingham)

574(172)—KENTUCKY GOVERNMENT AND CONSTITUTION. An intensive study of government and administration in Kentucky. The course is intended primarily for teachers of civics in the secondary schools, and for teachers of government in colleges. (3) II (Reeves)

752—PROBLEMS IN STATE AND LOCAL GOVERNMENT. An intensive study of the basic problems of state and local government. Varying emphasis will be given, particular problem areas consistent with the background and needs of the student. Added emphasis will be given also to such current problems as are of fundamental importance. (3) II (Reeves, Vanlandingham)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

795(180a,b)—INDEPENDENT WORK. Reading course on graduate level directed by members of staff qualified to direct graduate work. It will involve selection of the material, books, research reports, etc. to be read by the student under the direction of a staff member. (3) I (Staff)
May be repeated to a maximum of six credits.

PSYCHOLOGY

The department's graduate program includes work leading to the master's degree in general psychology and to the Ph.D. degree in the fields of clinical or general psychology, the latter with concentration in any of the various areas represented in the department.

In cooperation with the Veterans Administration and the Kentucky Department of Mental Health, the Psychology Department offers graduate training in clinical psychology leading to the Ph.D. degree. Students in these programs usually have part-time assignments in hospitals or clinics in the Veterans Administration or Department of Mental Health. Various other means of securing practical training in clinical psychology are afforded by other hospitals and clinics in the locality.

The Department operates a speech clinic and an audiology clinic. Diagnosis and corrective therapy is provided for children and adults with speech and hearing disorders, and training is offered in the techniques of speech correction and clinical audiology.

The Department is affiliated with the University testing and counseling services. The records of scores obtained by students on various tests of intelligence, aptitudes, and achievement are available to graduate students who wish to do research on problems of student personnel.

(For information concerning the doctoral program in counseling and guidance, see page 25.)

The Department cooperates in the operation of the Child Guidance Service.

The Department offers to industries and business establishments an industrial psychological service, which includes various forms of testing, personnel surveys, selection devices, and advice on miscellaneous problems of personnel. Students who are interested in industrial personnel work have opportunities to obtain practical experience and to do research in this field.

A laboratory for the study of animal behavior is provided and equipped for research and class work on white rats and other lower animals.

505(108)—EXPERIMENTAL PSYCHOLOGY. An experimental study of the nature of sensation and perception—the process by which we know the world through our senses: vision; hearing; taste and smell; the skin senses. *Prereq: Psychology* 100. (4) I (Donahoe)

506—LABORATORY TO ACCOMPANY 505. Two hours. (0)

507(113)—PSYCHOLOGY OF LEARNING. An experimental study of the learning process with an analysis of various types of learning—verbal learning, form learning, conditioned response learning, acquisition of skills, memory, problem solving, and thinking. *Prereq: Psychology* 100. (4) II (Donahoe)

508–LABORATORY TO ACCOMPANY 507. Two hours. (0)

509(116)–ANIMAL BEHAVIOR. Experimental techniques used in investigations of animal behavior. Topics include: heredity and environment, activity, instinct, motivation, learning, sensory discrimination, and personality in subhuman species. *Prereq: Psychology* 100. (4) I (Newbury)

510–LABORATORY TO ACCOMPANY 509. Two hours. (0)

511(125)–EXPERIMENTAL CHILD STUDY. An advanced course in the psychology of the normal child. The scientific background of experimental and observation method. Opportunities are provided to work with children. *Prereq: Psychology* 200. (3) II (Estes)

520(124)–MENTAL HYGIENE. A general orientation to the subject of mental hygiene, its historical development, its scope and relation to various sciences. The individual and cultural determinants of behavior will be discussed. *Prereq: Phychology* 100. (3) I, II, S (Chapman)

521(114)–ABNORMAL PSYCHOLOGY. Disturbed conduct and thinking studied from both the theoretical and the practical points of view. The major psychoses and neuroses are given special consideration. Some opportunity for clinical observation. *Prereq: Psychology* 100. (3) I, II, S (Pattie)

522(121)–COUNSELING PSYCHOLOGY. The methods of dealing with problems in counseling psychology in college and high school, including the problems of selection, classification, grading, personal adjustment, motivation, academic, vocational and personal counseling. *Prereq: Psychology* 100. (3) I, S (Elton)

523(141)–PSYCHOLOGY OF THE CRIMINAL. A study of psychological factors involved in criminality, with special emphasis on the emotional and personality patterns underlying the life of the criminal, and the problems brought about by incarceration. *Prereq: Psychology* 100. (2) I (Watson)

530(117)–BIOLOGY OF MOTIVATION. Fundamental activating and goal-seeking processes of living organisms, biologically considered, including experimental and theoretical studies on such topics as instincts, drives, motives, appetites, and the taste preferences. *Prereq: Psychology* 100. (2) I (Newbury)

531(115)–GENETIC PSYCHOLOGY. Influence of hereditary factors in the development of human behavior. A critical survey of the evidence regarding psychological traits such as musical and other special abilities, intelligence, and interests. *Prereq: Psychology* 100. (3) II (Newbury)

535(150)–PSYCHOLOGICAL TESTING. A general orientation to the field of psychological testing. Introduction to the principles and methods of psychological testing, and a survey of the various kinds of psychological tests. *Prereq: Psychology* 100, 201. (3) I, S (Staff)

540(127)–INTRODUCTION TO INDUSTRIAL PSYCHOLOGY. Review of the functions and findings of psychology applicable to business and industry. Topics covered are: employment procedures, personnel testing, attitude analysis, motivation, and morale. *Prereq: Psychology* 100. (3) I (Roadman)

541(128)–PSYCHOLOGY OF INDUSTRIAL PERSONNEL PROCEDURES. A practical course for those preparing for personnel administration and for psychology in industry and business. A study is made of the theory and methods of position classification, job analysis, job evaluation, merit rating, supervisor selection and training, and collective bargaining. *Prereq: Psychology* 100. (3) II (Roadman)

544(104)–SOCIAL PSYCHOLOGY. Description and explanation of social phenomena in terms of the original and acquired reaction systems of the individual. Topics given special consideration: crowds, mob behavior, propaganda, and nationalism. *Prereq: Psychology* 100. (3) I, S (Lott)

545(105)–SMALL GROUP BEHAVIOR. The course will systematically cover theoretical and empirical approaches to small groups. Attention will be given to certain group properties and how these properties have been manipulated experimentally. *Prereq: one introductory course in psychology, one introductory course in sociology.* (3) II (Lott)

550(130a)–SPEECH PATHOLOGY: A SURVEY. An introduction to the nature, causes and treatment of the major disorders of speech: articulation, stuttering, voice, cleft palate, hearing, cerebral palsy and aphasia. *Prereq: Psychology* 100. (3) I, S (Diehl)

551(130b)–SPEECH PATHOLOGY: AN INTRODUCTION TO THERAPY. Observation and discussion of and limited supervised experience with therapeutic techniques and procedures of speech therapy. *Prereq:* 550 *or may be taken concurrently.* (3) II (Diehl)

552(131)–STUTTERING AND ITS CORRECTION. The nature, causes and treatment of stuttering, with emphasis on therapeutic procedures. *Prereq: Psychology* 550. (3) II (Diehl)

553(132)—SPEECH MECHANISMS. A detailed investigation of the speech musculature: respiration, phonation, resonation, and articulation. Voice disorders and cleft palate will be given special emphasis. *Prereq: Psychology* 550. (3) I (Diehl)

560(133)—INTRODUCTION TO CLINICAL AUDIOLOGY. Topics covered are the auditory stimulus, air and bone conduction thresholds, masking, speech audiometry and auditory rehabilitation. *Prereq: Psychology* 550. (3) II (Kodman)

561(134)—AUDIOMETRY. Methods and techniques for evaluating the hearing of large samples (school children, industry, etc.). Study of test instruments, calibration and variables in testing procedures. Essentials of hearing conservation. *Prereq: Psychology* 560 *or consent of instructor.* (3) I, S (Kodman)

562(135)—INTRODUCTION TO HEARING DISORDERS. Types of hearing loss. Classification of organic hearing disorders. Non-organic hearing disorders. Psychological effects of impaired hearing. Differential diagnosis. *Prereq: Psychology* 551 *and* 560. (3) II (Kodman)

563(136)—ADVANCED CLINICAL METHODS FOR THE AURALLY HANDICAPPED. Principles and methods of speech and hearing therapy including speech reading, auditory training, speech conservation and hearing aid counseling for children and adults. *Prereq: Psychology* 562 *or equivalent.* (3) S (Kodman)

600(222)—SYSTEMS OF PSYCHOLOGY AND THEIR HISTORY. A survey of the history of psychology and an intensive study of current systems of psychology. (3) I (Pattie)

601,602(231a,b)—PSYCHOLOGICAL THEORIES. An examination of theories of learning, perception, and personality. The relation of these theories to psychological research will be examined. *Prereq: Psychology* 505, 507, 600. (3 ea.) I, II (Horton)

603(253)—PSYCHOPATHOLOGY. Problems of differentiation between the various neuroses and psychoses with emphasis upon the affective and conative factors. *Prereq: Psychology* 521, 602. (4) I (Dimmick)

610(215)—PSYCHOMETRICS. Analysis and interpretation of human measurements. The course deals with the computation and interpretation of simple, partial, and multiple correlations, regression equations, and reliability of measures. *Prereq: Psy.* 336 *or equivalent.* (3) I (Calvin)

611(270)—PSYCHOLOGICAL RESEARCH. A study of the application of experimental methods in the major areas of psychology, including sensation and perception, learning, motivation, emotion, and personality. The design of research studies will be emphasized. *Prereq: Psychology* 505, 507, 610. (3) II (Donahoe)

615(211)—MENTAL WORK AND FATIGUE. A laboratory course. Two hours devoted to experiments and two hours discussion each week. *Prereq: an advanced course in experimental psychology and elementary statistics, or equivalent.* (3) I

616—LABORATORY TO ACCOMPANY 615. Two hours. (0)

617(212)—THE EMOTIONS. An experimental study of feeling and emotion. The following aspects of emotional behavior are considered: the conscious experience of emotion; behavior in emotional situations; physiological changes accompanying emotion. *Prereq: Psychology* 505. (3) II

618(254)—AREAS OF RESEARCH IN PSYCHOPATHOLOGY. A consideration of the research evidence of several problems in psychopathology. *Prereq: One course each in abnormal psychology, statistics, and experimental psychology. Permission of instructor required.* (4) I (Chapman)

630(219)—CLINICAL PSYCHOLOGY. A survey of clinical work on the diagnosis and adjustment of problem children and adults. The course gives practical training and experience with representative cases. (4) II (Harris)

631(217)—PSYCHOLOGY OF LANGUAGE. A survey of semantic uses of languages as related to human behavior. Special attention will be given to language problems of brain injured; aphasic, cerebral palsied, and mentally disordered. (2) II (Diehl)

640(225)—PRACTICE IN TESTING: INTELLIGENCE TESTS. This course provides advanced laboratory practice in the measurement of intelligence by individual techniques. Six hours a week. *Prereq: Psychology* 535 *or equivalent.* (3) I, S (Estes)

641(226)—PSYCHOLOGICAL MEASURING INSTRUMENTS. A study is made of a wide variety of psychological tests including group intelligence tests, personality and interest inventories, area aptitude tests, and special aptitude tests. *Prereq: Psychology* 201. (3)

642(234a)—PRINCIPLES OF TEST CONSTRUCTION. A survey of the principles involved in different types of standardized tests, followed by the construction and item analysis of an original test by the student. *Prereq: Psychology* 610. (3)

643(234b)—TEST STANDARDIZATION. A continuation of 642. The student will administer a revised form of his preliminary test to an adequate sampling of the appropriate population and will determine its reliability and validity. *Prereq: Psychology* 642. (3)

644,645(251a,b)—PROJECTIVE TECHNIQUES. Projective tests as instruments in obtaining information concerning thought content, attitudes and feelings; their use in clinical diagnosis and therapy. Practice in administering, scoring, and interpretation. *Prereq:* Psychology 630, 640. (3 ea.) I, II (Dimmick)

646(237)—CLINICAL TESTING. Practical experience in the application of clinical diagnostic techniques to a variety of pathological subjects. *Prereq: Psychology* 640. (2) I (Harris)

650(235)—DIAGNOSIS AND COUNSELING IN COUNSELING PSYCHOLOGY. An advanced course in diagnosis and application of theories, techniques and tools in counseling psychology. *Prereq: A graduate major in psychology or education.* (3)

651(252)—PSYCHOTHERAPY. Theories and techniques of psychotherapeutic procedures including directive, non-directive, and play therapies. Demonstration and supervised experience in these techniques. *Prereq: Completion of one year of graduate study in psychology.* (3) II (Dimmick)

652(300a)—MEDICAL THERAPEUTIC PROCEDURE. Rationale, procedures, and results of four important psychiatric therapeutic methods: (1) electrical and pharmacological shock, (2) narcohypnosis or drug-analytic methods, (3) malaria and other types of fever therapy, and (4) prefrontal lobotomy. (1)

653(300b)—MEDICAL THERAPEUTIC PROCEDURE. This course presents the history, rationale, indications, procedures, and results of psychotherapeutic methods. (1)

661(310a)—PRACTICUM IN CLINICAL PSYCHOLOGY. Students rotate among five different institutions, including neuropsychiatric hospitals, reformatories, institutes for the feebleminded, and child guidance clinics. *Prereq: Psychology* 630, 640, 644. (3) I, II (Estes, Chapman)
May be repeated to a maximum of twelve credits.

662(312a)—PRACTICUM IN CHILD PSYCHOLOGY. Nine hours of supervised work each week. (3) I, II (Estes)
May be repeated to a maximum of twelve credits.

663(313a-h)—PRACTICUM IN INDUSTRIAL PSYCHOLOGY. (3)
May be repeated to a maximum of twelve credits.

664(315a,b)—PRACTICUM IN SPEECH THERAPY. Practical case work in speech therapy in speech clinic, hospitals, and public schools. Training in diagnostic examinations, case history methods, and group therapy. *Prereq: Psychology* 550, 551. (3) I, II, S (Diehl)
May be repeated to a maximum of six credits.

665(311a-h)—PRACTICUM IN COUNSELING PSYCHOLOGY. Supervised experience in application of diagnostic and interviewing techniques in a Counseling Service. (3) I, II, S
May be repeated to a maximum of twelve credits.

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

770(201a-d)—SEMINAR IN PSYCHOLOGY, I. One two-hour discussion each week on a research problem under investigation by a graduate student or staff member. For M.A. candidates. (0) I, II (Staff)
May be repeated indefinitely.

771(201e-m)—SEMINAR IN PSYCHOLOGY, II. One two-hour discussion each week on a research problem under investigation by a graduate student or staff member. For Ph.D. candidates. (0) I, II (Staff)
May be repeated indefinitely.

779(205a,b)—SEMINAR IN SOCIAL PSYCHOLOGY. Each semester some topic in the field of social psychology such as attitudes and beliefs, structure and function of social groups, social determinants of behavior, leadership, and morale will be studied intensively. Same as Soc. 779. (3) II (Lott, Claster)
May be repeated to a maximum of six credits.

780(203a)—PROBLEMS IN PSYCHOLOGY. Shorter research problems are registered under this number. A minimum of six hours per week is required in consultation with the instructor. (2) I, II, S (Staff)
May be repeated to a maximum of twelve credits.

790(210a)—RESEARCH IN PSYCHOLOGY. Research or thesis work may be registered under this number. A minimum of nine hours a week is required on research conducted in consultation with the instructor. (3) I, II, S (Staff)
May be repeated to a maximum of twelve credits.

RADIO-TV-FILMS

While no advanced degrees are offered at present with a major in Radio-TV-Films, graduate students may find the following courses of value if they are interested in any phase of radio, television or film work.

Departmental facilities include an FM transmitter, three studios, two announce booths, two studio control rooms, music library, news wire, sound-on-film recording studio, and complete 16 mm film equipment and editing facilities.

501(101)—RADIO-TV REGULATIONS. Two recitation or lecture periods per week, devoted to an intensive study of Parts 2, 3, and 4 of the Rules and Regulations of the Federal Communications Commission, including various application procedures; the music licensing regulations of ASCAP, SESAC, and BMI, and programming practices; censorship through FCC licensing practices; libel and slander copyrights as applied to broadcasting. (2) (Press)

505(102)—ADVANCED RADIO-TV ANNOUNCING. One recitation or lecture period. The study of techniques pertaining to specialized radio-TV announcing, news commentating, public events, the interview, round-table participation and moderation, public forums, master of ceremonies, concert announcing and art of ad-libbing. *Prereq: Radio-TV Films* 201. (2) (Hallock)

506—LABORATORY TO ACCOMPANY 505. Two hours. (0)

510(103)—RADIO AND TELEVISION ADVERTISING. Two recitation periods per week. The data and techniques of radio and television advertising including problems of coverage and circulation, spot campaigns, testing, time buying, the agency, measuring broadcast effectiveness, merchandising radio and television advertising, and time selling. (2) (Hallock)

515(105a)—RADIO-TV-SCRIPT WRITING. One recitation per week. Practice in script-writing in the various short forms; music continuities, commercials, audience participation programs, interviews, talks, and unit and serial drama-with attention to techniques of television as well as radio writing. (2) (Press)

516—LABORATORY TO ACCOMPANY 515. Two hours. (0)

520(106a)—RADIO-TV PRODUCTION. One recitation per week. The tools of Production Directing. General procedures, application of procedure, including program building, studio problems and projects; casting, rehearsing and acting, on-the-air practice. (2) (Russell-Tutty)

521—LABORATORY TO ACCOMPANY 520. Two hours. (0)

525(106b)—RADIO-TV ADVANCED PRODUCTION. Advanced practice in radio-TV production involving research on assigned projects for radio and TV broadcast. Recitation. Continuation of 520. *Prereq: Radio-TV-Films* 515 *and* 520 *or permission of instructor.* (2) (Russell-Tutty)

526—LABORATORY TO ACCOMPANY 525. Two hours. (0)

530(110)—PROSEMINAR. One recitation per week. Lectures and outside readings devoted to radio and TV and their relation to other communications media from the standpoint of structure, function, process, basic tools of research, control, content, the audience, and effect. *Prereq: permission of instructor.* (1) (Press)

535(111-1)—CINEMATOGRAPHY. One recitation per week. The art of making films for television, including the mechanics of motion picture photography. A study of equipment, lenses, lighting, color, editing and set designing. *Prereq: consent of instructor.* (2) (Hallock)

536—LABORATORY TO ACCOMPANY 535. Two hours. (0)

SOCIAL WORK

Courses in Social Work listed below may be taken for graduate credit. Major programs of study in this field leading to advanced degrees are not offered at the present time.

500(100)—PUBLIC WELFARE ADMINISTRATION. Philosophy, background, and methods of tax-supported social work. The inter-relationship of federal, state and local services; standards and supervision as influenced by federal welfare legislation. *Prereq: two courses in social work.* (3) II (Wetzel)

505(105)—CHILD WELFARE SERVICES. A study of community and national programs for child care and protection, including aid to dependent children and other social security services. (2 or 3) I, S (Theobald)

510(110)—PSYCHIATRIC INFORMATION FOR SOCIAL WORKERS. An analysis of personality development and behavior patterns with special reference to psychiatric interpretations and their implication for social case work. *Prereq: two courses in social work or special permission.* (2) I (Gail)

513(113)—INTRODUCTION TO SOCIAL CASE WORK. An introductory course in the generic principles of social case work. Discussion based on selected readings and case records. *Prereq: two courses in social work or special permission.* (2) II (Theobald)

516(116)—SOCIAL WORK RESEARCH AND STATISTICS. A consideration of statistical and other types of research in social work problems with illustrations drawn from current studies of government and private welfare agencies. *Prereq: two courses in social work.* (3) I (Wetzel)

530(130a)—COMMUNITY ORGANIZATION FOR SOCIAL WELFARE. Methods and techniques of social welfare planning. Analysis of needs and resources, coordination of agencies, financing and developing chest and council programs, and the interpretation of social work. (3) I, S (Wetzel)

531(130b)—COMMUNITY ORGANIZATION FOR SOCIAL WELFARE. A continuation of 530 with special emphasis on the organization and function of national and international welfare agencies. *Prereq: S.W. 530 or permission of instructor.* (3) II (Wetzel)

540(140a)—PRINCIPLES OF SOCIAL GROUP WORK. A critical study of the theories and practices of social group work with reference to the work of public and private agencies in this field. (3) I, S (Wilson)

541(140b)—ADMINISTRATION AND SUPERVISION OF GROUP WORK AGENCY PROGRAMS. The group work process as applied to agency administration, supervision of staff and volunteers, statistical and process recording, evaluation of program, personnel and committee relationships in the group work field. *Prereq: S.W. 540 or permission of instructor.* (3) II (Wilson)

551(151)—PUBLIC ASSISTANCE PROGRAMS. A study of the current function of public assistance upon the federal, state and local levels with emphasis on the public assistance provisions of the Social Security Act, general relief, and work relief policies. (3) II (Wetzel)

617(217)—GENERIC SOCIAL CASE WORK. An introductory course for graduate students with emphasis upon the application of case work in problems of increasing complexity. *Prereq: S.W. 513, or special permission.* (2) II (Theobald)

625(225)—SOCIAL INSURANCE. A study of social insurance in Europe and the United States. Emphasis will be given to the problems in administration, financing, and coverage. (2) II (Wetzel)

SOCIOLOGY

Advanced degrees available with major work in sociology are Master of Arts, Master of Science, Master of Science in Agriculture, and Doctor of Philosophy.

The University of Kentucky has two departments concerned with graduate instruction in sociology: The Department of Sociology in the College of Arts and Sciences and the Department of Rural Sociology in the College of Agriculture and Home Economics. The departments have common headship, a common chairman of graduate study, and a coordinated program of graduate

instruction. Each graduate student is assigned an adviser according to his field of interest.

In addition to resident teaching, the staffs of both departments are engaged in various research and consultative activities through which the student's graduate experience is enriched, both indirectly and directly.

In the Department of Sociology there are:

1. The Social Research Service, conducting a program of sociological studies, surveys and advanced research projects.
2. The Bureau of Community Service, offering counsel to citizens interested in community improvement.

The Department of Rural Sociology participates in three related, though separate, parts of the University: (1) as a part of the College of Agriculture and Home Economics and of the Graduate School, it offers both undergraduate and graduate courses, (2) as a part of the Agricultural Experiment Station it carries on research in rural sociology, and (3) as a part of the Extension Service it is involved in applying the results of sociological research to the problems of rural people of the state.

The Department of Behavioral Science in the College of Medicine includes sociologists on its staff and conducts research and other activities of a sociological nature. Sociology graduate students with appropriate training and interests may participate in activities of this Department and hold graduate assistantships or other appointments therein.

501(121)—POPULATION ANALYSIS. Distribution and composition, fertility and mortality, migration, ecological relationships and growth of population. (3) II (Ford)

502—LABORATORY IN METHODS OF DEMOGRAPHIC ANALYSIS. Application of statistical techniques employed in the analysis of census and vital statistics data, including methods of population standardization, life table construction, and preparation of population estimates. Three hours weekly. *Prereq: An introductory statistics course and* Soc. 501, or taken concur. (1) II (Ford)

503(127)—SOCIAL CLASSES. A systematic treatment of the factors underlying social differentiation and stratification, with particular attention to class and caste; social mobility in American society. *Prereq: one sociology course.* (3) I (Kolaja)

509(109a)—THE FAMILY. A study of the institutions of marriage and the family and an analysis of the various factors and forces at work in our time which are affecting the individual marital relationship. *Prereq: one sociology course.* (3) I, II, S (Gladden)

510(109b)—THE FAMILY. A study of the various social situations in which children grow to early adolescence with emphasis on the primary group relationships in home, neighborhood, play group, and school. *Prereq: Sociology 509 or permission of instructor.* (3) II, S (Gladden)

519(170)—SOCIOLOGY OF URBAN LIFE. This course is a study of the sociology of city life. The major emphasis is upon the ecological and social characteristics of urban life in contrast to rural community life. *Prereq: an introductory sociology course or approval of instructor.* (3) (Sutton)

520(128)—THE SOCIOLOGY OF THE SOUTH. Analysis of the population and social organization of the South and of the factors influencing the development and utilization of the human resources of the region. *Prereq: senior standing of social science majors; others by arrangement.* (3) (Staff)

521(126)—INDUSTRIAL SOCIOLOGY. A sociological analysis of the division of labor, the characteristics of occupational groupings; principal socio-economic movements, and group relationships in modern industry. *Prereq: one sociology and one economics course.* (3) (Kolaja)

525(129)—RELIGION AND CULTURE. An analysis of the structure, function, and process of religion, using the development of the Hebrew and Christian religions to show social origins of the two faiths and the effect of cultural change on their growth. (3) I (Gladden)

526(142)—CULTURE AND PERSONALITY. The cultural basis of personality. Personal character considered as the result of culturally fostered patterns. The ideal personality in several selected societies. (Same as Anthropology 526.) (3) (Essene)

527(110)—HEALTH AND SOCIETY. Historical and cross-cultural analysis of human behavior in illness; medicine as a behavior system. Relates components of contemporary medicine to pertinent concepts of social process. *Prereq: permission of instructor.* (3) II (Straus)

531(131)—SOCIOLOGICAL ANALYSIS OF AMERICAN SOCIETY. A study of the contemporary U.S.A. with emphasis upon the changing relations among various aspects of American society and culture. *Prereq: one sociology course.* (3) (Staff)

532(132a,b)—INTERGROUP RELATIONS. Analysis of relationships between groups which differ in religious, ethnic, or socio-cultural backgrounds; the development of educational and social techniques for reduction of tensions. (Same as Education 532.) (3) S (Staff)

May be repeated to a maximum of six credits.

533—SOCIAL ANTHROPOLOGY. History and theory of social anthropology with special emphasis on the comparative approach to analysis of structure, function, and change in social and cultural systems. *Prereq: Consent of instructor.* (Same as Anthropology 533) (3) II (Pearsall)

536—SOCIOLOGY OF DEVIANT BEHAVIOR. A systematic examination of the various types of social disorganization, with particular emphasis upon the sociological explanation of underlying factors. *Prereq: one sociology course.* (3) II (Ball)

537(103)—CRIMINOLOGY. A study of general conditions as to crime and delinquency, of measures of punishment and reform of offenders, of criminal procedure and its possible reform, and of measures for the prevention of crime. (3) I, II (Kaplan)

538(108)—JUVENILE DELINQUENCY. Study of the extent, ecological distribution, and etiology of delinquency in contemporary American society, including a critical examination of trends and methods of treatment. (3) I (Ball)

542(134)—HUMAN RELATIONS IN ADMINISTRATION. Analysis of the role of social structure, leadership, authority, power, and psychological stress in the administration of large-scale enterprises. (3) (Staff)

544(104)—SOCIAL PSYCHOLOGY. Description and explanation of social phenomena in terms of the original and acquired reaction systems of the individual. Topics given special consideration: crowds, mob behavior, propaganda, and nationalism. *Prereq: Psychology* 100. (Same as Psychology 544.) (3) (Lott)

546(112)—SOCIAL FACTORS IN MENTAL HEALTH. The significance of social and cultural factors in the recognition, course, and management of mental health problems; social organization of the mental hospital and cultural alternatives to hospitalization. *Prereq: prior course work in sociology, anthropology, or psychology and permission of instructor.* (3) I (Mabry)

547(113)—THE SOCIOLOGY OF AGING. Analysis of demographic and institutional patterns, social roles, psychological and physiological changes, and rehabilitative and educational programs associated with aging. (3) (Staff)

548—THE SOCIOLOGY OF PUBLIC OPINION. Introduction to the study of public opinion and mass communication in American society. The formation of public opinion and the effects of mass media are analyzed. (3) I (alternate years) (Staff)

551(106)—PRINCIPLES OF SOCIOLOGY. A survey of the basic elements of culture, collective behavior, communities, social institutions, and social change. Basic concepts required for the analysis of sociological data are systematically considered. (3) I, II, S (Staff)

561(107)—COMPARATIVE SOCIOLOGY. A study of the dynamics of culture as shown in a primitive, a peasant, and a modern culture system. (3) (Staff)

571(122)—CONTEMPORARY SOCIOLOGICAL THEORY. A study of the leading developments in sociological theory and methodology from Comte to the present time. *Prereq: two sociology courses.* (3) II (Staff)

581(124)—TECHNIQUES OF SOCIAL INVESTIGATION. A study of the practical applications of sociology in organizing, conducting, and interpreting social surveys and other forms of sociological research. *Prereq: one sociology course.* (3) I (Ball)

582—MEASUREMENT OF ATTITUDES AND PUBLIC OPINION. Attention is focused upon measurement procedures in the study of public opinion and attitudes. Study of contemporary research problems included. *Prereq: Introductory Statistics, or Soc.* 548, *or* 581. Given in alternate years. (3) II (Staff)

625(228)—SOCIOLOGY OF RELIGION. Critical study of reciprocal relation of religion and culture, the function of religion in society, social sources of religious concepts, religious differentiation and institutionalization, the problem of church and state. (3) (Flint, Gladden)

632(224)—MINORITY GROUPS. A sociological scheme of analysis is applied to the special problems of adjustment arising from ethnic group relations and culture contacts. (3) (Coleman)

651(225)—SYSTEMATIC SOCIOLOGY. An intensive study of certain selected sociological theorists such as Weber, Durkheim, Simmel, Pareto, and others. (3) (Kolaja)

661(230)—EDUCATIONAL SOCIOLOGY. A course in the sociological foundations of education. (Same as Education 661.) (3) II, S (Staff)

681(208)—RESEARCH DESIGN AND ANALYSIS. Problem definition and delimitation, design appropriate to problem and data, and selection of appropriate analysis techniques; critical examination of representative research studies and students' designs. *Prereq: Elementary Statistics and Sociology* 581 *or equivalents.* (3) II (Ball)

750(260)—PROBLEMS IN EDUCATIONAL SOCIOLOGY. An advanced course in the application of sociological findings to education, including consideration of southern regional problems and potentialities. *Prereq:* 12 *semester hours of graduate work including Sociology* 661 *or equivalent.* (Same as Education 750.) (3) S (Staff)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

770(201a,b)—SOCIOLOGY SEMINAR. Consideration mainly of methods of research and of current sociological literature. (3) I, II (Flint, Kolaja)
May be repeated to a maximum of six credits.

772(203a,b)—TOPICAL SEMINAR IN SOCIOLOGY. Advanced study of topics of current importance in sociology, such as structural strain and social change, game theory, decision processes, communication and power structures. *Prereq: at least nine hours in the social sciences, preferably in sociology.* (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

775(209)—SEMINAR IN THE FAMILY. A seminar for advanced students interested in family research, family counseling, or dealing with family relationships in some other professional capacity. (2) (Gladden)

779(205a,b)—SEMINAR IN SOCIAL PSYCHOLOGY. Each semester some topic in the field of social psychology, such as attitudes and beliefs, structure and function of social groups, social determinants of behavior, leadership, and morale will be studied intensively. (Same as Psychology 779.) (3) II (Claster, Lott)
May be repeated to a maximum of six credits.

780(202a-j)—SPECIAL PROBLEMS IN SOCIOLOGY. The purpose of this course is to provide an opportunity for advanced graduate students with special interests to pursue specialized reading under supervision. (1-6) I, II, S (Staff)
May be repeated to a maximum of ten credits.

792—RESEARCH IN SOCIOLOGY. Individual research and reading in particular fields of sociology, under staff supervision. Open to advanced graduate students who are prepared for intensive study beyond that offered in regular classes in each field. (1-6) I, II, S (Staff)
May be repeated to a maximum of ten credits.

RURAL SOCIOLOGY *(See Agriculture)*

ZOOLOGY

400—FUNDAMENTALS OF BIOLOGY FOR SECONDARY SCHOOL TEACHERS. A course designed to aid the teacher in the selection of subject matter and in the presentation of modern biology to high school students. Lectures, discussions, 8 hrs. per wk. *Prereq: Employment as a high school teacher.* (*Same as Botany* 400) (4) S (Carpenter and others)

401—LABORATORY TO ACCOMPANY 400. Seven hours. (0)

402—ADVANCED TOPICS IN BIOLOGY FOR SECONDARY SCHOOL TEACHERS. A treatment of selected topics from the point of view of modern developments designed to aid the high school teacher to keep abreast of changes in theory and practice, to increase his knowledge of subject matter, and to provide better motivation for his students. Lectures, discussions, and demonstrations, 7 hrs. per wk. *Prereq: Employment as high school teacher and consent of instructor.* (*Same as Botany* 402) (4) S

500—ADVANCED INVERTEBRATE ZOOLOGY. A detailed treatment of the organization of the invertebrate body, including the origin and development of organ systems. Practical work includes laboratory and field studies involving collection, identification, culturing, and preservation of invertebrate animals. *Prereq: Zoology* 206-207. (4) II (Wallwork)

501—LABORATORY TO ACCOMPANY 500. Four hours. (0)

502(109)—ANIMAL ECOLOGY. An analysis of the environment and the respective adjustments of animal life to the environmental complex. Habitats, food, respiratory needs and mechanisms, life histories, animal associations, adaptations. *Prereq: Zoology* 204 *or consent of instructor.* (3) I (Barr)

504(107)—HEREDITY. Lectures and laboratory on principles of heredity, variation and eugenics. *Prereq: Zoology* 100. (4) I, S (Carpenter)

505—LABORATORY TO ACCOMPANY 504. Four hours. (0)

506(106)—EMBRYOLOGY. A general course in ontogeny. Studies in maturation, fertilization, cleavage, organogenesis and anomalies of development with laboratory work based on the chick and pig. *Prereq: Zoology* 100. (4) II, S (Brauer)

507—LABORATORY TO ACCOMPANY 506. Four hours. (0)

508(108)—EVOLUTION. An advanced lecture course on some of the fundamental principles of organic evolution. *Prereq: Zoology* 100. (3) II, S (Carpenter)

509(114a-f)—ZOOLOGY SEMINAR. Reports on: technical papers in scientific journals, book reviews, recent developments in Zoology, scientific meetings. Required of all majors in Zoology. (1) I, II (Staff)
May be repeated to a maximum of four credits.

510(110a-f)—INDEPENDENT WORK. Special problems for individual students who are capable of pursuing independent investigations. For Zoology Majors. *Prereq: Standing of 3.0 in Dept.* (3) I, II, S (Staff)
May be repeated to a maximum of twelve credits.

511(126)—SPECIATION. Mechanisms of Evolution. A discussion of modern theories and problems concerning the formation of animal and plant species. Three hours per week. *Prereq: Zoology* 508. (3) I, II (Carpenter)

512(166)—PHYSIOLOGY OF DEVELOPMENT. A review of theories of differentiation and a consideration of the genetic environment, and correlative physiological factors in differentiation. Lectures, assigned readings and literature reports. *Prereq: Zoology* 200 *or* 506. (3) I (Brauer)

513(101)—GENERAL HISTOLOGY. A course in the technique of preparation of animal tissues for microscopic study. Practice in imbedding, staining, sectioning, mounting, and identification of tissues. *Prereq: Zoology* 100. (4) I (Brauer)

514—LABORATORY TO ACCOMPANY 513. Four hours. (0)

515(104)—SPECIAL HISTOLOGY. Histology of the organs. A continuation of Zoology 513 in which the studies are based on the organs. *Prereq: Zoology* 513. (3) II (Brauer)

516—LABORATORY TO ACCOMPANY 515. Four hours. (0)

517(111)—ADVANCED MICROTECHNIQUE. Special methods in histological technique for students of Zoology, Pathology or Anatomy. *Prereq: Zoology* 513, 515. (3) I, II, S (Brauer)

518(102)—ORNITHOLOGY. A study of the life-histories, habits, identification, structure, adaptations, and physiology of birds. Special emphasis upon migrations, songs, nests and economic importance of our native birds. Lectures; field excursions; laboratory studies. *Prereq: Zoology* 100. (4) II (Barbour)

519—LABORATORY TO ACCOMPANY 518. Four hours. (0)

520(141)—MAMMALOGY. Designed to acquaint the student with the mammals of eastern North America, their taxonomy, adaptations and natural history. Given alternate years. *Prereq: Zoology* 100. (4) I (Barbour)

521—LABORATORY TO ACCOMPANY 520. Four hours. (0)

522(140)—HERPETOLOGY. Designed to acquaint the student with the amphibians and reptiles of eastern North America, their taxonomy, adaptations and natural history. Given alternate years. *Prereq: Zoology* 100. (4) II (Barbour)

523—LABORATORY TO ACCOMPANY 522. Four hours. (0)

524(112)—ICHTHYOLOGY. Taxonomy of fishes with life-histories and biology of types. Fish structure and physiology, habits, ecology. Fish-culture and economic Ichthyology; care of fishes, aquaria, etc. Elements of fresh-water fishery administration. *Prereq: Zoology* 100. (4) II (Kuehne)

525—LABORATORY TO ACCOMPANY 524. Four hours. (0)

526(130)—LIMNOLOGY. Detailed analysis of fresh water environment with special emphasis upon biological productivity. Two hours lecture, four hours field and laboratory. *Prereq: Zoology* 100 *or consent of instructor.* (4) II (Kuehne)

527—LABORATORY TO ACCOMPANY 526. Four hours. (0)

528(103a)—GENERAL ENTOMOLOGY. A beginning course in the study of this greatest group of the Animal Kingdom. Anatomy, morphology, adaptations, life-histories of representatives of the most important orders of insects and other arthopod classes. *Prereq: Zoology* 100. (3) I (Wallwork)

529—LABORATORY TO ACCOMPANY 528. Four hours. (0)

530(103b)—GENERAL ENTOMOLOGY. Continuation of 528. More detailed study of the orders and many representative families. Methods of making and preserving insect collections. Identification; life-history, ecology of many insect species. Making an individual collection. *Prereq: Zoology* 528. (3) II (Wallwork)

531—LABORATORY TO ACCOMPANY 530. Four hours. (0)

532(123)—MEDICAL ENTOMOLOGY. Study of Arthropod vectors of disease. Structure, collection, identification, control measures and life history studies. Given alternate years. *Prereq: Zoology* 534 *or consent of instructor.* (4) I, S (Edney)

533—LABORATORY TO ACCOMPANY 532. Four hours. (0)

534(105)—PARASITOLOGY. Protozoan, helminth and arthropod parasites of man and domestic animals, emphasis on etiology, epidemiology, methods of diagnosis, control measures, and life histories. Techniques for host examination and preparation of material for study. *Prereq: Zoology* 100. (4) I, S (Edney)

535—LABORATORY TO ACCOMPANY 534. Four hours. (0)

536(117)—MEDICAL PROTOZOOLOGY. The etiology, epidemiology, pathology, diagnosis, prophylaxis and control of parastic protozoa, with special emphasis on life cycles and detailed studies of the protozoan parasites of man. Given alternate years. *Prereq: Zoology* 534 *or consent of instructor.* (4) II, S (Edney)

537—LABORATORY TO ACCOMPANY 536. Four hours. (0)

538(119)—HELMINTHOLOGY. The etiology, epidemiology, pathology, diagnosis, prophylaxis and control of trematode, cestode and nematode parasites of vertebrates, with special emphasis on those of veterinary and medical importance. Given alternate years. *Prereq: Zoology* 534 *or consent of instructor.* (4) II, S (Edney)

539—LABORATORY TO ACCOMPANY 538. Four hours. (0)

540—GENERAL RADIATION BIOLOGY. A basic course devoted to a study of radiation techniques and research and their application in the various fields of biology. Lectures devoted to basic background and health hazard aspects followed by more comprehensive treatment of biological aspects. Laboratories devoted to use of radioisotopes and techniques of their measurement using various radiation detectors and counters. *Prereq: Two years of biological sciences, one year of chemistry, and consent of instructor.* (4) II (Carpenter)

541—LABORATORY TO ACCOMPANY 540. Four hours. (0)

542—VERTEBRATE NATURAL HISTORY. Behavior of vertebrate animals in their natural habitats as related to shelter, food, reproduction, and other aspects of survival. Adaptations contributing to behavioral patterns will be considered. *Prereq: Zool.* 208-209. (4) I (Barbour)

543—LABORATORY TO ACCOMPANY 542. Four hours. (0)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (In Biological Sciences). (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

COURSES PRIMARILY FOR GRADUATE STUDENTS

Qualified students may elect work in any special field listed below. Independent work under direction, with conferences on objectives, principles, materials, methods, analysis of data and conclusion. Progress reports required at intervals. Each of these courses may be repeated to a maximum of twelve credits.

791(216a-d)—PROBLEMS IN SPECIATION. (3) I, II, S (Carpenter)

792(209a-d)—PROBLEMS IN LIMNOLOGY AND ECOLOGY. (3) I, II, S (Kuehne, Wallwork)

793(221a-d)—PROBLEMS IN HERPETOLOGY AND MANNALOGY. (3) I, II, S (Barbour)

794(205a-d)—PROBLEMS IN PARASITOLOGY. (3) I, II, S (Edney)

795(212a-d)—PROBLEMS IN ICHTHYOLOGY. (3) I, II, S

796(206a-d)—PROBLEMS IN EMBRYOLOGY AND HISTOLOGY. (3) I, II, S (Brauer)

798(202a-d)—PROBLEMS IN ORNITHOLOGY. (3) I, II, S (Barbour)

799(220a-d)—PROBLEMS IN CYTOLOGY. (3) I, II, S

III. COMMERCE AND ECONOMICS

REQUIREMENTS FOR ADVANCED DEGREES IN COMMERCE AND ECONOMICS

The Degree of Master of Business Administration

1. Admission to study for the degree is open to students who hold a bachelor's degree from any accredited college or university.
2. Graduate study in business presumes a minimum preparation of 21 hours in economics and business, including the completion of the following basic courses:

Principles of Economics	6 hrs.
Principles of Accounting	3-6 hrs.
Statistical Method	3 hrs.
Business Law	3 hrs.

3. In addition to the foregoing courses the student must have completed courses in money and banking, corporation finance, personnel management, production management, and marketing management, in either his undergraduate or graduate program.
4. A minimum of 24 semester hours must be presented in courses numbered 600 or above. The remaining six hours may be completed in approved courses numbered 500 or above. With the permission of the student's Director of Graduate Study, the candidate may submit a maximum of 9 hours in related courses outside the College of Commerce.
5. The course requirements are as follows:

600—Business Economics	3 hrs.
656—Research and Report Writing	3 hrs.
737—Advanced Business Management	3 hrs.
An advanced course in Accounting	2 or 3 hrs.
Two of the following courses	6 hrs.
655—Adv. Personnel Management	
717—Corporate Financial Policy (Econ. 611 Adv. Money & Banking, may be offered to meet the finance course requirement.)	
738—Production Management	
760—Advanced Marketing Management	
Electives	12 or 13 hrs.
Total	30 hrs.

In special cases the student's Director of Graduate Study may approve the substitution of another graduate course for a required course.

6. Further requirements, in addition to the completion of prescribed courses, are as follows:
   a. Residence for at least two semesters at the University of Kentucky as a full-time student, or its equivalent as a full-time and part-time student.
   b. The maintenance of a minimum average of grade B in all courses taken as a graduate student. A minimum grade of C is required for credit in a course.

c. If essential to the program pursued by the student, a reading knowledge of a modern foreign language may be required by the student's Director of Graduate Study.
d. A comprehensive final examination.

The Master of Arts or Master of Science Degree in Economics

The candidate for the master's degree is presumed to possess knowledge of the fundamentals of statistics, accounting, economic history, and a reasonable range of institutional economics which must include money and banking and public finance. If the student enters the program with a deficiency in this background, he will be expected to remedy the deficiency concurrently with his graduate work.

In addition to fullfilling the general requirements of the graduate school, the program must include advanced economic theory. At least twelve hours must consist of courses numbered 600 and above.

PLAN A

Both a reading knowledge of one modern foreign language and a thesis are required. See pages 17-18 of this Bulletin.

PLAN B

A thesis is required. The candidate will substitute proficiency in mathematics through integral calculus for the language requirement—proficiency to be certified on the basis of a test composed and evaluated by the Department of Mathematics.

The Ph.D. Degree in Economics

Work for the degree of Doctor of Philosophy must conform to the general requirements of the Graduate School appearing on pages 13-15 and 20-24 of this bulletin.

The candidate is presumed to possess knowledge of the fundamentals of statistics, accounting, economic history, and a reasonable range of institutional economics which must include money and banking and public finance. If the student enters the program with a deficiency in this background, he will be expected to remedy this deficiency concurrently with his graduate work.

The written part of the qualifying examinations will cover the following classes of subject matter: (1) economic theory; (2) three other fields in economics; (3) a minor subject closely related to economics, such as business administration, political science, agricultural economics, mathematics, psychology, or sociology.

The oral part of the examinations gives further opportunity for the candidate to show facility in economic analysis and knowledge of research methods and materials.

Suggested fields of study in economics and commerce and possible courses comprising such fields are as follows (a field will normally include one to three courses not open to undergraduates):

Economic theory: Economics 515, 516, 590, 603, 604, 618, 619, 690; and Agr. Econ. 620, and 621.

Statistics: Economics 507, 550, 650, 651, 652, and 691; Commerce 549, 571, 572 and 720; Mathematics 521; Psychology 610.

Private Finance: Economics 505, 554, 560, 611; Commerce 517, 529, 531, 543, 544, 585, 717, 731.

Public Finance: Economics 504, 524, 606, 607, 608, 685; Commerce 547, 559, 722; Law 529, 512; and Political Science 577 and 578.

Accounting: Commerce 508, 513, 518, 528, 529, 546, 547, 559, 708, and 722.

Mathematical Economics: Economics 590, 690, 691.

Management: Commerce 437, 462, 518, 538, 539, 719, 720, 737, 738, 760; Economics 600, 655 and Psychology 540.

Marketing: Commerce 519, 536, 539, 540, 541, 549, and 760; Economics 527 and 600; and Agri. Econ. 606.

Money and Banking: Economics 505, 516, 609, 611; Commerce 585.

Agricultural Economics: Agr. Econ. 620, 621, 640, and 650.

Labor Economics and Industrial Relations: Economics 402, 530, 555, 566, 655; Law 544; Psychology 540; and Political Science 579.

International Economics: Economics 527, and courses in Economics in the School of Diplomacy and International Commerce.

The Ph.D. Degree in Economics and Business

The requirements are the same as for the Ph.D. in Economics except that two fields in business will be substituted for two of the fields in economics.

DESCRIPTION OF COURSES

COMMERCE

437(137)—INDUSTRIAL MANAGEMENT. Management of manufacturing operations including organization theory, physical aspects of the plant, quality control, time and motion study, production control, industrial safety and industrial relations. (3) I, II (Carter, Haynes)

445(145)—OFFICE MANAGEMENT. Planning and scheduling of work; employment procedures; supervision of employees, re-training, promotion; equipment. (3) II (McMurtry)

462(162)SMALL BUSINESS OPERATION. Application of management principles and techniques to the special problems of establishing and operating a small business enterprise. (2) II (Massie)

477(177a)—COLLEGE BUSINESS MANAGEMENT. Elements of management organization, budgetary procedure, financial accounting, procurement techniques and property management as applied in the business administration of colleges. (2) S (Peterson)

478(177b)—COLLEGE BUSINESS MANAGEMENT. Elements of personnel management, public relations, investments and finance as related to college business management. (2) S (Peterson)

479(177c)—COLLEGE BUSINESS MANAGEMENT. Case problems in plant operation, purchasing, insurance, bookstore operation and legal aspects of college management. (2) S (Peterson)

508(108)—ACCOUNTING THEORY. The function of accounting, asset valuation, recognition of revenue and expenses, and classification of equities will be studied with a view to presenting a coordinated body of accounting theory. *Prereq: Commerce* 297. (2) I (Haun)

509,510(109a,b)—BUSINESS LAW. A survey of the principles of contracts, sales, bills and notes, and that portion of the law of torts applicable to business practices. (3 ea.) I, II (Haun, Lewis)

513(113)—AUDITING. The theory of auditing, the valuation of assets, analysis of accounting procedure, and the presentation of statements. Special problems applicable to particular business will also be presented. *Prereq: Commerce* 297. (3) II (Beals)

517(117)—CORPORATION FINANCE. Principles concerning the issue of securities, the management of the corporate income, the disbursement of dividends, the creation of sinking funds, and reorganization procedure. *Prereq: Economics* 252 *and Commerce* 108. (3) I, II (Pickett)

518(118)—COST ACCOUNTING. The place of cost accounting in the general field of accounting, special records and cost statistics, and application to particular businesses. *Prereq: Commerce* 108. (3) I (Beals)

519(119)—RETAIL MERCHANDISING. Selecting a business location, internal layout, departmentalization, merchandising control, store policies toward the public, training, and management of personnel, and related subjects. *Prereq: Commerce* 260. (3) II (Tarpey)

528(128)—ADVANCED COST ACCOUNTING. The use of standard costs, estimated cost systems and procedures, non-manufacturing costs, budgetary control, and management uses of cost data. *Prereq: Commerce* 518. (3) II (Beals)

529(129)—CREDIT AND STATEMENT ANALYSIS. The theory underlying credit-granting; credit administration; analysis and interpretation of financial statements. *Prereq: Commerce* 107. (2) I (Haun, Beals)

531(131)—INVESTMENTS. Analysis of corporation statements for investment purposes; the security market; market influences on security prices; effect of interest changes on security prices; and the development of investment programs. *Prereq: Economics* 252. (3) II (Pickett)

532,533(132a,b)—C.P.A. PROBLEMS. This course is designed to prepare students for C.P.A. examinations. Advanced accounting theory is stressed through the study of a wide range of problems. *Prereq: Commerce* 297. (3 ea.) I, II (Haun, Beals)

536(136)—SALES MANAGEMENT. The case method is used, supplemented with outside reading and written reports. *Prereq: Commerce* 260. (3) I (DeVoe)

538(138)—CASES IN MANAGEMENT. Emphasizes production, plant layout, wage payments, personnel management, production control, and related problems. *Prereq: Commerce* 437. (3) II (Massie)

539(139)—INDUSTRIAL PURCHASING. Organization of purchasing; relations with other departments; qualifications and training of buyers. Purchasing procedures; sources of supply; price negotiation; stores control; value analysis. *Prereq: Economics* 252. (3) II (DeVoe)

540(140)—ADVERTISING MANAGEMENT. A study of advertising from the point of view of marketing and advertising executives; problems in integrating advertising with marketing; the advertising appropriation, and advertising campaigns. (2) I (DeVoe)

541(141)—INDUSTRIAL MARKETING. The marketing of goods for business consumption. The structure of the industrial market with special problems in marketing raw materials, parts and machinery relative to manufacturing, agricultural, mining, construction and other industries. *Prereq: Economics* 252. (3) I (Tarpey)

543(143)—LIFE INSURANCE. Economics of life insurance; organization and control; special forms of life insurance; fundamental principles of rate-making. *Prereq: Economics* 252. (3) I (Hargreaves)

544(144)—PROPERTY AND CASUALTY INSURANCE. Public control; nature of contracts; analysis of reserve functions and rate-making processes. *Prereq: Economics* 252. (3) II (Pickett)

546(146)—SPECIALIZED ACCOUNTING PROBLEMS. Accounting records for consolidations and mergers, preparation of consolidated statements. Insolvency and receivership records and statements. Accounting for estates and trusts. *Prereq: Commerce* 297. (3) II (Ecton)

547(133)—INCOME TAX PROCEDURE. The preparation of income tax returns for individuals and corporations of all classes and a practical application of principles of accounting. *Prereq: Commerce* 297. (3) II (Haun)

549(149)—MARKET RESEARCH. Training in the application of scientific method to research in fields of marketing. A major marketing investigation will be conducted by the class. *Prereq: Commerce* 260 *and a course in statistics.* (3) I (Devoe)

556(156)—BUSINESS REPORTS. Major emphasis is placed upon sources of data, compilation and arrangement of data, documentation, bibliographies and effective presentation of reports. Problems are assigned in the various areas of interest. (2) I, II (Thomas)

559(159)—GOVERNMENTAL ACCOUNTING. The requirement of adequate accounting systems for various governmental units, including the recording of usual transactions and the form and content of reports. *Prereq: Commerce* 108. (2) II (Beals)

570(170)—CONTROLLERSHIP. The organizational position of the Comptroller, his functions and objectives; his methods and procedures. *Prereq: Commerce* 296 *and* 518. (3) I (Haun)

571(171)—STATISTICAL QUALITY CONTROL. Elementary probability theory, control charts, acceptance sampling plans including single, double and sequential sampling. (2) I (Christian)

572(172)—SAMPLING TECHNIQUES. Application of sampling theory and significance testing in economic research, practical problems in sample design. (2) II (Christian)

573(173)—AUTOMATIC DATA PROCESSING. Examination of the role of high speed data processing equipment in the solution of business and economic problems. The study of computer fundamentals; input, arithmetic and logical units, control storage, and output. Includes digital computer programming. (3) I, II (Stroup)

585(185)—BANK MANAGEMENT. A study of principles and cases in commercial banking practice. Bank management practices are studied within the economic monetary, fiscal and legal framework of the American economy. *Prereq: Economics* 505 *or consent of instructor.* (3) II (Masten)

708(208)—ADVANCED ACCOUNTING THEORY. Critical examination of accounting concepts and standards. Study of current problems and contemporary developments reflected in accounting literature and reports. (3) II (Haun)

717(217)—CORPORATE FINANCIAL POLICY. A study of financial management from the viewpoint of the corporate financial officer. Problems of planning the capital structure, issuing securities, the management of working capital and policies with reference to reserves, surplus and dividends. (3) I (Pickett)

719—QUANTITATIVE METHODS IN BUSINESS DECISIONS. Application of mathematical analysis in business decision-making. Includes linear programming, total value analysis, incremental analysis, and other phases of operations research. *Prereq: Mathematics* 611 *and Economics* 507. (3) I (Haynes)

720—STATISTICS IN BUSINESS DECISIONS. Statistical analysis as applied to business decisions. Includes waiting line theory, Monte Carlo method, and sampling as applied to inventory control, quality control, and similar business problems. *Prereq: Economics* 507. (3) I (Guthrie)

722(222)—TAX ACCOUNTING PROBLEMS. Advanced tax accounting problems of a complex nature involved in income taxes, gift taxes, and death taxes under the federal and state laws. *Prereq: Commerce* 547. (3) II (Haun)

728—ACCOUNTING FOR CONTROL AND PLANNING. A study of the application of accounting information and services in the recognition or solution of management problems in business. (3) II (Haun)

731(231)—INVESTMENT MANAGEMENT. Evaluation of sources of information and advice concerning securities, methods of analysis and policies of individuals and institutions in the management of investment funds. *Prereq: appropriate undergraduate courses in accounting and finance.* (3) II (Pickett)

737(237)—ADVANCED BUSINESS MANAGEMENT. A functional study of business management. Control devices and procedures for carrying out and testing policies. (3) II (Haynes)

738(238)—PRODUCTION MANAGEMENT. A study of procedures and techniques employed in manufacturing plants. An analysis of actual cases in production planning and control, time and motion study, quality control, plant layout, and budgetary control. Visits to industrial plants. (3) I (Massie)

760(260)—ADVANCED MARKETING MANAGEMENT. A critical study of significant trends, controversial issues and advanced techniques in the fields of marketing. 3) II (DeVoe)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

ECONOMICS

402(102)—LABOR ECONOMICS. Insecurity, wages and income, substandard workers, industrial conflict; wage theories, the economics of collective bargaining, unionism in its structural and functional aspects; recent developments. *Prereq: Economics* 252. (3) I (Carter)

503(103)—TRANSPORTATION. Railway, waterways, highways, airways. Rates, services, management, regulation. *Prereq: Economics* 252. (3) I (Tolman)

504(104)—PUBLIC FINANCE. A study of public receipts; public expenditures; the principles of taxation with special reference to their application to the tax systems, federal and state. *Prereq: Economics* 252. (3) I (Sullivan, Soule)

505(105)—MONEY AND BANKING. Nature and functions of money; the importance of credit; relation of money and credit to prices; bank deposits; and loans; complete study of our national banking system. *Prereq: Economics* 252. (3) I, II (Masten)

507(107)—STATISTICAL METHOD. Introduction to the sources of business data, the use of calculating machinery, tabulation, simple charts and graphs, the average, dispersion, correlation, and time series analysis. (3) I (Christian, Stroup)

515(115)—INTERMEDIATE ECONOMIC ANALYSIS. The output, price and factor proportion problems of firms in different market situations; some problems in industry behavior; coordination of basic economic processes. (3) I (Pearce)

516(110)—BUSINESS CYCLES. The nature and characteristics of the economic factors which underlie the cyclical fluctuations in business conditions; the methods of business and investment forecasting. *Prereq: Economics* 252. (3) I, II (Haynes)

524(124)—STATE AND LOCAL TAXATION. Classified property taxes; separation of sources of revenue, taxation of banks, forests, public utilities, mines, and rural and urban real estate; income, inheritance and sales taxes. (3) II (Martin)

525(125)—ECONOMIC DEVELOPMENT. A comparative study of economic progress in selected countries; growth patterns, theories of development and capital formation; interaction of social and economic change. *Prereq: Economics* 252. (3) II (Erwin)

527(127)—INTERNATIONAL ECONOMICS. Free trade; protectionism; preferential tariffs; colonial tariff policies; dumping; commercial treaties; control of raw materials; international investments and the movement of capital; international debts; reparations. *Prereq: Economics* 252. (3) II (Sullivan)

530(130)—LABOR LEGISLATION. The status of labor law, mediation, conciliation, arbitration, the minimum wage, the eight-hour day, unemployment relief, safety and health legislation, and social insurance. *Prereq: Economics* 252. (3) II (Cabe)

534(134)—ADVANCED ECONOMIC HISTORY OF THE UNITED STATES. Population growth, immigration, territorial expansion, agriculture, manufactures, tariff, labor, industrial combinations, commerce, transportation facilities, money and banking, and conservation. (3) II (Erwin)

550(150)—ADVANCED BUSINESS AND ECONOMIC STATISTICS. Advanced time series analysis, multiple and partial correlation, elementary analysis of variance and experimental design. (3) II, S (Christian)

554(154)—URBAN REAL ESTATE. Urban land economics; the real estate business; essentials of real estate law and contracts, the financing of real estate transactions, property valuation and appraisal, the management of real estate properties. *Prereq: Economics* 252. (3) II (Pickett)

555(155)—INDUSTRIAL RELATIONS. Historical development of industrial relations; the economic implications of job analysis, recruitment, selection and training for industry; wages, hours, promotion and health policies; employee representation, collective bargaining; union-management cooperation. *Prereq: Economics* 252. (3) II (Carter)

560(160)—BUSINESS COMBINATIONS. Forms of combination; the problem of monopoly; federal and state anti-trust legislation and court decision. *Prereq: Economics* 252. (2) II (Tolman)

565(165)—COMPARATIVE ECONOMIC SYSTEMS. A study of capitalism, socialism, fascism, communism and cooperation, with attention to current experiments in economic planning. *Prereq: Economics* 252. (3) I (Masten)

566(166)—PERSONNEL PROBLEMS. A case course in the problems of supervision of employees, and the personnel policies which promote productive efficiency. *Prereq: Economics* 555. (2) II (Carter)

579(179)—COLLECTIVE BARGAINING. The principles and procedures of bargaining and dispute settlement studied in detail. Includes a review of the content of labor contracts and provisions for administration. Union and management techniques considered. (2) II (Cabe)

590(190)—INTRODUCTION TO MATHEMATICAL ECONOMICS. A review of mathematical approaches to economic theory. Models applicable to production, marketing and pricing problems. (Same as Agr. Ec. 590) (3) I (Christian)

600(200)—BUSINESS ECONOMICS. The interrelations of economic laws with the social, political and legal framework of business, especially from the point of view of the industry and of the firm. (3) I (Sullivan)

603(203)—HISTORY OF ECONOMIC THOUGHT. A survey of the history of economic thought from the ancient period to about the end of the Classical School. *Prereq: Economics* 252. (3) I (Hargreaves)

604(204)—SURVEY OF ECONOMIC THEORY SINCE THE AUSTRIAN SCHOOL. This course is virtually a continuation of course 603. (3) II (Hargreaves)

606(206a,b)—MUNICIPAL FINANCE. City and county budget and related problems are studied in reports and seminar. (3) I (Martin)

607,608(207a,b)—PROBLEMS IN PUBLIC FINANCE. Depending on varying needs of public finance students from time to time, specific subject matter will be selected for study. Each student's report will indicate the class problems intensively examined. (2 ea.) I, II (Martin)

609(209)—HISTORY AND THEORY OF MONEY AND PRICES. The evolution of money, the rise of banking processes and the causes of fluctuations in the general price level. (3) II (Masten)

611(211)—ADVANCED MONEY AND BANKING. A theoretical study of contemporary money and banking institutions with emphasis on central bank functions. (3) II (Masten)

618(218a)—ECONOMIC THEORY. An intensive course covering contemporary micro-economic theory and the various analytical techniques used therein. *Prereq: Economics* 252. (3) I (Haynes)

619(218b)—ECONOMIC THEORY. Macro-economic theory. National income analysis and employment theory. The theory of inflation and an introduction to theories of enconomic development. *Prereq: Econ.* 252. (3) II (Haynes)

650(210)—RESEARCH STATISTICS I. The place of statistics in research method, the theory of statistical averages, the application of advanced statistical methods to economic data; the testing of economic theory. *Prereq: an elementary course in statistics.* (2) II (Stroup)

651—RESEARCH STATISTICS II. Inferences involving linear transformations of random variables; individual degrees of freedom; complex analysis of covariance. Applications to economic and business data. *Prereq: Economics* 650 *or Agr. Econ.* 630. (3) II (Guthrie)

652—EXPERIMENTAL DESIGN. Role of experimentation in the scientific method; basic principles of design related to problems of randomization and replication; analysis of specific designs including randomized blocks, Latin squares, and elementary factorial systems. Applications to economic and business problems. *Prereq: Economics* 651 *or Agr. Econ.* 631. (3) II (Christian)

655(255)—ADVANCED PERSONNEL MANAGEMENT. A critical examination of the principles, methods, policies and procedures related to the effective utilization of human resources in business concerns, consideration being given to mutual relationships. (3) II (Carter)

656(256)—RESEARCH AND REPORT WRITING. Investigations of business problems: sources, procedures, analysis, and presentation. (3) I (Haynes)

657(257)—THEORY OF WAGES. A critical analysis of contemporary wage theories, tradeunion wage policy, wage differentials, wage adjustment to technological change, and wages and employment. *Prereq: Economics* 252. (3) II (Cabe)

685(285)—GOVERNMENT FINANCE ADMINISTRATION. Government budget; accounting, debt, purchasing, treasury, revenues, and auditing administration are examined; illustrations are drawn from federal, state and local experience. Each student makes a special report on finance-management or experience. (3) II (Martin)

690(290)—MATHEMATICAL ECONOMICS. Problems of economics amenable to the mathematics of differential and difference equations, vectors, complex numbers and matrix algebra. Agricultural and business applications. (Same as Agr. Ec. 690) (3) II (Christian)

691—ECONOMETRICS. The application of statistical methods to problems of economic analysis. Building and measuring relationships among economic variables. Econometric models of the economy as a whole and of individual sectors. (Same as Agr. Ec. 691) (3) I (Christian)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

770(202a-f)—SEMINAR. An extended investigation of some specific topic with a view to giving training in methods of research and studying intensively a particular subject in the field of economics. (1 to 6) I, II (Carpenter)
May be repeated to a maximum of six credits.

780(212a-f)—RESEARCH PROBLEMS IN ECONOMICS. Students confer individually with the instructor. (1 to 6) I, II (Staff)
May be repeated to a maximum of six credits.

IV. EDUCATION

GENERAL STATEMENT OF REGULATIONS GOVERNING GRADUATE WORK IN THE COLLEGE OF EDUCATION

Work leading to the doctoral degree with a major in education must conform to the same rules and regulations as prescribed in the general requirements, pages 13-16, 20-25 of this Bulletin. In addition to the general requirements, the following specific requirement must be met. No person will be considered as a candidate for the doctoral degree with a major in education unless he has completed three years of successful teaching experience.

(For information concerning the degree of Specialist in Education, see p. 25)

(For information concerning the doctoral program in Counseling and Guidance, see p. 25)

There are two plans of work leading toward the degree of Master of Arts or Master of Science in Education. Plan II, which follows, is permissible only with the approval of the Graduate School and the Dean of the College of Education.

Plan I

1. A minimum of 24 semester hours of graduate work must be completed and a thesis must be presented.
2. At least 12 semester hours of graduate work must be in education.
3. At least 15 semester hours of graduate work must be in courses numbered 600 or higher.
4. At least 12 semester hours must be outside the field of education, except for majors in Educational Administration, Counseling and Guidance, and Vocational Education, other than Home Economics Education. It is expected that students in Educational Administration, Counseling and Guidance, and Vocational Education will have six hours outside education.
5. At least 36 weeks of residence must be acquired as a University of Kentucky graduate student.
6. No student may satisfy more than one-half of the residence requirements for advanced degrees by part-time work. This limitation does not apply to intensive courses.
7. The total number of credits presented in education, undergraduate and graduate, must be at least 30 semester hours.
8. A standing of 3.0 (an average of B) or better must be made on all graduate work.
9. Six semester hours (if approved by the graduate adviser) may be completed in off-campus study (that is, extension work). In such case, however, a minimum of 30 weeks of *resident-on-campus* work is required for the master's degree.
10. The National Teachers Examination will be required of all candidates for the degree of Master of Arts in Education or Master of Science in Education. In exceptional cases an additional examination, either written or oral, may be required. These examinations are to be taken just prior to or during the session in which the degree is to be conferred.
11. All graduate students must meet the requirements for a teaching certificate in Kentucky as established by the State Department of Education of Kentucky. These requirements are outlined in the General Catalog

of the University. If deficiencies are found, they should be overcome before proceeding with graduate work. The work required to overcome these deficiencies is in addition to the minimum graduate requirements for the degree.

Plan II

1. A minimum of 30 semester hours of graduate work must be completed.
2. At least 12 semester hours of graduate work must be in education.
3. At least 15 semester hours must be in courses numbered 600 or higher.
4. At least 12 semester hours must be outside the field of education, except for majors in Educational Administration, Counseling and Guidance, and Vocational Education, other than Home Economics Education. It is expected that students in Educational Administration, Counseling and Guidance, and Vocational Education will have six hours outside education.
5. At least 36 weeks of residence must be acquired as a University of Kentucky graduate student.
6. No student may satisfy more than one-half of the residence requirements for advanced degrees by part-time work. This limitation does not apply to intensive courses.
7. The total number of credits presented in education, undergraduate and graduate, must be at least 30 semester hours.
8. A standing of 3.0 (an average of B) or better must be made on all graduate work.
9. Six semester hours and nine weeks of residence may be done in extension classes, off-campus study, or independent work courses with the permission of the student's adviser and the dean of the Graduate School.
10. The National Teachers Examination will be required of all candidates for the degree of Master of Arts in Education or Master of Science in Education. In exceptional cases an additional examination, either written or oral, may be required. These examinations are to be taken just prior to or during the session in which the degree is to be conferred.
11. All graduate students must meet the requirements for a teaching certificate in Kentucky as established by the State Department of Education of Kentucky. These requirements are outlined in the General Catalog of the University. If deficiencies are found, they should be overcome before proceeding with graduate work, and in addition to the minimum 30 graduate credits required for the degree.

Each student's graduate curriculum must be a well-rounded program of courses related to the student's major interest and approved by his committee. In cases of deficient preparation the committee, with the approval of the Dean, determines prerequisite undergraduate courses to be taken. The following persons have been designated to guide graduate students in their work toward the master's degree in education:

Area	
Elementary Teachers	Moore, Ramsey, Sudduth
Secondary Teachers	
General	Lurry, McClure, Manker, Powell, Ravitz, Reed, Shipman, Smith
Agricultural	Hammonds, Binkley, Lamar
Art	Haines
Business Education	Musselman, Thomas, Humphreys
Home Economics	Gorman
Industrial Education	Baker

Music ..... Osborne, Steiden
Physical Education ..... Clay, Carr, Gilb, Huff
Elementary Principal ..... Cierley
Secondary Principal ..... Cierley
Guidance Counselor ..... Carse
Supervisor ..... Ogletree, Cierley, Edmonds
Attendance Officer ..... Cierley
Superintendent ..... Cierley, Kincheloe, Ogletree
Higher Education ..... Chamberlain

Education 99—This is a non-credit seminar required of all graduate students in education the first semester or summer session they are registered for graduate study.

Suggested Graduate Curricula

MASTER'S DEGREE PROGRAM AND PROVISIONAL CERTIFICATION FOR SUPERINTENDENTS, PRINCIPALS, AND SUPERVISORS

M.A. DEGREE AND PROVISIONAL CERTIFICATION

I. *Foundations* 6 semester hours
Education 756, Fundamentals of Guidance, 3 hours
Three additional hours such as:
Education 645, Foundations of Education, 3 hours or
Education 661, Educational Sociology, 3 hours

II. *Curriculum and Instruction* 6 semester hours
Education 732, Curriculum Construction, 3 hours
For candidates with background in secondary education:
Education 712, The Elementary School, 3 hours
For candidates with background in elementary education:
Education 714, The Secondary School, 3 hours or
Education 717, The Junior High School, 3 hours

III. *Behavioral Sciences* 9 semester hours
Sociology 542, Human Relations in Administration, 3 hours
Six additional hours such as:
Sociology 544, Social Psychology, 3 hours or
Sociology 551, Principles of Sociology, 3 hours or
Anthropology 526, Culture and Personality, 3 hours

IV. *Administration and Supervision* 9 semester hours
Education 99, Orientation (no credit)
Education 633, Administering the Teaching Personnel (offered together in block
Education 634, Administrative Problems in Today's School of 6 hours)
(Pre-requisite: Admission to the program in Administration)
Education 639, Supervision of Instruction, 3 hours
(Prerequisite: Education 633 and 634 and at least three years teaching experience)

Standard Certification:
Those seeking Standard Certification must meet the requirements given below, in addition to those required for Provisional Certification.

For all school leaders
Ed.771 Seminar in Educational Administration or Behavioral Sciences, 6 semester hours
Ed. 608 Internship in Educational Administration
Ed. 792 Research Problems in Educational Administration
Six to nine hours electives appropriate to field in which applicant is specializing

For Superintendent
Ed. 636 State School Administration

For High School Principal
Ed. 630 High School Administration

For Elementary Principal
Ed. 629 The Elementary Principal

For Supervisor
Ed. 608 Internship in Educational Administration (for 6 semester hours)

MASTER'S DEGREE PROGRAM IN COUNSELING AND GUIDANCE

Curriculum for master's degree (30 *semester hours required*) Sem. Hrs.

Required:

Ed. 755	Human Development and Behavior	3
Ed. 756	Fundamentals of Guidance	3
Ed. 522	Educational Tests and Measurements	
or		3
Psy. 535	Psychological Testing	
Ed. 758	Group Guidance Problems and Practices	3
Ed. 760	Counseling Theory and Practice	3
Ed. 761	Supervised Practice in Counseling (May be repeated to a maximum of 9 hours)	3
Ed. 661	Education Sociology	
or		3
Ed. 640	Philosophy of Education	

Electives: 9 hours from the following:

Ed. 759	Identifying and Providing for Individual Student Needs	3
Psy. 505	Experimental Psychology	3
Psy. 507	Psychology of Learning	3
Psy. 520	Mental Hygiene	3
Psy. 521	Abnormal Psychology	3
Psy. 522	Counseling Psychology	3
Psy. 544	Social Psychology	3
Psy. 538	Juvenile Delinquency	3
Anth. 526	Culture and Personality	3

SIXTH-YEAR DEGREE PROGRAM IN COUNSELING AND GUIDANCE

Curriculum for the Ed.S. degree (30 *semester hours required*) Sem. hours

Required: 15-21 hours from the following, in addition to the courses required for the master's degree in Guidance and Counseling:

Ed. 657	Educational Statistics	3
Ed. 759	Identifying and Providing for Individual Student Needs	3
Ed. 761	Supervised Practice in Counseling (May be repeated to a maximum of 9 hours)	3
Ed. 762	Organization and Administration of Guidance Services	3
Ed. 763	Research and Evaluation in Guidance	3
Ed. 764	Using Occupational and Educational Information in Guidance and Counseling	3
Ed. 777	Seminar in Guidance and Counseling (May be repeated to a maximum of 6 hours)	3
Psy. 640	Practice in Testing: Intelligence Tests	3

Electives: 6-9 hours outside of Education (to be approved by adviser)
Research: 3-6 hours in independent research as approved by adviser

MASTER'S DEGREE PROGRAM FOR SUPERVISING TEACHERS

Elementary Level

Ed. 550	The Role of the Teacher and the Principal in Guidance	3
Ed. 640	Philosophy of Education	3
Ed. 712	The Elementary School	3
Ed. 724	Organization and Supervision of Student Teaching	3
Ed. 732	Principles of Curriculum Construction	3
Ed. 661	Educational Sociology	3

Secondary Level

Ed. 550	The Role of the Teacher and the Principal in Guidance	3
Ed. 640	Philosophy of Education	3
Ed. 714	The Secondary School	3
Ed. 724	Organization and Supervision of Student Teaching	3
Ed. 732	Principles of Curriculum Construction	3
Ed. 661	Educational Sociology	3

MASTER'S DEGREE PROGRAM IN ELEMENTARY EDUCATION

1. The master's program for elementary teachers is composed of two 6-semester-hour blocks: a 6-hour block in the area of curriculum ,and a 6-hour block in the area of human development, guidance, and testing.

2. Education 732 (Principles of Curriculum Construction) and Education 712 (The Elementary School) will comprise the curriculum block, but adjustments will be made in these courses as need indicates. This block will give special emphasis to science and social learnings and will be taken by elementary majors only. Separate sections of each will be offered for students other than elementary majors. In general, the curriculum block will be taken at the beginning of the student's master's program.

3. Education 739 (Survey of Research in Human Development and Education) and a course from the Guidance area will comprise the second block.

4. Courses in Educational Psychology, Educational Sociology, Comparative Education,

Special Education, Core Curriculum, Audio Visual Aids, Educational Administration, Organization and Supervision of Student Teaching, and special areas in Elementary Education will be used as electives to meet the special interests and needs of the student.

5. The 12 hours of work outside the College of Education will also be chosen in terms of special needs of the student and with the approval of the adviser. Courses in Art, Music, and Sociology should be given special consideration.

MASTER'S DEGREE PROGRAM FOR TEACHERS IN SECONDARY EDUCATION

A. Professional education courses to be done in residence (12 hours required):

Choose one: (3 hours required)

Ed. 522	Educational Tests and Measurements
Ed. 550	The Role of the Teacher and the Principal in Guidance
Ed. 756	Fundamentals of Guidance

Choose one: (3 hours required)

Ed. 645	Foundations of Education. (When Ed. 645 is not offered, Ed. 661 and Ed. 658 are recommended as substitutes, but students should clear this with their advisers.)
Ed. 661	Educational Sociology
Ed. 658	Problems in Educational Psychology
Ed. 714	The Secondary School (3 hours, required)

A 3-hour course recommended by the student's adviser.

B. Courses outside Education should be related to the student's teaching field and should be planned with, and have the approval of, the student's adviser.

C. Summary of Requirements:

1. Must be eligible for a teaching certificate by the time the M.A. degree is completed.
2. Must have a total of 30 semester hours in Education at both the graduate and undergraduate levels.
3. Must have 15 hours of graduate work in courses numbered 600 or higher.
4. Must have at least 12 hours of graduate work in education.
5. Must have at least 12 hours outside the field of Education.
6. Must have a standing of 3.0 (an average of B) or better on all graduate work.

The student is required to take a non-credit seminar the first summer term or the first semester he is enrolled in the graduate school.

MASTER'S DEGREE PROGRAMS IN VOCATIONAL EDUCATION

One Course in Teaching Methods Selected from the following:

Ed. 518	Teaching Office Practice, Clerical Practice, and Office Appliances	3 semester hours
Ed. 514	Teaching General Business Subjects	
Ed. 618	The Social Business Subjects in High School	

Two Courses Selected from the Following:

Ed. 615	Problems in Business Education	6 semester hours
Ed. 774	Seminar in Business Education	
Ed. 622	Business Education in Colleges and Universities	
Ed. 623	Administration and Supervision of Business Education	
Ed. 786	Independent Work in Business Education	
Ed. 626	Classification and Possible Use of Community Resources in Business Education	

Two Courses Selected from the Following:

Ed. 544	Visual Teaching	6 semester hours
Ed. 732	Principles of Curriculum Construction	
Ed. 661	Educational Sociology	
Ed. 756	Fundamentals of Guidance	
Ed. 714	The Secondary School	
Ed. 724	Organization and Supervision of Student Teaching	

Elective ..... 3 semester hours

In addition, the student will take 12 semester hours outside education. These are to be selected from commerce, or his secondary teaching major or minor, or from areas of need as shown by his scores on the Graduate Record Examination.

MASTER'S DEGREE PROGRAMS IN VOCATIONAL EDUCATION

For Agricultural Education Majors

Ed. 714	The Secondary School	3
Ed. 732	Principles of Curriculum Construction	3
Ed. 670	Method in Teaching Vocational Agriculture	3
Ed. 678	Selecting Teaching Materials	3
Ed. 679	Adult-Farmer Schools	3
Ed. 680	Directing Farm Practice	3
Ed. 682	Young-Farmer Schools	3

For Home Economics Education Majors

Ed. 687	Supervision in Home Economics Education (For Supervision of Student Teachers)	3
Ed. 683	Current Problems in Home Economics Education	3
Ed. 684	Modern Trends in Home Economics Education	3
Ed. 685	Home Economics Curriculum Construction	3
Ed. 686	Evaluation in Home Economics Education	3
Ed. 787	Independent Work in Home Economics Education	3
or 656	Methodology of Educational Research	3

For Industrial Education Majors

Ed. 523	Principles and Philosophy of Industrial Education	3
Ed. 518	Vocational Guidance	3
Ed. 534	Methods in Industrial Education	3
Ed. 714	Organization and Operation of Part-Time and Evening Classes	3
Ed. 630	The Secondary School	3
Ed. 732	High School Administration	3
Ed. 535	Principles of Curriculum Construction	3

GRADUATE COURSES IN EDUCATION

Division of Counseling and Guidance

755(251)—HUMAN DEVELOPMENT AND BEHAVIOR. The physiological, sociological, and psychological bases of human behavior with emphasis upon the normal school child in his environment. Findings of research in the behavioral sciences and their implications for the guidance of young persons. (3) I, S (Carse)

756—FUNDAMENTALS OF GUIDANCE. A survey of the educational, sociological, and psychological foundations of guidance in schools and colleges. Study of the basic philosophy and nature of guidance services, organization and administration of guidance programs, the role of the guidance counselor, and the relationship of guidance services to the total curriculum. (3) I, II, S (Carse, Martin)

758—GROUP GUIDANCE PROBLEMS AND PRACTICES. Providing for the common needs of groups of students in making more effective educational, occupational, social, and personal adjustments. Special emphasis is given to the selection, organization, and effective use of group guidance materials and techniques. (3) II, S (Rogers)

759(250)—IDENTIFYING AND PROVIDING FOR INDIVIDUAL STUDENTS NEEDS. Research studies and reports on individual differences in the physical, intellectual, social, and emotional development of students, and of ways that have proved effective in meeting individual needs, especially in secondary schools. (3) (Staff)

760—COUNSELING THEORY AND PRACTICE. A study of the basic theories, principles, and techniques of counseling and their applications to counseling in schools and colleges. Practice in the techniques of interviewing, and the use of psychological tests, observation, records, case studies, and other procedures in the counseling process. *Prereq: Ed.* 755, *Ed.* 756. (3) II, S (Martin)

761—SUPERVISED PRACTICE IN COUNSELING. Supervised practice in counseling in the educational setting in which the student plans to work. Requires 8 hours a week in actual counseling plus a minimum of 2 hours weekly in seminar. *Prereq: Ed.* 755, *Ed.* 756, *Ed.* 760, *and at least 6 graduate hours in Psychology.* (3) I, II, S (Staff)
May be repeated to a maximum of nine credits.

762—ORGANIZATION AND ADMINISTRATION OF GUIDANCE SERVICES. A study of the problems of supervision, staffing, finances, effective inter-personal relationships, community participation, in-service education and evaluation of the guidance program. Includes supervised experience in the planning and administration of guidance services. *Prereq: Master's degree in counseling and guidance.* (3) (Martin, Rogers)

763—RESEARCH AND EVALUATION IN GUIDANCE. Research methodology applied to the evaluation and interpretation of guidance services. May include analysis and interpretation of test data from schools and school systems, emphasizing the application of test data to local school problems and the organization of reports. (3) (McDaniel)

764(236)—USING OCCUPATIONAL AND EDUCATIONAL INFORMATION IN COUNSELING AND GUIDANCE. Collection, evaluation, organization, filing and use in counseling of current data. Supply and demand, working conditions, trends, entrance requirements, job families, and career fields. Schools, colleges, and other agencies that prepare for advancement in productive careers. (3) (Staff)

765—INDEPENDENT WORK IN COUNSELING AND GUIDANCE. An independent work course for advanced graduate students who desire to investigate special problems in counseling and guidance. *Prereq: one year of graduate work in Counseling and Guidance, including Ed.* 755, 757 (*or Psych.* 610), *and approval of instructor.* (2) (Staff)
May be repeated to a maximum of four credits.

777—SEMINAR IN COUNSELING AND GUIDANCE. A seminar for advanced graduate students. Designed to develop deeper understandings and clearer insights in guidance and counseling, through critical examination and discussion of pertinent theories, research reports, case records, and counseling experiences. *Prereq: 36 hours in Counseling and Guidance, including Practicum (Ed. 761 or Psych. 665), approval of adviser and staff.* (3) (Staff)

DIVISION OF ADMINISTRATION AND SUPERVISION

502(198)—THE ADMINISTRATION OF PUPIL PERSONNEL. Administrative problems relating to child accounting, including school census, attendance records and reports, social and economic factors affecting school attendance, and duties and responsibilities of school and non-school personnel and agencies. (3) S (Staff)

602(202)—LOCAL SCHOOL ADMINISTRATION. The organization, management, and control of a local school system, including such problems as federal, state, and local relationships, board of education, pupil personnel, employed personnel, public relations, finance and business management, and school services. (3) I, II, S (Staff)

603(203)—CONSTITUTIONAL AND LEGAL BASIS OF PUBLIC SCHOOL ADMINISTRATION. A study of court decisions to discover the legal principles involved in practical problems of school administration. *Prereq: Education* 602, 636 *or* 630. (3) II, S (Staff)

604(207)—SCHOOL BUILDINGS AND EQUIPMENT. Measurement and evaluation of existing school building facilities, planning new buildings, determining suitable equipment, and financing the building program. *Prereq: Education* 602 *or its equivalent.* (3) (Staff)

608(209a,b)—INTERNSHIP IN EDUCATIONAL ADMINISTRATION. Field experiences are provided for prospective administrators under the cooperative supervision of University personnel and principals, supervisors, and superintendents in Kentucky public school systems. (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

628(292a,b)—FIELD PROBLEMS IN CURRICULUM AND SUPERVISION. A course designed to provide direct experience in dealing with educational problems in field situations. Observations, readings, and research also required. Registration only with consent of instructor. (3) I, II (Ogletree)
May be repeated to a maximum of six credits.

629(229)—THE ELEMENTARY PRINCIPAL. Problems involved in the organization and administration of a modern elementary school. (3) I, S (Staff)

630(232)—HIGH SCHOOL ADMINISTRATION. This course deals with organization, administration, and problems of the modern secondary schools, including such specific problems as school staff, program of studies, records and reports, school-community relationships, school plant, finance, and scheduling. (3) I, II, S (Staff)

633(233)—THE ADMINISTRATION OF THE TEACHING PERSONNEL. The course emphasizes principles and practices in teacher preparation, selection, and placement. Includes a study of salaries, tenure, retirement, teaching loads, sick leave, personnel records, and teacher participation in school administration problems. (3) (Staff)

634(276)—ADMINISTRATIVE PROBLEMS IN TODAY'S EDUCATION. A study of present-day administrative problems. The course is designed to be of assistance particularly to superintendents. (3) (Staff)

635(231)—BUSINESS ADMINISTRATION AND FINANCE OF PUBLIC EDUCATION. A course for prospective superintendents. Emphasizes school support, including state, local, and federal revenues; budgetary policy; procedures for purchasing, accounting, and reporting costs; management of funds, property, equipment, and supplies; payroll procedures, records, and reports. (3) II, S (Staff)

636(213)—STATE SCHOOL ADMINISTRATION. Organization, administration, and control of education at the state level, including state-federal and state-local school relationships, state support, control of the material environment, training and certification of teachers, teachers contracts, tenure, retirement. (3) S (Staff)

639(225)—SUPERVISION OF INSTRUCTION. Development, purposes, and organization of supervisory programs. Special emphasis on the nature of educational leadership. Consideration of various approaches to supervision with special attention to current in-service educational problems. (3) II, S (Staff)

718(238)—TRENDS IN HIGHER EDUCATION. A survey of modern tendencies in higher education; scope and development, objectives, organization, administration, curricula, finance, faculty and student personnel. Designed primarily for prospective college administrators, teachers, and registrars. (3) (Staff)

719(206)—PROBLEMS OF COLLEGE TEACHING. Methods commonly used in college teaching, bases for measuring instruction, marking systems, qualifications for college teaching, and efforts being made to improve college instruction. (3) (Staff)

733(290a,b)—TECHNIQUE AND PROFESSIONAL WORK OF THE REGISTRAR. A comprehensive study of the work of the registrar in institutions of higher education, including the history, literature, and present-day tendencies; rules of the University, recommendations of the American Association of College Registrars. (3) I, II, S (Elton)
May be repeated to a maximum of six credits.

771(221a,b)—SEMINAR IN ADMINISTRATION. A critical study of selected problems in school administration. The course is designed primarily for students who have had some administrative experience. *Prereq: Education* 602 *and* 639. (3) II, S (Staff)
May be repeated to a maximum of six credits.

772(228a,b)—SEMINAR IN EDUCATION. A course planned for graduate students majoring in education, given under the direction of the faculty of the College of Education. (1) I, II (Staff)
May be repeated to a maximum of two credits.

785(210a,b)—INDEPENDENT WORK IN SCHOOL ADMINISTRATION. Research on a practical problem in school administration. Open only to students with at least one semester of graduate work in education. Approval of instructor necessary before registration. (3) I, II (Staff)
May be repeated to a maximum of six credits.

792(301a,b)—RESEARCH PROBLEMS IN EDUCATIONAL ADMINISTRATION. An independent research course for the study of special problems in educational administration. *Prereq: one year of graduate work.* (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

793(305a,b)—RESEARCH PROBLEMS IN CURRICULUM AND SUPERVISION. An independent research course. Students confer individually with the instructor. *Prereq: one year of graduate work.* (3) I, II (Ogletree)
May be repeated to a maximum of six credits.

799(321a,b)—RESEARCH PROBLEMS IN HIGHER EDUCATION. An independent research course for the study of special problems in higher education. *Prereq: one year of graduate work.* (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

DIVISION OF FOUNDATIONS OF EDUCATION

501(101)—SCHOOL ORGANIZATION. Scope and general character of the American public school system and organizational and administrative problems as they relate to the work of the classroom teacher. (3) I, II, S (Staff)

519(119)—THE ELEMENTARY SCHOOL PUPIL. The psychology of the child in the primary and intermediate grades. *Prereq: one course in psychology.* (2) I, S (Sorenson)

520(147)—THE SECONDARY SCHOOL PUPIL. The psychology of the pupil in junior and senior high school. *Prereq: one course in Psychology.* (3) II, S (Sorenson, Reed)

522(122)—EDUCATIONAL TEST AND MEASUREMENTS. The problems of measurement in the school program, with special emphasis on standardized tests. The construction and use of new-type tests, use and limitations of traditional examinations, marking systems, etc., are also considered. (3) I, S (Sorenson)

532(132a,b)—INTERGROUP RELATIONS. Analysis of relationships between groups which differ in religious, ethnic, or socio-cultural backgrounds; the development of educational and social techniques for reduction of tensions. (Same as Sociology 532) (3) S (Staff)
May be repeated to a maximum of six credits.

548(148)—EDUCATIONAL PSYCHOLOGY. Application of psychology to the problems of learning and teaching. (3) I, II, S (Sorenson)

550(150)—THE ROLE OF THE TEACHER AND THE PRINCIPAL IN GUIDANCE. A first course for non-specialists; basic principles and practical approaches to guidance for prospective teachers and principals in service. (3) I, II, S (Staff)

551(151)—THE TEACHING OF HIGHER LEVEL STUDY SKILLS. A course designed to demonstrate the teaching of study skills (including remedial work) in secondary schools. One approach to teaching these skills will include the study problems of college students. (3) I, S (Staff)

640(200a,b)—PHILOSOPHY OF EDUCATION. An advanced course dealing with the philosophy of democratic education and applications to some of the larger educational problems of today. *Prereq:* 12 *semester hours in education.* (3) I, II (Hartford)
May be repeated to a maximum of six credits.

645(201)—FOUNDATIONS IN EDUCATION. An intensive study in various fields which contribute to the development of educational theory and practice. (3) I, S (Hartford and Staff)
May be repeated to a maximum of six credits.

649(205)—REVIEW OF CURRENT EDUCATIONAL LITERATURE. An extensive study of current educational literature as found in educational periodicals. *Prereq:* 12 *semester hours in education.* (3) II, S (Hartford)

650(217)—GENERAL HISTORY OF EDUCATION. A survey of the history of education from the Greek period to the present. (3) (Hartford)

651(218)—HISTORY OF EDUCATION IN THE UNITED STATES. A history of the growth and development of education in the United States from earliest Colonial times to the present, including recent movements and trends. (3) (Hartford)

652(219)—HISTORY OF EDUCATIONAL THOUGHT. A study of the lives and writings of the world's educators to acquaint the student with the ideals and contributions to society of great educators. (3) I, S (Hartford)

655(220)—COMPARATIVE EDUCATION. Comparisons of modern national systems of education. (3) II, S (Hartford)

656(222)—METHODOLOGY OF EDUCATION RESEARCH. A course intended to acquaint the student with the various techniques of research and to aid him in methods of attack on his own particular research problems. *Prereq:* 12 *semester hours in education.* (3) II (Sorenson)

657(223)—EDUCATIONAL STATISTICS. A non-mathematical study of the applications of statistical and graphical methods to educational data. (3) I (Sorenson)

658(254)—PROBLEMS IN EDUCATIONAL PSYCHOLOGY. A critical survey of the psychological theories and research applicable to educational practices. *Prereq: one year of psychology.* (3) II, S (Sorenson)

661(230)—EDUCATIONAL SOCIOLOGY. A course in sociological foundations of education. (3) II, S (Hartford)

665(311a-h)—PRACTICUM IN COUNSELING PSYCHOLOGY. Nine hours of supervised work each week in counseling psychology in the University Counseling Office. Same as Psychology 665.) (3) I, II, S
May be repeated to a maximum of twelve credits.

725(275)—ADVANCED PROBLEMS IN PHILOSOPHY OF EDUCATION. A critical study of philosophical problems which relate to present day education. *Prereq: teaching experience and 6 semester hours in philosophy of education.* (3) (Hartford)

739(239)—A SURVEY OF RESEARCH IN HUMAN DEVELOPMENT AND EDUCATION. A study of the research and principles of education and allied fields which are appropriate to a consideration of education as a developmental process. *Prereq: Master's degree or by permission.* (4) II (Staff)

750(260)—PROBLEMS IN EDUCATIONAL SOCIOLOGY. An advanced course in the application of sociological findings to education including consideration of Southern regional problems and potentialities. *Prereq:* 12 *semester hours of graduate work including Education* 661 *or equivalent.* (*Same as Soc.* 750.) (3) S (Hartford)

773(241a)—SEMINAR IN FOUNDATIONS OF EDUCATION. A critical study of selected problems in the foundations of education areas. (3) S (Hartford)

778(241b)—SEMINAR IN HISTORY OF EDUCATION IN KENTUCKY. A seminar for graduate students in education who are interested in developing a background and perspective upon educational problems by study of the history and development of education in Kentucky. (3) II, S (Hartford, Manker)

782(258a,b)—INDEPENDENT WORK IN EDUCATIONAL PSYCHOLOGY. An independent work course for students who have done a minimum of 12 semester hours of graduate work including Education 522, 520, or 658. (3) I, II, S (Sorenson, McDaniel)
May be repeated to a maximum of six credits.

783(247a,b)—INDEPENDENT WORK IN THE PHILOSOPHY OF EDUCATION. An independent work course for students who have done a minimum of 12 semester hours of graduate work, including Education 640, 652, and 661. (3) I, II, S (Hartford)
May be repeated to a maximum of six credits.

784(237a,b)—INDEPENDENT WORK IN HISTORY OF EDUCATION. Independent work problems and topics for advanced students in history of education.
(3) I, II, S (Hartford)

DIVISION OF INSTRUCTION

724(224)—ORGANIZATION AND SUPERVISION OF STUDENT TEACHING. A course designed for teachers preparing to become supervising teachers. The basic principles apply to both elementary and secondary education. Includes a presentation of the experiences deemed important in developing students into effective teachers. (3) S (Reed, Smith)

DIVISION OF CURRICULUM

507(107)—SAFETY EDUCATION. A course designed to aid in developing skills and techniques essential to improving automotive and pedestrian safety. Psycho-physical tests, classroom work, behind-the-wheel driving, and other basic safety education are presented.
(3) S (Gardner, Huff)

525(125)—METHODS AND MATERIALS IN TEACHING THE ORTHOPEDICALLY HANDICAPPED, INCLUDING THE CEREBRAL PALSIED. Analysis of the special problems involved in teaching the orthopedically handicapped children and those who are cerebral palsied. Emphasis upon team relationships, planning the school day, adjustment and adaptation of curriculum methods and materials to meet the children's individual and group needs. Interpretation and use of professional records and research. (3) S (Staff)

526(126)—METHODS AND MATERIALS OF TEACHING THE MENTALLY RETARDED. Basic organization and planning of school programs for the classroom teacher of the "educable" and "trainable" mentally retarded. Major emphasis on curriculum development and teaching techniques. Observation in classes for the mentally retarded arranged.
(3) II (Staff)

527(130)—SURVEY OF PHYSICAL DEFECTS. A survey of causes, treatment, and educational implications of crippling conditions of school age children. Attention given to rehabiliation and life adjustment problems of individuals with single or multiple handicaps. Field trips to various facilities concerned with meeting the needs of the physically disabled.
(3) II (Staff)

530—THE NATURE AND NEEDS OF RETARDED CHILDREN. A critical examination of pertinent research in reference to the educational, physical, and psychological nature and needs of the educable and trainable mentally retarded child, including interpretation of psychological tests. Evaluation of the physical, social, emotional and mental characteristics of the retarded, to assist the classroom teacher to recognize the social potential of each child to the degree that the child with retarded mental development may become less of a burden to himself and society. (3) I, II, S (Levy)

538(110)—ADVANCED ARTS AND CRAFTS IN THE ELEMENTARY SCHOOL. Planned to give the elementary teacher an understanding of teaching methods involved in, and construction of, art activities which would enrich the classroom program.
(3) II (Haines)

539(127)—THE ELEMENTARY CURRICULUM. The philosophy and techniques of curriculum construction and some practical work in construction. (3) (Moore)

540(141)—PROBLEMS IN DIAGNOSTIC AND REMEDIAL READING. Prevention, diagnosis and corrective measures for reading difficulties. Study of investigations and literature in this field. (3) (Ramsey)

541(111)—THE TEACHING OF READING IN THE JUNIOR AND SENIOR HIGH SCHOOLS. The diagnosis and corrective measures for junior and senior high schools. Study of plans of organizing a corrective program and suitable materials. (2) (Staff)

542(173)—CHILDREN'S LITERATURE. Planned to acquaint students with literature for children, kindergarten through grade 8. Review of interests at different ages. Discussion of types of literature—folklore, modern fairy tales, myths and legends, realistic stories, biography and poetry. (3)

543(174)—TEACHING IN THE KINDERGARTEN. The nature, development and education of the child of kindergarten age. Organization, equipment, curriculum, and procedures used with children of this age. Regular periods are scheduled for observing and participating in the kindergarten. (3) I (Burke)

544(186)—VISUAL TEACHING. A course in methods and techniques of visual instruction. Emphasis is on the effective use of films, film strips, pictures, maps, graphs, slides, field trips, by means of lesson plans. Surveys are made of visual materials.
(3) I, II, S (Bissmeyer)

558(175g)—MODERN EDUCATIONAL PROBLEMS: EDUCATION OF HANDICAPPED CHILDREN. Procedures to be used in the education of children who are handicapped physically, mentally, or emotionally. Attention is given to work with individual children as well as with groups. (3) (Staff)

560-576(175j-z)—MODERN EDUCATIONAL PROBLEMS. A brief survey of some of the problems in modern education. (3 ea.) (Staff)

596(196)—SCIENCE IN THE ELEMENTARY SCHOOL. A background of elementary science usable with children in the first six grades. Includes planning units of work, organizing and using materials, and references, making bibliographies for teachers and children, graphy and poetry. (3)

712(212)—THE ELEMENTARY SCHOOL. Recent research and modern trends in teaching the skills and content subjects in the elementary school. Planned for supervisors, superintendents, principals, and teachers for better understanding of a modern elementary school. (3) II (Moore)

714(214)—THE SECONDARY SCHOOL. A course designed to acquaint the secondary teacher and the administrator with the nature and function of the secondary school. (3) I, II, S (Ogletree)

717(216)—THE JUNIOR HIGH SCHOOL. A study of the unique functions of the junior high school. Scope and sequence of the curriculum, school organization and guidance as related to the young adolescent will be considered. A course for principals, supervisors, teachers. (3) I, II, S (Lurry)

730(226a-f)—PROBLEMS OF THE SCHOOL CURRICULUM. Problems in the field of the school curriculum and in the preparation of instructional materials. Students enrolling in this course are required to leave on file with the College of Education a complete report of each problem studied. (3) (Staff)
May be repeated to a maximum of six credits.

732(227)—PRINCIPLES OF CURRICULUM CONSTRUCTION. Study of basic principles of curriculum development. Relationship of social and psychological factors to curriculum change. Survey of current approaches to curriculum organization. Consideration of means of curriculum development in school systems. (3) (Musselman, Moore, Lurry)

735(235)—THE CORE PROGRAM IN THE SECONDARY SCHOOLS. Deals with the philosophical and psychological bases of the core program and gives major emphasis to problems of teaching in the core class. A course designed for teachers, principals, supervisors. (3) I, II, S (Lurry)

740(240)—TEACHING READING AND RELATED LANGUAGE ARTS IN THE ELEMENTARY SCHOOL. A study of major factors in teaching reading, writing, spelling, speaking, listening, and creative language activities. Consideration of materials, diagnostic, corrective, and evaluation procedures for each area. (3) I, II, S (Ramsey)

742(242)—ADMINISTRATION AND SUPERVISION OF PUBLIC SCHOOL MUSIC. A study of current trends in school music, curricula, testing programs, and other supervisory procedures. (3) I, II, S (Staff)

743(243)—ADVANCED METHODS AND MATERIALS IN MUSIC EDUCATION. Survey and evaluation of new public school music methods and materials. (2) I, II, S (Staff)

744(244)—HISTORY AND PHILOSOPHY OF MUSIC EDUCATION. A course designed to acquaint the student with the historical developments and basic philosophies in public school music. (2) I, II, S (Staff)

745(245)—ORGANIZATION OF AUDIO-VISUAL AIDS. Operation of an audio-visual program considering budgeting, training of personnel, duties of staff, sources of materials, and use of equipment. Previews are made of many audio-visual materials. (3) II (Bissmeyer)

746(246)—MOTION PICTURES IN EDUCATION. The history of the educational motion picture, technique in the use of films, educational scenairo writing, grading and scoring films, and motion picture appreciation. (3) (Bissmeyer)

749(249)—EXTRACURRICULAR ACTIVITIES. The underlying principles and common practices of the co-curricular activities programs as developed in public schools. Home room activities, assembly programs, and clubs are the three major sections of the course; other activities included when necessary. (3) S (Cierley, Burkeen)

770(325)—SEMINAR IN EDUCATION OF EXCEPTIONAL CHILDREN. Study of philosophy, principles, trends, and research in education of exceptional children. Students will carry on an extensive study of a problem dealing with education of exceptional child. (3) I, II, S (Levy)

780(215a,b)—INDEPENDENT WORK IN ELEMENTARY EDUCATION. An independent work course for students who have done a minimum of 12 semester hours of graduate work including Education 712 or 629. (2) I, II (Moore, Ramsey, Sudduth)
May be repeated to a maximum of four credits.

781(248a,b)—INDEPENDENT WORK IN SECONDARY EDUCATION. An independent work course for students who have done a minimum of twelve semester hours of graduate work including Education 714 or 630. (3) I, II, S (Cierley, Lurry, Reed, Smith)
May be repeated to a maximum of six credits.

790(307a,b)—RESEARCH PROBLEMS IN SECONDARY EDUCATION. An independent research course. Students confer individually with the instructor. *Prereq: one year of graduate work.* (3) I, II, S (Cierley, Lurry, Reed, Smith)
May be repeated to a maximum of six credits.

791(308a,b)—RESEARCH PROBLEMS IN ELEMENTARY EDUCATION. An independent research course. Students confer individually with the instructor. *Prereq: one year of graduate work.* (3) I, II (Moore, Ramsey)
May be repeated to a maximum of six credits.

BUSINESS EDUCATION

511(158a)—TEACHING SECRETARIAL SUBJECTS. Special techniques and devices for teaching shorthand, typewriting and secretarial office practice. Required of business education majors. (3) II, S (Musselman)

512(158b)—TEACHING BOOKKEEPING AND ACCOUNTING. Methods materials, and techniques used in the teaching of bookkeeping and accounting. (3) I, S (Musselman)

513(184)—TEACHING OFFICE PRACTICE, CLERICAL PRACTICE, AND OFFICE APPLIANCES. Methods and materials in teaching office practice and procedures, clerical practice and the various machines commonly used in business offices. (3) I, II, S (Musselman)

514(192)—TEACHING GENERAL BUSINESS SUBJECTS IN THE SECONDARY SCHOOLS. The aims and purposes of the general business courses are studied. Analysis is made of the objectives of the general business subjects, and methods and materials used in teaching them are emphasized. (3) II, S (Musselman)

605(194)—TEACHING CONSUMER COURSES IN THE HIGH SCHOOL. Methods, materials and techniques of teaching high school pupils the various aspects of consumer education. Emphasis is placed on procedures and the student should have a background of training in economics before taking the course. (3) I, S (Musselman)

615(208a-d)—PROBLEMS IN BUSINESS EDUCATION. A study of advanced problems of interest to business teachers such as testing in business subjects, guidance, job studies, placement and follow-up, equipment, and supervision. (3) I, II, S (Musselman)
May be repeated to a maximum of six credits.

618(256)—THE SOCIAL BUSINESS SUBJECTS IN HIGH SCHOOL. An examination of the various social business subjects to determine their contribution to the objectives of business education. (3) I (Musselman)

621(259)—THE COMMERCE CURRICULUM. A study of business subjects offered in the high school to determine their content and the place each should occupy in high school curricula. A course of study is developed for each subject. (3) II, S (Musselman)

622(270)—BUSINESS EDUCATION IN COLLEGES AND UNIVERSITIES. Consideration of the problems pertaining to the teaching of business subjects at the college level. Consideration is also given to the development of curricula to meet teacher certification requirements in various states. (3) S (Musselman)

623(271)—ADMINISTRATION AND SUPERVISION OF BUSINESS EDUCATION. Duties and responsibilities of city and state supervisors, department heads, and others engaged in directing business education. (3) II, S (Musselman)

626(273)—CLASSIFICATION AND POSSIBLE USE OF COMMUNITY RESOURCES IN BUSINESS EDUCATION. Course provides for community analysis, and the development of possible ways and means to supplement the business education course in the secondary school with a study of vital community resources. (3) I, S (Musselman)

774(257a,b)—SEMINAR IN BUSINESS EDUCATION. A study of current literature in business education with special reference to trends in this field. (1) I, II, S (Musselman)
May be repeated to a maximum of two credits.

786(272a,b)—INDEPENDENT WORK IN BUSINESS EDUCATION. An independent work course for students who have done a minimum of 12 semester hours of graduate work, one-half of which must have been in business education. (3) I, II, S (Musselman)
May be repeated to a maximum of six credits.

DIVISION OF VOCATIONAL EDUCATION

Agricultural Education

580(181)—TEACHING VOCATIONAL AGRICULTURE. Preparation for teaching of agriculture. About one-half of the course is practice.
(15) I, II (Hammonds, Binkley, Lamar, and supervising teachers)

581(182)—ADULT-FARMER SCHOOLS AND YOUNG-FARMER COURSES IN AGRICULTURE. A general introduction to adult-farmer schools and young-farmer courses with some observation of work in both of these fields.
(3) I, II (Hammonds, Binkley, Lamar, and supervising teachers)

582(185a-d)—PROBLEMS IN AGRICULTURAL EDUCATION. Class work on current problems in agricultural education common to special groups of students (not individual-problem work). (3) I, II, S (Hammonds, Binkley, Lamar)
May be repeated to a maximum of six credits.

585(188)—FARM PRACTICE SUPERVISION. Practice and directed study in supervising farming programs in vocational agriculture. (1) I, II, S (Hammonds)

670(280)—METHOD OF TEACHING VOCATIONAL AGRICULTURE. The principles of method applied to the teaching of agriculture. *Prereq: experience in teaching vocational agriculture.* (3) S (Hammonds)

671(281)—TEACHING PREVOCATIONAL AGRICULTURE. Aims, purposes, and methods of teaching prevocational agriculture. Each student works out the content of a course, including selecting the teaching materials. (3) (Hammonds)

672(283)—DETERMINING CONTENT IN VOCATIONAL AGRICULTURE. Interpretation of local data as a basis for course building. Each student works out the content of a four-year course in vocational agriculture. (3) S (Hammonds, Luster)

675(285a-d)—MODERN PROBLEMS IN AGRICULTURAL EDUCATION. Class work (not individual-problem work) on modern problems in agricultural education.
(3) I, II, S (Hammonds)
May be repeated to a maximum of nine credits.

677(287a)—ADVANCED PROBLEMS IN AGRICULTURAL EDUCATION. Specific problems selected according to the needs of the individuals. (3) I, II, S (Hammonds)

678(287b)—SELECTING TEACHING MATERIALS. Selection of specific references and other teaching materials to be used in the teaching of vocational agriculture.
(3) S (Luster)

679(287c)—ADULT-FARMER SCHOOLS. Preparation for teaching adult farmers; organization of adult-farmer schools, curriculum content, method of teaching, and follow-up work. (3) S (Lamar)

680(287d)—DIRECTING FARM PRACTICE. Supervised farming as a method of teaching; standards, planning, supervision, and records. (3) S (Binkley)

681(287e)—TEACHING FARM SHOP. A study of necessary content for shop, plans for securing and equipping the shop, and methods of teaching farm shop. (3) S (Cox)

682(287f)—YOUNG-FARMER SCHOOLS. Content and method of teaching young-farmer courses in vocational agriculture. (3) S (Cox)

795(289a,b)—RESEARCH PROBLEMS IN AGRICULTURAL EDUCATION. Individual problems of importance to agricultural education. (3) I, II, S (Staff)
May be repeated to a maximum of nine credits.

Distributive Education

515(115a,b)—PROBLEMS IN DISTRIBUTIVE EDUCATION. Problems in teaching vocational distributive education in day, part-time, and evening schools. The problems are selected in accordance with the needs and desires of the students. *Prereq: Education* 517 and 528. (3) I, II, S (Baker)
May be repeated to a maximum of six credits.

516(116a,b)—PROBLEMS OF THE COORDINATOR IN INDUSTRIAL AND DISTRIBUTIVE EDUCATION. A course for coordinators of Industrial and Distributive Education, including planning of local programs, use of advisory committees, selection and arrangement of teaching materials and over-all planning and operation of the program. (2) I, II, S (Baker, Owens)
May be repeated to a maximum of four credits.

517(112)—DETERMINING TEACHING CONTENT IN DISTRIBUTIVE EDUCATION. Course construction in the field of distributive education. This course is planned to meet the needs of persons engaged as instructors in the field of distributive education. (3) I, II, S (Baker, Fagan)

528(128)—TECHNIQUE OF TEACHING DISTRIBUTIVE EDUCATION. A study of the methods of teaching as applied to distributive education. The purpose of the course is to train prospective teachers to teach in the field of distributive education. (3) I, II, S (Baker, McDowell)

Home Economics Education

586(160)—TECHNIQUE OF TEACHING HOME ECONOMICS. A study of methods of teaching as applied to home economics. (3) I, II (Haile)

588(165)—ADULT EDUCATION IN HOME ECONOMICS. Problems in teaching vocational homemaking in day, part-time, and evening schools. *Prereq: Education* 586. *Prereq. (or to be taken concur.): Education* 362. (3) I, II, S (Haile)

590(166a-d)—PROBLEMS IN HOME ECONOMICS EDUCATION. Problems in teaching home economics for high school students and adults. The course may include such subjects as teaching in, and supervision of, the school community cannery and the teaching of housing. (3) S (Staff)
May be repeated to a maximum of nine credits.

683(263)—CURRENT PROBLEMS IN HOME ECONOMICS EDUCATION. Recent developments in home economics education. *Prereq: Education* 586 *and* 362; *teaching experience.* (3) II, S (Kelsay)

684(264)—MODERN TRENDS IN HOME ECONOMICS EDUCATION. A basic course for students in home economics education. The course includes the development of home economics education and modern trends in curriculum, methods of teaching, and evaluation. (3) I, S (Gorman)

685(268)—HOME ECONOMICS CURRICULUM CONSTRUCTION. A study of the underlying principles of curriculum building for junior and senior high school and adult education in home economics. *Prereq: Education* 586 *and* 362. (3) S (Gorman)

686(269)—EVALUATION IN HOME ECONOMICS EDUCATION. A course to acquaint teachers of home economics with techniques used in measuring attainment in home economics in the junior and senior high school and college. *Prereq: teaching experience.* (3) I, S (Gorman)

687(261)—HOME ECONOMICS SUPERVISION. A course planned primarily to help prepare teacher-trainers and supervisors of home economics education. *Prereq: Education* 586 *and* 362; *teaching experience; and permission of instructor.* (3) I, S (Kelsay)

693(267)—DIRECTED SUPERVISION IN HOME ECONOMICS EDUCATION. This course includes practice in teaching for observation by others, student teaching, and school visiting. *Prereq: two years of teaching experience and Education* 687. (3) I, II (Gorman)

775(266a-c)—SEMINAR IN HOME ECONOMICS EDUCATION. Individual investigations and reports on special problems in home economics education. (3) I, II, S (Gorman)
May be repeated to a maximum of nine credits.

787(265a,b)—INDEPENDENT WORK IN HOME ECONOMICS EDUCATION. An independent work course for students who have done at least 12 semester hours of graduate work, one course of which must have been in home economics education. (3) I, II, S (Staff)
May be repeated to a maximum of six credits.

Industrial Education

518(183a,b)—METHODS IN INDUSTRIAL EDUCATION. The most approved methods in instructional management, including lesson planning, in the field of vocational industrial education. (2) S (McDowell)
May be repeated to a maximum of four credits.

523(123)—VOCATIONAL GUIDANCE. Course content includes units on aims and purposes, individual inventory, and counseling techniques. Emphasis is placed on occupational information and guidance, placement, follow-up, and organization and administration of a guidance program. (2) I, II, S (Owens)

524(143)—MODERN INDUSTRIAL ANALYSIS. Modern industrial organizations, trends in industrial educational policies; the proper approach to and analysis of these problems as they affect the industrial vocational teacher. (2) I, II, S (Baker, McDowell)

529—EVALUATION IN INDUSTRIAL AND DISTRIBUTIVE EDUCATION. The theory and practice of standardized, classroom, and performance testing as a means of measuring student achievement. (2) I, II, S (Fagan)

534(134)—ORGANIZATION AND OPERATION OF PART-TIME AND EVENING CLASSES. A course for administrators, coordinators, and teachers in part-time and evening industrial education. Covers the duties of a coordinator in cooperative training programs. (2) I, II, S (Baker)

535(171a,b)—PRINCIPLES AND PHILOSOPHY OF INDUSTRIAL EDUCATION. A course planned primarily for the advanced student in industrial education. It covers the general philosophy of vocational education as it relates to the problems and principles of industrial education. (2) I, II, S (Owens)
May be repeated to a maximum of four credits.

536(136)—SURVEYS IN INDUSTRIAL EDUCATION. This course deals with the basic methods and techniques used in making a survey to determine the needs for trade and industrial education. How to gather, evaluate, and interpret the data is emphasized. (2) I, II, S (Baker)

537(137)—SPECIAL PROBLEMS IN INDUSTRIAL EDUCATION. The supervised study of approved problems in industrial education on a research basis. (2) I, II, S (Staff)

Vocational Education

694(211)—THE ADMINISTRATION OF VOCATIONAL EDUCATION. A course designed for superintendents, high-school principals, and other administrators. Its purpose is to train for administering and supervising vocational education in schools. (3) I, II (Hammonds)

695(282)—SPECIAL PROBLEMS IN VOCATIONAL EDUCATION. An independent work course for students interested in vocational education. Students make individual investigations and report on special problems. (3) I, II, S (Hammonds, Staff)

776(286a,b)—SEMINAR IN VOCATIONAL EDUCATION. A critical study of selected problems in vocational education. The course is open only to students with experience in the field. (2) I, II, S (Hammonds, Gorman, Baker)
May be repeated to a maximum of four credits.

Courses Applicable to All Divisions

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE.
(1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.
(1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

V. ENGINEERING

Students desiring to take any of the following courses should have the prerequisites indicated in each case. Courses numbered 500 and above (400 and above for departmental non-majors) are offered to graduate students, and to such practicing engineers as may be qualified to pursue them. A thorough working knowledge of chemistry, physics, and mathematics is necessary. For credit toward an advanced degree, a candidate must hold a baccalaureate degree in the division of engineering in which he is registered, or its equivalent.

Graduate work on the master's level is conducted in all engineering departments. Doctoral work is offered in physical metallurgy.

ARCHITECTURE

432—SEMINAR IN ARCHITECTURAL HISTORY. A research seminar in special problems of architectural history and philosophy. *Prereq: Consent of instructor.* (2) I, II (Noffsinger)

GENERAL ENGINEERING

431(100)—STRENGTH OF MATERIALS. A study of stress and strain due to direct forces, shear, bending, torsion, eccentric loads and combined stresses, riveted and welded joints, columns, and energy loads. Lecture and recitation, four hours. *Prereq: GE* 221. *Prereq: or con. Math.* 212. (4) I, II, S (Hawkins, Barber, Adams, Land and Lafferty)

481(101)—NUCLEAR REACTOR ENGINEERING I. Reactor design studies based on neutron diffusion; critical size calculation of homogeneous and heterogeneous systems. Lecture and recitation, three hours. *Prereq: Phys.* 232, *Math.* 331 *or Math.* 431. (3) Thorpe)

482(102)—NUCLEAR REACTOR ENGINEERING II. Engineering aspects of reactor kinetics and control; shielding and radiation protection; reactor design variables, nuclear fuels and reactor materials. Lecture and recitation, three hours. *Prereq: GE* 481. (3) Thorpe)

513(107)—MECHANICAL VIBRATIONS. Vibrations of systems of one and several degrees of freedom, critical speeds and torsional and lateral vibrations of shafts. Lecture and recitation, three hours. *Prereq: GE* 431 *and GE* 311 *or GE* 313. *Prereq. or concur: Math.* 331. (3) I, II, (Hawkins, Barber)

531(106)—ADVANCED STRENGTH OF MATERIALS. Unsymmetrical bending of beams, thin plates, stress analysis of thick walled cylinders, and rotating discs. Theory of elastic energy, curved beams, stress concentration, and fatigue. Lecture and recitation, three hours. *Prereq: GE* 431. (3) I, II, S (Hawkins, Adams)

CHEMICAL ENGINEERING

421—UNIT OPERATIONS I. Principles of unit physical operations of fluid flow, heat transfer, evaporation, and filtration with quantitative problems in the design and operation of chemical process equipment. *Prereq: Math.* 212, *Phy.* 232 *and CME.* 211 *or consent of instructor.* (3) I (Hite)

422—UNIT OPERATIONS II. Continuation of CME 421. Principles of mass transfer operations—distillation, gas absorption, liquid extraction, drying, etc., including quantitative problems in design and operation of chemical process equipment. *Prereq: CME* 421 *or consent of instructor.* (3) II (Crewe)

AGRICULTURAL ENGINEERING

NOTE: Agricultural Engineering 775, 657, 658 and at least one other agricultural engineering course in the 600 series are required for the Master of Science Degree in Agricultural Engineering.

Courses for Agricultural Students

410(106)—FARM POWER AND MACHINERY. A lecture and laboratory course on tractors and power-driven machinery with special attention on principles of engine operation and maintenance. Lecture, one hour; laboratory, four hours. (3) S (Young)

420(107)—FARM STRUCTURES. Planning buildings for the adequate housing of farm animals, crops, machinery and supplies. Design problems considering the efficient use of labor, space requirements, arrangement, construction, building materials and costs. Lecture, one hour; lab, four hours. (3) S (Young)

430(105)—FARM WATER MANAGEMENT. Surveying, mapping, and determining areas of farm land, designing farm drainage systems, farm reservoirs; controlling water erosion with terraces and other mechanical structures. Lecture, two hours; lab, two hours. (3) I, II, S (Staff)

440(102)—DAIRY EQUIPMENT. Engineering principles involved in the construction, operation, and management of machinery and equipment used in processing dairy products. Lecture, two hours. *Prereq: Agr. Engr.* 110 *and Agr. Engr.* 111 *and* 3 *hours of Physics.* (2) II (Parker)

442(104)—FARM ELECTRIFICATION. Principles involved in the application of electricity to agriculture for heating, refrigerating, crop conditioning, materials handling, lighting, etc. Safety and electrical controls are emphasized. Lecture, two hours; lab, two hours. (3) I, II (Staff)

450(101a-c)—SPECIAL PROBLEMS. An intensive study of some phases of Agricultural Engineering in which the student is particularly interested. Approval of the instructor is required. (2) I, II, S (Staff)
May be repeated to a maximum of six credits.

Courses for Engineering Students

415—ENGINEERING ANALYSIS IN FARM MACHINERY DESIGN. A study of the professional method of dealing with engineering problems and the application of this method to problems encountered in the functional, mechanical, and economic design of machinery. Lecture, three hours; lab, a study of farm machinery dealing with its development, design, tests, costs, selection, and utilization; two hours. *Prereq: GE* 221, *GE* 311, *GE* 431, *and Ma* 431. (4) I (Smith)

417(120)—AGRICULTURAL TRACTOR POWER. A study of internal combustion engine cycles; principles of construction, operation, and adjustment of engines and tractors; power and performance measurements; economics of tractor power. Lecture, two hours; lab, two hours. *Prereq: ME* 400 *or ME* 320. (3) I (Young)

425(121a)—FARM BUILDINGS AND EQUIPMENT. Functional requirements of farm buildings and structures; selection and utilization of materials; sanitary equipment and disposal of wastes; preparation of plans, estimates, and specifications. Lecture, two hours; lab, four hours. *Prereq: GE* 431 *and GE* 102. (4) II (Walker)

426(121b)—FARM BUILDINGS AND EQUIPMENT. Continuation of Agr. Engr. 425 with more advanced study devoted to several of the same subjects. Lecture, two hours; lab, two hours. *Prereq: Agr. Engr.* 425. (3) I (Walker)

435(122a)—SOIL AND WATER CONSERVATION ENGINEERING. Engineering aspects of the control of surface and subsurface water to aid agricultural production. Mapping of farm land; design and construction of terraces, dams, waterways, drainage, and irrigation systems. Lecture, three hours; lab, two hours. *Prereq: ME* 330 *or CE* 350. (4) II (Ligon)

436(122b)—SOIL AND WATER CONSERVATION ENGINEERING. Continuation of Agr. Engr. 435 with more advanced study devoted to several of the same topics. Lecture, three hours. *Prereq: Agr. Engr.* 435. (3) I (Ligon)

445(124)—ELECTRICITY IN AGRICULTURE. Planning and design of adequate farmstead wiring systems; utilization of electricity for heat, light, power, for control of agricultural machines and processes, and for chemical, biological, or other effects in agricultural production. Lecture, two hours; lab, two hours. *Prereq: EE* 301. (3) II (White)

519(203)—ADVANCED FARM MACHINERY. Engineering analysis of agricultural machines, power units, and equipment with emphasis on functional design requirements, development procedures, safety requirements, and evaluation of performance. To be offered as a formal class or as a special problems course. *Prereq: Agr. Engr.* 417. (3) I, II (Smith)

548(207)—ADVANCED AGRICULTURAL PROCESSING. Analytical study of engineering problems dealing with the handling and processing of agricultural products, such as grading, sorting, drying, and curing and the preparation of plans for these operations. To be offered as a formal class or as a special problems course. *Prereq: Agr. Engr.* 425 *and* 445. (3) I, II (White)

628(204)—ADVANCED FARM BUILDINGS AND EQUIPMENT. Analysis and solution of selected problems dealing with such topics as rural housing, and the maintenance of desirable environments for farm animals and for the storage of farm products. To be offered as a formal class or as a special problems course. *Prereq: Agr. Engr.* 425.
(3) I, II (Walker)

635(206)—ADVANCED SOIL AND WATER CONSERVATION ENGINEERING. Analysis of selected problems dealing with land improvements and the control and use of water for agricultural production, with emphasis on functional design requirements of water retarding, storage and distribution systems. To be offered as a formal class or as a special problems course. *Prereq: Agr. Engr.* 435. (3) I, II (Ligon)

646(205)—ADVANCED RURAL ELECTRIFICATION. Analytical study of selected topics associated with the use of electricity in agriculture. To be offered as a formal class or as a special problems course. *Prereq: Agr. Engr.* 445. (3) I, II (White)

657(201)—RESEARCH METHODS IN AGRICULTURAL ENGINEERING. A study of research techniques and methods used in agricultural engineering. *Prereq. or concur: Agr. Econ.* 130 *or equivalent.* (3) I, II, S (Staff)

658(202)—INSTRUMENTATION IN AGRICULTURAL ENGINEERING RESEARCH. The principles and application of measuring instruments and devices for obtaining experimental data. *Prereq. or concur: Agr. Engr.* 657. (3) I, II (Staff)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE.
(1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

775(200a)—SEMINAR. Weekly meetings with members of the staff for reports and discussions on research and current trends and practices in agricultural engineering. One class hour. (0) I, II, S (Staff)
May be repeated twice.

CIVIL ENGINEERING

425(107)—SOIL MECHANICS. A study of soil and its utilization in foundations for structures and subgrade for highways. Stabilization and improvement of bearing values. Lectures and recitations, two hours a week. *Prereq. or concur: Geol.* 200 *and GE* 431.
(3) I, II (Pendley)

426—LABORATORY TO ACCOMPANY 425. Three hours. (0)

440(130b)—HIGHWAY ENGINEERING II. Materials, construction and maintenance of intermediate and high type roads including all types of bituminous surfaces, macadams and Portland cement concrete. Lecture, two hours. *Prereq: CE* 340, *Geol.* 202, *Math.* 431.
(3) I, II (Chambers)

441—LABORATORY TO ACCOMPANY 440. Three hours. (0)

459(158)—SANITARY ENGINEERING DESIGN. For students now majoring in Sanitary Engineering. Complete design and layout of a water plant, distribution system, storm and sanitary sewer and sewage disposal plant. Drawing room, nine hours. *Prereq: Consent of instructor.* (3) I, II (King)

480(171b)—THEORY OF STRUCTURES II. Continuation of CE 380, with emphasis on indeterminate structures and using the following methods: consistent deflections, moment distribution and slope-deflection. Introduction to computer programs. Lecture and recitation, three hours. *Prereq. or concur: GE* 431. (3) I, II (Staff)

487—STEEL STRUCTURES II. Continuation of CE 387 with emphasis on floor systems, trusses, plate girders and composite beams for bridges. Drawing room, six hours. *Prereq: CE* 387 *and CE* 580. (2) II (Maggard, Staff)

492—REINFORCED CONCRETE II. Continuation of CE 392 with special emphasis on complete structures. Design of building frames, combined footings, retaining walls and pile foundations. Study of soil properties as related to structures. Lecture, three hours. *Prereq: CE* 392 *and Geol.* 204. (3) II (Staff)

521(115)—ENGINEERING INTERPRETATION OF AERIAL PHOTOGRAPHS. Fundamentals of aerial photography as applied to modern engineering surveys. Analysis and reports on soil pattern, geologic formations, and land use studies using photographs. *Prereq: consent of instructor, GE* 100, *and Geol.* 202. (3) I, II (Dearinger)

542—TRAFFIC ENGINEERING. Characteristics of traffic, drivers and vehicles. Traffic engineering investigations. Design and application of signs, signals and markings. Design of intersections, parking facilities and signal systems. Lecture and recitation, two hours; laboratory, three hours. *Prereq: CE* 340 *and consent of instructor.*
(3) I (Dearinger)

553(126)—HYDROLOGY. Occurrence, control and utilization of water particularly as a problem of Civil and Sanitary Engineering. *Prereq: CE* 352. (2) I, II (King)

566(192)—PUBLIC HEALTH ENGINEERING. Application of engineering principles to the control of the environment, as used by sanitary engineers in federal, state or international health agencies. Lecture, three hours. *Prereq: consent of instructor.* (3) II (Staff)

568(193)—SANITARY ENGINEERING LABORATORY. Lectures and laboratory practice in principles, application and interpretation of analytical tests used in sanitary engineering research and plant control. Lecture, three hours; lab, six hours. *Prereq: consent of instructor.* (5) I (Staff)

580—THEORY OF STRUCTURES III. Plastic design of steel. Theory of trussed arches. Theory and design of continuous trusses. Lecture and recitation, three hours. *Prereq: CE* 480 *and MA* 431. (3) I (Mory)

625—ADVANCED SOIL MECHANICS. Study of the physical, mechanical and engineering properties of soils. Lectures, three hours per week. *Prereq: CE* 425 *or consent of instructor.* (3) I, II (Deen or Hardin)

626—SOIL TESTING FOR ENGINEERING PURPOSES. Theory and techniques of sampling and identification, classification, strength, permeability and consolidation tests on soils. Lecture and laboratory, seven hours. *Prereq: CE* 425, 625 *or concur.* (3) I (Deen or Hardin)

627—APPLIED SOIL MECHANICS. Application of soil mechanics to the design and analysis of earth structures. Lecture, three hours per week. *Prereq: CE* 625 *or consent of instructor.* (3) II (Deen or Hardin)

628—ADVANCED FOUNDATION ENGINEERING. Application of the principles of soil mechanics to the design and analysis of foundations. Lectures, three hours. *Prereq: CE* 625 *or consent of instructor.* (3) II (Hardin or Deen)

640(230a)—HIGHWAY ADMINISTRATION, ECONOMICS AND FINANCE. A study of highway administration, economics and finance; including organization of highway departments, sources and types of revenue, road costs, classification of roads, benefits from improvements, and program planning. Lecture, three hours. *Prereq: CE* 440 *or consent of instructor.* (3) I, II (Drake)

642(230b)—ADVANCED HIGHWAY ENGINEERING. A study of traffic, planning and geometric design including traffic surveys, traffic control, parking and design consideration. Lecture, two hours; laboratory, two hours. *Prereq: CE* 340 *and CE* 341 *or consent of instructor.* (3) II (Dearinger)

645(230c)—HIGHWAY DESIGN, CONSTRUCTION AND MAINTENANCE. A study of highway design, construction and maintenance; including physical aspects of design, drainage, road types, structural pavement design, construction methods and supervision and maintenance methods. Lecture, three hours. *Prereq: CE* 642 *or consent of instructor.* (3) I, II (Drake)

646(230d)—BITUMINOUS PAVING MATERIALS. Origin, production, use-classifications and significant engineering properties of bituminous materials; design of bituminous concrete pavements and highway wearing surfaces. Includes the most recent developments of practical and potential significance in the highway industry. Covers specifications and materials testing. Lecture, two hours; laboratory, three hours. *Prereq: CE* 440 *and CE* 441 *or consent of instructor.* (3) I, II (Havens)

647(230e)—CEMENTS, CONCRETES AND AGGREGATES. Origin, production, use-classifications and significant engineering properties of portland cements, concretes and mortars. Covers: precise methods of design and control of mixes; durability considerations; pozzolans; additions and admixtures; mineral aggregates; structural, paving and mass concretes; specifications and materials testing. Lecture, two hours; laboratory, three hours. *Prereq: CE* 440 *and CE* 441 *or consent of instructor.* (3) I, II (Havens)

659(252a)—ADVANCED SANITARY ENGINEERING DESIGN I. Application of theory of water treatment processes to the functional and hydraulic design of water treatment facilities. Lecture, two hours; laboratory, three hours. (3) I (Lauderdale, King)

660(252b)—ADVANCED SANITARY ENGINEERING DESIGN II. Application of theory of waste treatment processes to the functional and hydraulic design of waste treatment facilities. Lecture, two hours; laboratory, three hours. (3) II (Lauderdale, King)

662(290)—WATER WORKS AND WATER TREATMENT. Theory of water supply and purification, microbiology of fresh water, design of water works and water distribution systems. Lecture, three hours. *Prereq. or concur: CE* 568, *Bact.* 400 *and Bact.* 401. (3) I (Lauderdale, King)

664(291)—SEWERAGE AND SEWAGE TREATMENT. Aerobic and anaerobic methods of waste stabilization, biochemical oxygen demand, stream purification, design of sewerage and sewage treatment plants. Lecture, three hours. *Prereq: CE* 568, *Bact.* 400 *and Bact.* 401. (3) II (Lauderdale, King)

681—DYNAMICS OF STRUCTURES. Behavior of materials under dynamic stresses, dynamic response of multidegree of freedom—concentrated mass systems, dynamic response of distributed mass structures, design of structures for earthquake, wind, traffic and machinery loads. *Prereq: GE* 513 *or permission of instructor.* (3) II (Gesund)

688(272b)—ADVANCED STRUCTURES. Preparation of design drawings of structures analyzed and proportioned in CE 692 and CE 687. Laboratory, four hours. *Prereq: CE* 692 *and CE* 687. (2) I, II (Maggard)

690(272d)—SUSPENSION BRIDGES. Theory and application of stress analysis and design as applied to suspension bridges. Lecture, two hours; laboratory, two hours. *Prereq: CE* 580. (3) I, II (Mory)

692(202a)—SLAB AND FOLDED PLATE STRUCTURES. Design and analysis of reinforced concrete floor slabs and folded plate roofs. Elastic and inelastic methods. Lecture, three hours. *Prereq: CE* 580, *GE* 531, *Math.* 431, *or consent of instructor.* (3) I, II (Gesund)

693(272c)—SHELL STRUCTURES. Design and analysis of reinforced concrete shell structures, including domes, barrel shells, hyperbolic paraboloids and cylindrical tanks. Lecture, three hours. *Prereq: CE* 692 *or consent of instructor.* (3) I, II (Gesund)

694(202b)—CONTINUOUS FRAMES BY THE RAPID COLUMN ANALOGY METHOD. Theory and application of the column analogy method of stress analysis and design as applied to prismatic and haunched members in continuous structures with emphasis on arches. This method has proven itself unusually efficient for programming for electronic computers. Lecture, three hours. *Prereq: CE* 480 *and CE* 492. (3) I, II (Mory)

695(202c)—CONTINUOUS ARCHES ON TALL PIERS AND LEAN-TO STRUCTURES. Theory and application of stress analysis and design methods as applied to continuous unsymmetrical frames carrying horizontal loads; frames with haunched members and continuous arches on slender piers. The translatory and rotary elastic constants and stresses due to displacements are obtained by the column analogy. Lecture, three hours. *Prereq: CE* 694 *or consent of instructor.* (3) I, II (Mory)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

771(283)—SEMINAR. Review of current literature in the field of Civil Engineering, general discussion and presentation of papers on departmental research. Required of all graduate students. One hour. (0) I, II (Staff)

780(282a-c)—SPECIAL PROBLEMS IN CIVIL ENGINEERING. Individual work on some selected design problems in one of the various fields of Civil Engineering. Laboratory, six hours. *Prereq: approval of the Head of Department.* (3) (Staff)
May be repeated to a maximum of nine credits.

790(282d-f)—SPECIAL PROBLEMS IN CIVIL ENGINEERING. Individual work on some selected research problems in one of the various fields of Civil Engineering. Laboratory, six hours. *Prereq: approval of the Head of Department.* (3) (Staff)
May be repeated to a maximum of nine credits.

ELECTRICAL ENGINEERING

414(114R)—CIRCUITS II. A mathematical study of electric and magnetic field effects; forces in fields; introduction to time-varying field theory. Three class hours. *Prereq: EE* 221, *Math.* 212, *Physics* 232, 242. (3) I, II (Black)

415(116R)—ELECTRICAL MACHINERY I. A study of construction, operating characteristics (by mathematical analysis), and applications of electrical machines. Three class hours. *Prereq: EE* 414. *Concur: EE* 416. (3) I, II (Krimm, Back)

416(116L)—ELECTRICAL ENGINEERING LABORATORY III. Laboratory practice and experimental studies related to EE 415. Lecture, one hour. *Prereq: EE* 414. *Concur: EE* 415. (2) I, II (Krimm)

417—LABORATORY TO ACCOMPANY 416. Three hours. (0)

420(120)—ENGINEERING ANALYSIS I. Determinants and matrices; electrical-mechanical analogies; solutions of engineering problems using Fourier series, integral and transforms, Laplace transforms, Gamma and Bessel Functions, LeGendre's polynomials. Three class hours. *Prereq. or concur: EE* 414. (3) I, II (Allison)

461(161R)—ELECTRONICS AND COMMUNICATIONS I. Thermionic emission; vacuum-tube and transistor characteristics. Graphical and mathematical analysis of audio amplifiers; rectifiers and smoothing filters as power supplies. Recitation, three class hours. *Prereq: EE* 221, *Physics* 232, *Math.* 212. *Concur: EE* 414, 462.
(3) I, II (Dailey, Puckett)

462(161L)—ELECTRICAL ENGINEERING LABORATORY II. Experimental exercises in vacuum-tube and transistor characteristics; basic A-F circuits, as voltage and power amplifiers, oscillators and rectifiers. Lecture, one class hour. *Prereq: EE* 222. *Concur: EE* 461. (2) I, II (Daily, Puckett)

463—LABORATORY TO ACCOMPANY 462. Three hours. (0)

507(107R)—ELECTRICAL CONTROLS I. Design and analysis of open-loop control components and systems. Three class hours. *Prereq: EE* 420. *Prereq. or concur: EE* 415, 416. (3) I, II (Maney, Jackson)

508(107L)—ELECTRICAL ENGINEERING LABORATORY IV. Laboratory study of control methods and systems employing magnetic and electronic components; analog computers. Lecture, one hour. *Prereq: EE* 507. *Concur: EE* 572. (2) I, II (Staff)

509—LABORATORY TO ACCOMPANY 508. Three hours. (0)

517—ELECTRICAL MACHINERY II. Electro-mechanical energy conversion systems studies. Development of generalized equivalent circuits for various conditions of operation. *Prereq: EE* 415, 416. (3) I, II (Maney)

520(120b)—ENGINEERING ANALYSIS II. Investigation of transient and steady-state conditions in electrical and mechanical systems, using Laplace transform methods; network analysis and synthesis; complex variable applications, feedback system stability criteria. Three class hours. *Prereq: EE* 420. (3) I, II (Distler, Allison)

523(123)—ELECTRICAL EQUIPMENT PROBLEMS. A creative design study of comprehensive engineering problems, primarily electrical but related to engineering in general. One class hour, five hours by appointment. (2) I, II (Maney)

535(135R)—CIRCUITS III. Fundamentals of network theory in communications circuits; transmission lines and wave filters. Three class hours. *Prereq: EE* 414, 462, 420. (3) I, II (Distler, Graham)

537(137a)—ELECTRIC POWER TRANSMISSION I. Transmission line parameters, generalized circuit constants; analysis of line performance. Three class hours. *Prereq:* 415, 416. (3) I (Maney)

538(137b)—ELECTRIC POWER TRANSMISSION II. Per-unit studies; symmetrical components, experimental studies on a-c network analyzer. Three class hours. *Prereq: EE* 537. (3) II (Maney)

562(162R)—ELECTRONICS AND COMMUNICATIONS II. Feedback amplifiers, tuned and untuned amplifiers; oscillators, AM and FM transmitters. Three class hours. *Prereq: EE* 461, 462. (3) I, II (Bradley, Kadaba)

563—TRANSISTOR CIRCUIT DESIGN. Small- and large-signal amplifier design, cascaded amplifiers; stability, feedback; pulse circuits, switching; currently developed devices. Three class hours. *Prereq: EE* 562 *or equivalent.* (3) I, II (Distler, Graham)

564(164R)—ELECTRONICS AND COMMUNICATIONS III. Timing, scanning, trigger and pulse circuits; video and broad-band R-F amplifiers. Generation, transmission and radiation of V-H-F and U-H-F energy. Three class hours. *Prereq: EE* 562, 567. (3) I, II (Allison, Kadaba)

565(164L)—ELECTRICAL ENGINEERING LABORATORY V. Laboratory practice and experiment exercises relating to studies in EE 564. Lecture, one hour; laboratory, three hours. Concur: EE 564. (2) I, II (Allison, Kadaba)

566(166)—MAGNETIC AMPLIFIERS. Wave-form analysis of circuits with nonlinear magnetic elements; saturable reactors and self-saturating magnetic amplifiers in steady-state and transient operation; some characteristics of semiconductor diodes including Zener types; effects of negative and positive feedback on magnetic amplifiers. Three class hours. *Prereq: EE* 415, 461. (3) II (Distler)

567—FIELDS AND WAVES. Theory of electric and magnetic fields using vector methods of analysis; Maxwell's equations. Time-varying fields, wave equations. Three class hours. *Prereq: EE* 414, 420. (3) I, II (Romanowitz, Allison)

572(172R)—ELECTRICAL CONTROLS II. Analytical and graphical techniques applied to the design of linear feedback control systems, emphasizing a root-lucus method. Non-linear systems are briefly discussed. Three class hours. *Prereq: EE* 520, 507, *Concur: EE* 508. (3) I, II (Jackson, Maney)

580—LOGICAL DESIGN OF DIGITAL SYSTEMS. Computation elements; analysis and synthesis of systems, Boolean functions and applications to relay and electronic circuits; circuit logic, memory elements; design of counters, sequential devices, digital devices; brief treatment of programming. Three class hours. (3) (Graham, Distler)

585—MOLECULAR ENGINEERING. Fundamental particles; Quantum concepts, statistics; crystal structure; Thermal properties of solids; Dielectric properties, optical properties; Free-electron model of metals; Band theory; Semiconductors; Solid state devices. Three class hours. *Prereq: Math.* 431, *EE* 567. *Prereq. or concur: EE* 520. (3) II (Kadaba)

595(152a-d)—INDEPENDENT PROBLEMS. For electrical engineers. A problem, approved by the head of the department provides an objective for study and research. (1) I, II (Staff)

May be repeated to a maximum of three credits.

596(152d-f)—INDEPENDENT PROBLEMS. Same conditions as EE 595. (2) I, II (Staff)

May be repeated to a maximum of six credits.

Prerequisite for graduate work: Students desiring to take any of the following courses should have a thorough working knowledge of chemistry, physics and mathematics. For major work, a candidate must hold a bachelor's degree in Electrical Engineering or its equivalent.

601—ELECTROMAGNETIC ENERGY CONVERSION I. General dynamical theories are developed for electromechanical energy systems. Various constraints are applied to the equations of motion and energy transfer. Lecture and recitation. *Prereq: EE* 517, 567 *or equivalent.* (3) (Maney)

602—ELECTROMAGNETIC ENERGY CONVERSION II. Continuation of EE 601, with special attention to specific areas of machine types. *Prereq: EE* 601 *or equivalent.* (3) (Maney)

606(206)—ELECTRIC POWER TRANSMISSION. The theory underlying the calculation and operation of long distance transmission circuits. Special attention to relay control. *Prereq: EE* 538. (3) (Maney)

611(211a)—LINEAR CIRCUIT ANALYSIS I. Laplace and Fourier transform methods of analysis of linear lumped constant systems under transient and steady state conditions; feedback amplifiers; filter networks; stability and physical realizability. *Prereq: EE* 520, 535, 572. (3) (Jackson, Graham)

612(211b)—LINEAR CIRCUIT ANALYSIS II. Continuation of EE 611 with an introduction to non-linear systems. *Prereq: EE* 611. (3) (Jackson, Graham)

613(212)—SERVOMECHANISMS. Analysis and synthesis of linear and non-linear closed-loop control systems; analog computer and phase-plane techniques; root-locus and Laplace transform methods applied to linear systems. *Prereq: EE* 572. (3) (Jackson, Distler)

622(222)—GASEOUS CONDUCTING ELECTRONIC DEVICES. Atomic energy level diagrams; photo-electric emission and devices; electric arcs and glow discharges, plasmas and boundaries, sheaths and probes; industrial devices. *Prereq: EE* 461, 567. (3) (Romanowitz)

623(223)—LINES AND WAVE GUIDES. Open-wire and coaxial lines, standing waves, stub matching; impedance transformation, rectangular and circular wave guides. *Prereq: EE* 535, 564, 567. (3) (Allison, Kadaba)

624—SOLID STATE ELECTRONICS. Bose and Fermi statistics, semiconductor theory. Solid state devices, electrical properties of insulators. Theory and applications of magnetic materials including ferrites. *Prereq: EE* 585 *or equivalent.* (3) (Kadaba)

626(226)—MICROWAVE ENGINEERING. Generation, detection and measurement of microwave energy; vacuum tubes at ultra high frequencies, the klystron and the magnetron. Lecture, two hours, three hours lab. *Prereq: EE* 564, 565, 567. (3) (Allison, Kadaba)

627(227)—ELECTROMAGNETIC FIELDS. Advanced studies in electromagnetic fields; antennas, radiation and propagation of energy. *Prereq: EE* 567. (3) (Allison, Kadaba)

680—ADVANCED LOGICAL DESIGN. Boolean matrices; bridge circuits; bilateral, cascaded, and iterative networks; secondary assignment methods for the design of sequential circuits. Design of actual digital computers. *Prereq: EE* 580 *or equivalent.* (3) II (Navarro)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)

May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

771(231a-d)—SEMINAR. Review of current literature in the field of Electrical Engineering, general discussion and presentation of papers on departmental research. Required of all graduate students. (0) (Staff)

781(230a-c)—SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING. Open to graduate students only. Individual work on an assignment approved by the head of the Department. (1) (Staff)
May be repeated to a maximum of three credits.

782—SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING. Open to graduate students only. Individual work on an assignment approved by the head of the department. (2) (Staff)
May be repeated to a maximum of six credits.

783(230d-f)—SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING. Open to graduate students only. Individual work on an assignment approved by the head of the department. (3) (Staff)
May be repeated to a maximum of nine credits.

MECHANICAL ENGINEERING

400—ELEMENTS OF ENGINEERING THERMODYNAMICS. (For Civil, Electrical, and Mining Engineers.) General energy equations, mixtures of gases and vapors, flow of fluids, vapor power cycles, internal combustion cycles, and refrigeration cycles. Recitation, three hours. Prereq: *Physics* 232 *and Math.* 212. (3) (Staff)

401—MECHANICAL AND ELECTRICAL EQUIPMENT FOR BUILDINGS. A course for Architectural Engineers. The principles of water supply, plumbing and drainage, air conditioning, electrical equipment, lighting and acoustics are studied. Lecture and recitation, one hour, laboratory, two hours. *Prereq: Physics* B32. (2) (Staff)

402—MECHANICAL AND ELECTRICAL EQUIPMENT FOR BUILDINGS. Continuation of ME 401. Lecture and recitation, one hour, laboratory, two hours. *Prereq: ME* 401. (2) (Staff)

525(129)—ELEMENTS OF HEAT TRANSFER. Fundamental principles of heat transfer. Lecture and recitation, three hours. *Prereq: ME* 321, *MA* 331. (3) (Elliott, Thorpe)

530—FLUID DYNAMICS. Thermodynamics of flow of compressible fluids. Isentropic flow, adiabatic flow, flow with friction, wave phenomena, and experimental techniques and measurement. Lectures and recitation, three hours. *Prereq: ME* 321 *and ME* 330. (4) (Marshall)

531—LABORATORY TO ACCOMPANY 530. Two hours. (0)

550(137)—MOTION AND TIME STUDY. Principles and uses of motion economy and fundamentals of time study. Lecture and recitation, three hours. *Prereq: ME* 251, *ME* 252. (4) (Gard)

551—LABORATORY TO ACCOMPANY 550. Two hours. (0)

552(139)—PLANT LAYOUT. Selection of processes and machines, material handling systems, and plant requirements. Lecture, two hours. *Prereq: ME* 550. (3) (Gard)

553—LABORATORY TO ACCOMPANY 552. Three hours. (0)

554(138)—TOOL DESIGN. An introduction to Tool Engineering which embodies the fundamental principles of designing jigs, fixtures, cams, gages, punches, dies and automatic machine tools. Lecture, two hours. *Prereq: ME* 341. (3) (Mason)

555—LABORATORY TO ACCOMPANY 554. Three hours. (0)

560(108)—INTERNAL COMBUSTION ENGINES. A study of internal combustion engine cycles and the characteristic and performance of actual engines, valve gears, and materials of construction. Lecture and recitation, three hours. *Prereq: ME* 321 *or ME* 400. (4) (Stewart)

561—LABORATORY TO ACCOMPANY 560. Two hours. (0)

562—RECIPROCATING ENGINE DESIGN. A brief review of basic thermodynamics of internal combustion engine cycles and a comprehensive analysis of the construction of reciprocating engines. Calculation of physical data for given design requirements. Assembly drawings of components designed. Lecture and recitation, one hour. *Prereq: ME* 560. (3) (Stewart)

563—LABORATORY TO ACCOMPANY 562. Six hours. (0)

564–PROPULSION SYSTEM DESIGN. Design of systems for aircraft or missile propulsion. Centrifugal compressors, axial-flow compressors, turbine and exhaust systems, and combustion chambers. Lecture, one hour. *Prereq: ME* 530. (3) (Marshall)

565–LABORATORY TO ACCOMPANY 564. Six hours. (0)

566(105)–POWER PLANT ENGINEERING. Study of the characteristics of steam and internal combustion engineering generating power stations. Lecture and recitation, three hours. *Prereq: ME* 321. (3) (Stewart)

580(114a)–AIR CONDITIONING, HEATING, AND VENTILATING. Theory of air conditioning and the mechanical equipment of buildings. Lecture and recitation, four hours. *Prereq: ME* 321. (4) (Walton)

581(114b)–AIR CONDITIONING, HEATING AND VENTILATING DESIGN. Continuation of ME 580 and the complete design and layout of a year-round air conditioning system. Drawing room, nine hours. *Prereq: ME* 580. (3) (Walton)

582(109)–REFRIGERATION. A course which deals with compression and absorption refrigeration machines and installations. Lecture and recitation, three hours. *Prereq: ME* 321. (3) (Walton)

590–ELEMENTS OF AERO-SPACE TECHNOLOGY. Flight performance of airborne and ballistic vehicles. Space vehicle propulsion and structures. The space environment. Lecture, three hours. *Prereq: ME* 321 *and ME* 330. (4) (Lange)

591–LABORATORY TO ACCOMPANY 590. Two hours. (0)

592–AERO-SPACE COMPONENT DESIGN. Preparation of a formal proposal on a given requirement in the aero-space field. Execution of the design. Testing of a prototype under proper environmental conditions. Lecture, one hour. *Prereq: ME* 590. (3) (Lange)

593–LABORATORY TO ACCOMPANY 592. Six hours. (0)

620(211a)–ADVANCED ENGINEERING THERMODYNAMICS I. Critical treatment of the laws of thermodynamics, temperature scales; applications of theory to compressors and internal combustion engines; frequent reference to research papers. Lecture, four hours. *Prereq: ME* 321. (3) (Walton)

621(211b)–ADVANCED ENGINEERING THERMODYNAMICS II. Continuation of *ME* 620. (3) (Walton)

625(213a)–ADVANCED HEAT TRANSFER I. Application of mathematics to heat transfer, transfer of heat in heat exchangers and furnaces, heat transmission and pressure drop, discussion of research papers. Lecture, three hours. *Prereq: ME* 525. *ME* 330 *or equivalent.* (3) (Thorpe)

626(213b)–ADVANCED HEAT TRANSFER II. Continuation of ME 625. *Prereq: ME* 625. (3) (Thorpe)

630(212a)–ADVANCED FLUID MECHANICS I. Fundamentals of hydro-and aero-mechanics treated by the use of vector and tensor calculus. Lecture, three hours. *Prereq: ME* 330 *or consent of instructor.* (3) (Renda)

631(212b)–ADVANCED FLUID MECHANICS II. Continuation of ME 630. *Prereq: ME* 630. (3) (Renda)

632–ADVANCED FLUID MECHANICS III. Introduction to research in fluid mechanics. Laminar motion. Turbulence. Boundary layer theorm. Free-turbulence, shear flow. Magnetohydrodynamics. Rarefied gas mechanics. Lecture, four hours. *Prereq: ME* 630. (3) (Renda)

633–ADVANCED FLUID MECHANICS IV. Conference course permitting latitude in choice of topics. *Prereq: ME* 630 *and consent of the instructor.* (3) (Renda)

640(204)–ADVANCED MACHINE DESIGN. The application of the principles of mechanics of materials, dynamics and kinematics to the design of complete machines. This involves a knowledge of shop practice and methods of construction. Lecture, three hours. *Prereq: consent of instructor.* (3) (Mason, Wireman)

641(218)–ADVANCED GEAR DESIGN. Fundamentals of gearing; involute trigonometry; design of planetary gear systems and transmission; study of gear forms such as bevel, helical, worm and spiral; study of gear manufacturing methods. Lecture and recitation, three hours. *Prereq: ME* 341. (3) (Carter)

642–ADVANCED KINEMATICS OF MACHINERY I. Fundamentals in the analysis and synthesis of mechanisms including coupler curves, guided plane systems and linkage design. Lecture, three hours. (3) (Tao)

643—ADVANCED KINEMATICS OF MACHINERY II. A continuation of ME 642 dealing with the motion of rigid planes passing through multiple positions. Theory and application. Lecture and recitation, three hours per week. *Prereq: ME* 642. (3) Tao

660(202)—POWER PLANT ENGINEERING. Advanced work in the design, selection, layout, and operation of heat-power plant equipment. Lecture, three hours. (3) (Stewart)

661(216)—STEAM TURBINES. Steam turbine cycles, flow of steam through nozzles and blades; internal losses; reheat factor; regenerative fed-heating; turbine performance at varying loads; mixed pressure turbines; construction of nozzles and diaphragms. Lecture, three hours. (3) (Stewart)

662(217)—GAS TURBINES AND JET PROPULSION. Momentum, energy, and thermodynamics of gas flow; performance calculations; centrifugal, axial-flow; gas turbine cycles and characteristics; combustion chamber, aircraft, stationary, marine, and locomotive power plants. ,Lecture, three hours. (3) (Marshall)

680(203a)—HEATING, VENTILATING, AND AIR CONDITIONING I. Theoretical analysis of complex refrigeration cycles and treatment of advanced refrigeration topics; intermittent heating; advanced psychrometrics and air conditioning techniques. Lecture, three hours. (3) (Walton)

681(203b)—HEATING, VENTILATING AND AIR CONDITIONING II. Analysis of panel heating and cooling systems; theoretical development of exact radiation equations involving multiple reflections; configuration factor analysis; exact and simplified design techniques. Lecture, three hours. (3) (Walton)

682(203c)—HEATING, VENTILATING, AND AIR CONDITIONING III. Advanced work in the design, selection, layout, and operation of heating, ventilating, and air conditioning equipment with emphasis on industrial application and heat pump design. Lecture, three hours. (3) (Walton)

690(219)—ADVANCED AERONAUTICAL METEOROLOGY. Atmospheric thermodynamics, and dynamics. Adiabatic changes of moist air through vertical motion, effects on aircraft. Energy equations of motion on rotating globe; rocket-spectrographic studies. Lecture and recitation, three hours. (3) (Lange)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

771(215a-d)—SEMINAR. Review of current literature in the field of Mechanical Engineering, general discussion and presentation of papers on departmental research. Required of all graduate students. Two hours. (0) (Staff)

780(210a-f)—SPECIAL PROBLEMS IN MECHANICAL ENGINEERING. For graduate students having research ability. Each course consists of individual work in one of the various fields of Mechanical Engineering. Laboratory, six hours. *Prereq: approval of* head of department. (3) (Staff)
May be repeated to a maximum of twelve credits.

METALLURGICAL ENGINEERING

443(166))—MINERALS BENEFICIATION. Principles and mechanics of beneficiation involved in the preparation of mine products, principles of plant design, and current developments. Lecture and recitation, three hours. *Prereq: Phys.* 232. (3) II (Spokes)

444(167)—MINERALS BENEFICIATION LABORATORY. Application of the principles studied in Met. 443. Laboratory, three hours. *Concurrent: Met.* 443. (1) II (Spokes)

451—METALLURGICAL THERMODYNAMICS. Application of fugacity, activity and equilibrium constants to metallurgical systems. Analysis of ideal, non-ideal and regular solutions and their relation to non-metallic solutions at elevated temperatures, molten salt solutions and slags. Discussion and application of the phase rule to metal systems. Lecture, three hours. *Prereq: Met.* 351. (3) I (Fields)

453—METALLURGICAL KINETICS. Rate processes in heat and mass transfer, nucleation and growth. Fluid flow in molten metal systems. Lecture, three hours. *Prereq: Met.* 451. (3) II (Morris)

461—PHYSICAL METALLURGY. High purity metals, nuclear alloys powder metallurgy techniques. Lecture, two hours, lab, three hours. *Prereq: Met.* 361. (3) I (Morris)

463—STRUCTURE OF ALLOYS. Age hardening and diffusion in metal systems. Lecture, two hours; lab, three hours. *Prereq: Met.* 363. (3) II (Morris)

521(180)—THE CASTING OF METALS. Ferrous and non-ferrous foundry practice. Theory and metallurgy of metal castings. Application of engineering principles to the design and production of castings. Lecture and recitation, three hours. *Prereq: Met.* 201, 301 *or* 303. (3) I, II (Duncan)

581(185)—POWDER METALLURGY. The production and testing of metal powders. The theory of sintering without and with a liquid phase. The practice and theory of compacting metal powders into useful forms. Lecture and recitation, three hours. *Prereq: Met.* 368. (3) I, II (Swift)

633(215)—SPECIAL PURPOSE ALLOY STEELS. Fundamental principles of the more complicated and special alloy steels and their heat treatment. Carbon, mild alloys, N.E., S.A.E., tool and super alloys are included. Alternate alloy steels for application are considered. Lecture, three hours. (3) I, II (Swift)

635—METALS AT HIGH TEMPERATURE. Fundamental considerations involved in high temperature behavior of metals. Test methods and equipment for elevated temperature testing. A review of the commercial alloys for high temperature use and study of current literature. Lecture, three hours. (3) I, II (Fields)

637—MATERIALS ENGINEERING. Factors in specification and testing of materials for lightweight construction, mechanical and electrical applications, and severe service conditions. Lecture, two hours; laboratory, three hours. (3) I, II (Fields)

639(250)—NUCLEAR METALLURGY. The physical metallurgy of materials used in components of nuclear reactors. Materials applicable to nuclear-reactor components in ceramics, metal ceramics, and other fields. Lecture and recitation, three hours. *Prereq: B.S. in Metallurgical Engineering or permission of instructor.* (3) I, II (Mateer)

641(207)—ADVANCED PRODUCTION METALLURGY. Principles and practices used in the production of alloys. Lecture, two hours; laboratory, three hours. (3) I, II (Swift)

643(209a)—ADVANCED ORE DRESSING I. Ore dressing plant design and original research in concentration problems. Lecture and recitation, one hour; laboratory, six hours. (3) I (Spokes)

645(209b)—ADVANCED ORE DRESSING II. Continuation of Met. 643. Lecture and recitation, one hour. Laboratory, six hours. (3) I (Spokes)

651(222)—CORROSION. Corrosion mechanisms, including the electrochemical theory, fundamentals of oxidation and tarnish, passivity and effects of crystal orientation on corrosion. Corrosion of engineering materials in various environments and testing. Lecture, two hours; laboratory, three hours. (3) I, II (Swift)

653(218)—DIFUSSION AND HEAT FLOW IN METALS. Fick and Fourier equations applied to diffusion and solid state transformations, and to the heating and cooling of metals in metallurgical processes. Radiation, convection, and conduction are considered in principles of furnace design. Lecture, two hours. (2) I, II (Morris)

657(216)—THE PHYSICAL CHEMISTRY OF STEELMAKING. Reactions involved in steel making processes. Slag constitution, slag control, and effects of additions to liquid metal. Influences of melting, refining, and deoxidizing practices on properties of finished steel. Lecture, three hours. (3) I, II (Fields)

659(221)—ADVANCED PHASE DIAGRAMS. Review of thermodynamic fundamentals and application to binary pressure-temperature-composition diagrams. Construction and interpretation of ternary temperature-composition diagrams. Review and discussion of important ternary diagrams. Lecture and recitation, three hours. *Prereq: Chem.* 447, *Met.* 261. (3) I, II (Mateer)

663(214)—THEORETICAL STRUCTURAL METALLURGY. Interatomic forces of crystal bonding; free electron zone theory; equilibrum and rate of approach thereto; thermal behavior, structure and free energy of alloy phases; equilibrium diagrams; diffusion; order-disorder change, nucleation and phase growth. Lecture, three hours. (3) I, II (Morris)

665(213)—X-RAY METALLOGRAPHY. Crystallography; x-ray theory. Laue, rotation-crystal, powder x-ray diffraction methods; special cameras; structure-factors equations; reciprocal lattice; stereographic, gnomonic projections; poles figures; stress-strain analysis, phase diagrams; electron diffraction. Lecture. three hours; laboratory, three hours. *Prereq: Met.* 361. (4) I, S (Mateer)

667—CRYSTAL PLASTICITY. Fundamentals of plastic deformation in metals. Crystallography, slip, twinning, strain hardening, recovery, cold working, cold-worked and recrystallization textures, Heyns stresses and creep. Lecture and recitation, three hours. (3) I, II (Fields)

745—CARBONIZATION OF COAL. The production of coke, char, gas, and chemical by-products. Determination of the quality of coals and the yields of by-products by low, medium and high temperature processes. Lecture and recitation, two hours, laboratory, three hours. (3) I, II (Spokes)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 wks. residence) (Staff)
May be repeated indefinitely.

771(275a-h)—SEMINAR. Review of current literature in the field of metallurgical engineering and presentation of papers on departmental research. Required of all graduate students. Two hours. (1) I, II, S (Swift)
May be repeated to a maximum of four credits.

781(240a-c)—SPECIAL PROBLEMS, LITERATURE AND LABORATORY. Literature research and planning of research programs; laboratory problems and technical writing, including a term paper, are required. Consultation, laboratory, and lecture by appointment. (1-3) I, II, S (Staff)
May be repeated to a maximum of nine credits.

MINING ENGINEERING

441(145)—MINING METHODS. Surface and underground mining of coal, metallic ores, and non-metallic minerals. Economic, engineering, and operating factors. Lecture and recitation, three hours. *Prereq: GE* 431; *Min.* 241. (3) I (Roll, Spokes)

461(130)—MINERAL INDUSTRIES ADMINISTRATION. The engineering aspects of mine administration and management, including safety engineering. Lecture and recitation, three hours. (3) I (Roll)

471(136)—MINE VENTILATION. The principles and methods of mine ventilating and air conditioning; the control of dangerous impurities. Lecture and recitation, two hours; laboratory, three hours. *Prereq: Min.* 241. (3) II (Spokes, Roll)

481(137)—MINE PLANT AND MACHINERY. Theory and practice of mine haulage, hoisting, drainage, pumping, and compressed air as power. Application of engineering principles to the mineral industries. Lecture and recitation, two hours; laboratory, three hours. *Prereq: Min.* 241. (3) II (Spokes)

541(133a)—COAL PREPARATION. Principles and practice of coal preparation and associated operations. Lecture and recitation, two hours; laboratory, three hours. *Prereq: Met.* 443. (3) I (Spokes)

542(133b)—COAL PREPARATION. Continuation of Min. 541. Lecture and recitation, two hours; laboratory, three hours. (3) II (Spokes)

561(139)—VALUATION OF MINERAL PROPERTIES. Methods of appraising the value of deposits of ores, mineral fuels, and non-metallics. Lecture and recitation, two hours. *Prereq: Eco.* 251, *Min.* 241. (2) II (Roll)

621(207)—ADVANCED PROSPECTING. Study of the principles involved in the geophysical investigation of the minerals of the earth's crust. Lecture and recitation, two hours; laboratory, three hours. (3) I, II (Spokes)

636(222)—CERAMIC ENGINEERING. Materials and equipment used in the ceramics industry. Physical and chemical principles relating to the manufacture of ceramic products such as pottery, tile, brick, whiteware, refractories, glass, and enamels on metals. Lecture and recitation, three hours. (3) I, II (Swift)

645(224)—PREPARATION AND USES OF INDUSTRIAL MINERALS. Sources, processing, marketing, utilization, product specifications, and economics of nonmetallic minerals, including clay, limestone, abestos, and refractories. Lecture and recitation, three hours. (3) I, II (Swift)

651(223)—FUELS AND THEIR COMBUSTION. The sources and properties of natural fuels and their refined products. The chemistry and physics of combustion. Combustion equipment. Lecture and recitation, three hours. (3) I, II (Spokes)

661(203)—MINE ORGANIZATION. Detailed study of the structure and function of a mining enterprise from both the financial and the engineering standpoint. Lecture and recitation, three hours. (3) I, II (Roll)

681(209a,b)—ADVANCED MINE ENGINEERING. Procedure and methods of collecting and recording data for the systematic development and exploitation of a mining property. Lecture and recitation, one hour; drawing and mapping, six hours. (3) I, II (Spokes, Roll)
May be repeated to a maximum of six credits.

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE.
(1 to 9 wks. residence) (Staff)
May be repeated. Maximum of six weeks can be applied toward master's degree with thesis.

771(221a-d)—SEMINAR. Review of current literature in the field of Mining Engineering and presentation of papers on departmental research. Required of all graduate students. Two hours. (1) I, II (Staff)
May be repeated to a maximum of three credits.

780(220a-c)—SPECIAL PROBLEMS IN MINING ENGINEERING. Literature research and planning of research programs; laboratory problems and technical writing, including a term paper, are required. Consultation, laboratory, and lecture by appointment.
(3) I, II, S (Spokes, Roll)
May be repeated to a maximum of nine credits.

790(220d-f)—SPECIAL PROBLEMS IN MINING ENGINEERING. Literature, research and planning of research programs; laboratory problems and technical writing, including a term paper, are required. Consultation, laboratory, and lecture by appointment.
(3) I, II, S (Spokes, Roll)
May be repeated to a maximum of nine credits.

V. LAW

The following courses in the College of Law are accepted as graduate work when taken by students majoring in Political Science, Economics, Sociology, Commerce or other fields in which such courses are recommended by the major professors. No major programs of study are offered in Law at present leading to a degree other than Bachelor of Laws (LL.B.).

501,502(101a,b)—CONTRACTS I, II. Patterson, Goble and Jones' Cases. Formation of contracts, offer, acceptance, consideration, Statute of Frauds, parties affected by contracts, contracts for benefit of third persons, assignments, joint and several contracts, performance of contracts, express and implied conditions, impossibility of performance, and illegal contracts. (3, 2) I, II (Ham)

503,504—TORTS I, II. Smith and Prosser's Cases. (2d ed.) Intentional torts and defenses, negligence, causation, duties of occupants of land and manufacturers and vendors of chattels. (3 ea.) I, II (Oberst, Lewis)

505,506(103)—PROPERTY I AND II. Casner and Leach's Case. Basic course in property: possession, gifts, bona fide purchasers of personalty, estates in land before and after, the Statute of Uses, easements, and rights incident to ownership. (4 ea.) I (Matthews)

507(106)—PROCEDURE. Clark's Cases on Modern Pleading; Keigwin's Cases on Common Law Pleading. Common law forms, theory of the case, composition of pleadings, demurrer, aided, duplicity, traverses, pleas, motions. Code and Federal Rule pleading. Claims, answers, objection and correction of pleadings, parties and joinders of actions. (3) (Richardson)

508(148)—DOMESTIC RELATIONS. Compton's Cases. Contracts to marry; requisites and incidents of marriage status; annulment, divorce and separation; parent and child; infants and incompetent persons. (2) I (Whiteside)

509(107a)—CRIMINAL LAW. Hall and Glueck's Cases. Jurisdiction; the criminal act, complete and incomplete; criminal intent, actual and constructive; duress and mistake of fact, of law; justification; parties in crime; crimes against the person; and crimes against property. (2) I (Moreland)

510(107b)—CRIMINAL PROCEDURE. Hall and Glueck's Cases. Arrest, preliminary examination, bail, methods of prosecution, the grand jury, indictment and information, arraignment and pleas, nolle prosequi and motion to quash, trial and verdict, motions after trial. (2) II (Moreland)

511(144)—LEGAL BIBLIOGRAPHY. Selected materials. Practical problems in the use of statutes, reports, digests, encyclopedias, annotated cases, citation books, periodicals, reference tables, and indices. (1) I (Salmon)

512(186)—LOCAL GOVERNMENT LAW. Fordham's Local Government Law. Legislative control over municipal corporation; municipal powers in general; licenses and franchises; appropriation of municipal funds; municipal contracts, indebtedness, torts, property, special assessments. (2) II (Lewis)

520(135)—COMMERCIAL LAW. Braucher and Sutherland's Commercial Transactions (2d ed.). The study of commercial law principles with special emphasis on the law of sales, especially as governed by the Uniform Commercial Code. (4) I (Whiteside)

521(120)—TRIAL AND APPELLATE PROCEDURE. McBaine's Cases, 3d ed. Venue, Service of Summons, provisional remedies, discovery and pretrial practice, summary judgment, trials, verdict, judgment and appeals, including final judgment rule, and appeal practice; *res judicata;* correction of judgments; extraordinary remedies. (3) II (Richardson)

522(122)—PROPERTY III. Casner and Leach's Cases. Titles and conveyancing. Adverse possession; prescription; accretion dedication; mode of conveyance at common law, under the Statute of Uses, and under modern statutes; execution of easements by implication; estates; covenants for title; estoppel by deed, and priorities. (3) II (Dukeminier)

523(124)—EVIDENCE. McCormick's Cases. Rules of admissibility, real, circumstantial, testimonial and documentary evidence, witnesses, hearsay rule and its exceptions, procedure of admissibility, law and fact, judge and jury, burden of proof and presumption, judicial notice, and parole evidence rule. (4) II (Richardson)

524(145)—INSURANCE. Goble's Cases on Insurance. Nature of contract, insurable interest, making the contract, concealment, representations, warranties, implied conditions of forfeiture, waiver and estoppel, rights under the contract, and construction of the policy. (2) II (Lewis)

525(152)—OIL AND GAS. Kulp's Cases (3d ed.). Oil and gas leases—infants, married women, life tenants, and others as parties; the granting clause—lessee's interest, lessee's right to ejectment; the habendum clause—duration of leases, etc. (2) S (Moreland)

526(154)—DAMAGES. McCormick's Cases. Nature of damages, avoidable consequences, counsel fees, certainty, compensation, damages for non-pecuniary injuries, interest, damages for death, and eminent domain. (2) S (Richardson)

527(155)—MODERN SOCIAL LEGISLATION. Aaron's Employment Relation and the Law. A study of statutes, administrative reports, regulations, legislative hearings and judicial decisions relating to modern social legislation, including Social Security, Workmen's Compensation, medical care insurance, unemployment insurance, wages and hours, and public assistance. (2-3) II (Gilliam)

528(156)—AGENCY-PARTNERSHIP. Conard's Cases on Business Organization (2d ed.). A study of traditional agency concepts and selected materials on partnership law, including the vicarious liability relationship in tort and contract, the fiduciary concept, the organization and liquidation of partnerships. (2-3) I (Ham)

529(161)—CONSTITUTIONAL LAW. Kauper's Cases. Judicial review, relationships in the federal system, powers of Congress, powers of the President, powers of the states. Due process, procedural and substantive; obligation of contracts, equal protection, civil rights, privileges and immunities. (4) I (Oberst)

530(174)—CREDIT TRANSACTIONS. Sturges' Cases, 4th ed. Mortgages; creation, assignment, priority, foreclosure, redemption. Pledges, suretyship rights, suretyship defenses, Statute of Frauds. (3) II (Lewis)

531(178)—CREDITORS' RIGHTS. Hanna and McLachlan's Cases (4th edition). Enforcement of judgments; fraudulent conveyances; general assignments; creditors' agreements; receiverships; bankruptcy, assets, and distribution. (3) I (Whiteside)

532(189)—TAXATION I. Bittker's Cases. Problems in federal and state income taxation. (3) II (Whiteside)

533(188)—TAXATION II. Bittker's Cases. Advanced income tax problems of business organization—of corporations and their shareholders connected with dividends and other distributions, liquidation and reorganization; of partners and partnerships; and of trusts and estates. (2) I (Whiteside)

534—EQUITY—Chafee, Simpson and Maloney's Cases (3d edition). The traditional equity materials. (3) II (Moreland)

540—CONFLICT OF LAWS. Cheatham, Goodrich and Griswold's cases (3d edition). Nature of the subject, penal laws, procedure, judgments, domicile, capacity, form, particular subjects, litigation, family law, inheritance, foreign administrators. (3) II (Moreland)

541(165)—TRUSTS. Scott's Cases (4th ed.). Uses and Statute of Uses; trust creation; elements; transfer of beneficiary's interest; administration, termination and modification; charitable trusts; resulting and constructive trusts; powers. (3) I (Matthews)

542(167)—ADMINISTRATIVE LAW. Gellhorn and Byse's Cases. Establishment of administrative tribunals, limits on discretion. Notice and hearing, orders, methods of judicial relief, scope of judicial review. (3) II (Oberst)

543(170)—THE LEGAL PROFESSION. Cheatham's Cases and Materials (2d ed.). A study of professional problems including: ethics, discipline, unauthorized practice, duty to court and client, bar admission and organization, fees and office procedure. (1) I (Gilliam)

544—LABOR LAW. Smith's Cases and Materials (2d edition). History, organization and structure of American labor unions, obligations of employers; questions of representation; privileges and obligations of unions; collective bargaining and dispute settlement. (3) II (Richardson)

545,546(182a,b)—ESTATE PLANNING I-II. Casner's Estate Planning (2d ed.). Donative transfers of property, including *inter vivos* transfers and wills; income, estate and gift tax consequences of the various methods of disposition; administration of estates. Future interests in property, including an intensive study of constructive problems and the rule against perpetuities. (3 or 4, 2 or 3) II (Dukeminier, Batt)

VII. MEDICINE

BIOCHEMISTRY

The program of graduate studies in biochemistry is designed primarily for doctoral candidates who plan to pursue a research career in this field. Creative research in biochemistry requires broader training and more extensive laboratory experience than can be achieved at the master's level. Therefore, candidates for the master's degree will be accepted only under unusual circumstances.

As preparation for graduate work in biochemistry, students should have completed courses in chemistry through physical chemistry, in mathematics through the calculus and must have had one year of work in physics and in one of the biological sciences. A reading knowledge of two modern foreign languages, of which one should be German and the other French or Russian, should be acquired as an undergraduate. Although students who have deficiencies in their preparation may be admitted to graduate study in the Department of Biochemistry, the time necessary for completion of their work will necessarily be lengthened. Although programs of study will be fitted to the preparation and interests of individual students, it is anticipated that most students will take advanced courses in chemistry and in physiology, microbiology, zoology or botany.

Inquiries concerning availability of financial support for graduate students should be addressed to the chairman of the department.

511—BIOCHEMISTRY FOR MEDICAL STUDENTS. A lecture, laboratory and conference course in general biochemistry with emphasis on the biochemistry of higher animals. This course is an integral part of the curriculum for first year medical students. It meets on an irregular schedule beginning in October and ending in March. Since laboratory space is limited, graduate students may be admitted only by permission of the department. (7) (Staff)

514,515—GENERAL BIOCHEMISTRY. An intensive introductory course in biochemistry. Topics stressed include the chemistry of naturally occurring materials, the nature of enzyme action, intermediary metabolism, and chemical aspects of the specialized biology of mammals, plants and microorganisms. *Prereq: Chemistry* 112, 222, 232 *and one year of a biological science. Chemistry* 442 *and* 443 *are desirable for students majoring in biochemistry but may be taken concurrently.* (3 ea.) I, II (Staff)

517—EXPERIMENTAL METHODS IN BIOCHEMISTRY. A laboratory course dealing with the techniques and instrumentation of biochemical research. This course is designed to accompany Biochemistry 515 or may be taken in the following year. Since the materials employed are labile, one full day per week is spent in the laboratory. (2) II (Staff)

610,611—INTERMEDIARY METABOLISM. A lecture and seminar course in which the degradative and synthetic pathways of metabolism in a wide variety of biological systems are discussed in depth. *Prereq: Biochemistry* 511 *or* 515. (3 ea.) I, II (Schweet, Lester)

614,615—BIOCHEMISTRY OF PROTEINS, NUCLEIC ACIDS AND ENZYMES. A lecture and seminar course devoted to the chemical, physical and biological properties of amino acids, proteins, and nucleic acids and to physical biochemistry including kinetic and thermodynamic aspects of enzyme-catalyzed reactions. *Prereq: Chemistry* 442, *Biochemistry* 511 *or* 515. (3 ea.) I, II (Schwert, Hu)

618,619—SEMINAR IN BIOCHEMISTRY. A weekly seminar, required of students majoring in biochemistry, and devoted to areas not covered in other courses and to recent developments. (1 ea.) I, II (Staff)

640—RESEARCH IN BIOCHEMISTRY. (1 to 5) I, II, S (Staff)
May be repeated to a maximum of fifteen credits.

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1 to 18 weeks residence) (Staff)
May be repeated indefinitely.

PHYSIOLOGY

Graduates of accredited colleges with a bachelor's degree in biology, zoology, chemistry, physics, psychology or engineering may become candidates for a graduate degree in physiology.

The department offers the master's degree according to Plan A.

The doctoral program involves extensive research experience plus qualification in a minor field.

Physiology is a biological field concerned with function. It is in fact, dynamic biology. The increase in knowledge in the field of physiology as well as the change in the nature and complexity of instrumentation necessary for experimentation and analysis of experimental data have lengthened doctoral programs in physiology or necessitated a restriction in the scope of the program. The graduate program meets these problems in three stages: (1) Requirement of adequate physical, chemical, and biological background before admission to the program or a reasonable plan to make up deficiencies that exist. In general, one year of physics, three years of chemistry and one year of biological science are required. (2) A basic program covering one to two years to allow instruction in basic mammalian and cellular physiology and the correlated instrumentation including project type laboratory work. (3) Special training and research including a thesis in the areas of physiology in which the department has competence.

Additional work and minor programs may involve course work in zoology, physics, chemistry and biochemistry, psychology, microbiology and certain courses in engineering and agriculture.

416—(CONJOINT THE NERVOUS SYSTEM. Basic work in neuroanatomy, neurophysiology, neuropharmacology, and psychophysiology offered conjointly with other departments of the College of Medicine. (5)

502,503—PRINCIPLES OF MAMMALIAN PHYSIOLOGY. A comprehensive discussion of mammalian physiology using advanced texts and library reading; includes function as related to major body system and laboratory experience with major experimental techniques. *Prereq:* 1 *year Physics and Organic Chemistry.* (5) I (Staff)

504—INDEPENDENT WORK IN PHYSIOLOGY. A study of some advanced problems in physiology under the direct supervision of the instructor. Discussion period, one hour; lab, four hours. *Prereq: Instructor's consent.* (3) I, II, S (Staff)

505,506—PHYSIOLOGY OF THE SUPPORTING SYSTEM. A course for students of Anthropology and Art. A detailed study of the architecture, function, joint combination, and muscular relations of bone. Lectures, two hours; lab, four hours. (4) II, S (Allen)

507—INTRODUCTION TO ENDOCRINOLOGY. Introductory study of the development, structure, and fundamental functions of endocrine glands. Lectures, three hours. *Prereq: Physiology* 502, 503; *instructor's consent.* (3) I, S (Archdeacon, Allen)

508,509—COMPARATIVE NEUROPHYSIOLOGY. A comparative study of anatomy and physiology of the nervous system. Lectures, two hours; lab, four hours. *Prereq: Instructor's consent.* (4) I (Allen)

511—MEDICAL PHYSIOLOGY. Instruction in physiology for medical students. (7) (Staff)

512,513—CELLULAR PHYSIOLOGY. An intensive study of general physiological principles with emphasis on the chemistry and physics of the cell. Lectures, two hours; lab, two hours. *Prereq: Physics and General Chemistry.* (4) I, S (Boyarsky)

602—PHYSIOLOGICAL TECHNIQUE. Training in techniques used in physiological research. Lecture, two hours; lab, six hours. *Prereqs Physiology* 502,503 *or Physiology* 512,513. (5) II (Staff)

604—EXPERIMENTAL ENDOCRINOLOGY. Experimental study of endocrine functions. Lecture, one hour; lab, two hours. *Prereq: Physiology* 507. (2) II (Allen, Archdeacon, and Carlson)

606,607—ADVANCED NEUROPHYSIOLOGY. Electrical analysis of nerve fibres and synapse; nerve impulse theories, reflexes, metabolism and central nervous function are considered from the cybernetic viewpoint. Lectures, two hours; lab, two hours. *Prereqs Physiology* 508,509 *and Physiology* 512,513; *instructor's consent.* (3) II (Boyarsky)

768—RESIDENCE CREDIT FOR THE MASTER'S DEGREE. May be repeated. Maximum of six weeks can be applied toward master's degree with thesis. (1 to 9 wks. residence) (Staff)

769—RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. May be repeated indefintely. (1 to 18 wks. residence) (Staff)

774—GRADUATE SEMINAR IN PHYSIOLOGY. (1) I, II, S (Staff)

791—RESEARCH IN PHYSIOLOGY. (3) I, II, S (Staff)

be repeated (Staff)

S (Staff)

S (Staff)

VIII. PHARMACY

Major programs leading to advanced degrees are not at present offered in the College of Pharmacy.

400(102)—BIOCHEMISTRY. A fundamental course in the chemistry and interrelationships of carbohydrates, lipids, and proteins, as well as the role of enzymes, vitamins, and hormones in physiological process. Laboratory exercises parallel the lecture material. Lecture, three hours: lab, three hours. *Prereq: Pharmaceutical Chemistry* 302.
(4) I (Glasser)

402(103)—DRUG ASSAY. Modern methods of analysis of medical products including synthetic drugs, fixed and volatile oils, alkaloids, glycosides, vitamins, and enzymes. Laboratory exercises selected on basis of application to pharmaceutical products. Lecture, two hours; lab, six hours. *Prereq: Chemistry* 226 *and Pharmaceutical Chemistry* 400.
(4) II (Glasser)

404(104)—CHEMISTRY OF MEDICINAL PRODUCTS. A study of the official and more important non-official medicinal agents with respect to their physical and chemical properties, relationships of chemical structure to physiological activity, as well as their potential incompatabilities. Lecture, three hours. *Prereq: Pharmaceutical Chemistry* 400.
(3) I (Glasser)

450(138a)—PHARMACOLOGY AND TOXICOLOGY. A presentation of the pharmacodynamic actions, modes of administration, toxic manifestations of drugs, and the relationship of pharmacodynamic action to therapeutic use. Lecture, four hours; lab, two hours. *Prereq: M.M.* 334, 846, *and Pharmaceutical Chemistry* 400. (5) I (Walton)

462(138b)—PHARMACOLOGY AND TOXICOLOGY. A continuation of 450. Lecture, four hours; lab, two hours. *Prereq: M.M.* 450. (5) II (Walton)

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