

A BULLETIN OF THE
UNIVERSITY OF KENTUCKY



*The
Graduate
School*

LEXINGTON • 1957

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BULLETIN

University of Kentucky



July, 1957

Graduate School

1957-58

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Number 7

KENTUCKY RESEARCH FELLOWS FOR 1957-58

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J. J. Nearing	Ancient Languages	British C., Can.
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Kuo-Fang Tung	Agricultural Econ.	Taipei, Formosa
Loraine Waters	History	Percy, Ill.

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UNIVERSITY CALENDAR FOR THE YEAR 1957-58

First Semester

1957

- Sept. 19-21 Thursday, 1:30 p.m. through Saturday, 11:00 a.m.—Registration and Classification of all students according to an alphabetical schedule.
- Sept. 23 Monday—Class work begins.
- Sept. 28 Saturday—Last date one may enter an organized class for the first semester.
- Oct. 18-19 Friday and Saturday—Period for filing applications for degrees.
- Oct. 18-19 Graduate Record Examination.
- Oct. 28 Monday—Last date one may drop a course without a grade.
- Nov. 28-Dec. 2 Thursday, 8:00 a.m. to Monday, 8:00 a.m.—Thanksgiving holidays.
- Dec. 21 Saturday noon—Christmas holidays begin.

1958

- Jan. 6 Monday, 8:00 a.m.—Christmas holidays end.
- Jan. 20-24 Monday through Friday—Final examinations.
- Jan. 24 Friday, 6:00 p.m.—End of First Semester.

Second Semester

- Feb. 3-4 Monday, 8:00 a.m. through Tuesday, 4:00 p.m.—Registration and classification of all students according to an alphabetical schedule.
- Feb. 5 Wednesday—Class work begins.
- Feb. 11 Tuesday—Last date one may enter an organized class for the second semester.
- Feb. 28-Mar. 1 Friday and Saturday—Period for filing applications for degrees.

March 7-8	Graduate Record Examinations.
March 10	Monday—Last date one may drop a course without a grade.
April 4-8	Friday, 8:00 a.m. to Tuesday, 8:00 a.m.—Easter holidays.
May 5	Monday—Thesis deadline.
May 25	Sunday—Baccalaureate service.
May 26	Monday—Ninety-first Annual Commencement.
May 27-31	Tuesday through Saturday—Final examinations.
May 31	Saturday—End of second semester.

Summer Session 1958

June 10	Tuesday, 8:00 a.m. to 4:00 p.m.—Registration and classification of all students according to an alphabetical schedule.
June 11	Wednesday—Class work begins.
June 14	Saturday—Last date one may enter an organized class for the summer session.
June 21	Saturday—Last date one may drop a course without a grade.
June 27-28	Graduate Record Examination.
July 4	Friday—Independence Day holiday.
July 19	Saturday—Thesis deadline.
August 1	Friday—Summer Session Commencement.
August 2	Saturday Noon—End of Summer Session.
Sept. 14	Sunday—Opening of Fall Semester of 1958-59.

REGISTRATION SCHEDULES FOR 1957-58

First Semester

September 19-21 — Thursday, 1:30 p.m. through Saturday, 11:00 a.m.—Registration and classification of all students, according to the alphabetical schedule below:

Thursday Afternoon

1:30- 1:55 — A through Bau
 2:00- 2:25 — Bav through Broz
 2:30- 2:55 — Brp through Clar
 3:00- 3:25 — Clas through Cz
 3:30- 3:55 — Miscellaneous
 A through Cz

Friday Forenoon

8:00- 8:25 — Da through Eiz
 8:30- 8:55 — Ej through Garr
 9:00- 9:25 — Gars through Hamb
 9:30- 9:55 — Hamc through Hogg
 10:00-10:25 — Hogh through Jog
 10:30-10:55 — Jch through Laf
 11:00-11:25 — Lag through Mars
 11:30-11:55 — Miscellaneous
 A through Mars

Friday Afternoon

1:30- 1:55 — Mart through Miz
 2:00- 2:25 — Mj through Oz
 2:30- 2:55 — Pa through Raz
 3:00- 3:25 — Rba through Saz
 3:30- 3:55 — Miscellaneous
 A through Saz

Saturday Forenoon

8:00- 8:25 — Sba through Smz
 8:30- 8:55 — Sn through Thoma
 9:00- 9:25 — Thomb through Watk
 9:30- 9:55 — Watl through Z
 10:00-10:30 — Miscellaneous A
 through Z

September 23 — Monday, 8:00 a.m. — Class work begins.

September 28 — Saturday — Last date one may enter an organized class for the First Semester.

Second Semester

February 3, 4 — Monday, 8:00 a.m. through Tuesday, 4:00 p.m. — Registration and classification of all students, according to the alphabetical schedule below:

Monday Forenoon

8:00- 8:25 — Watl through Z
 8:30- 8:55 — Thomb through Watk
 9:00- 9:25 — Sna through Thoma
 9:30- 9:55 — Sba through Smz
 10:00-10:30 — Rba through Saz
 10:30-10:55 — Pa through Raz
 11:00-11:25 — Mj through Oz
 11:30-11:55 — Miscellaneous
 Mj through Z

Tuesday Forenoon

8:00- 8:25 — Hamc through Hogg
 8:30- 8:55 — Gars through Hamb
 9:00- 9:25 — Ej through Garr
 9:30- 9:55 — Da through Eiz
 10:00-10:25 — Clas through Cz
 10:30-10:55 — Brp through Clar
 11:00-11:25 — Bav through Broz
 11:30-11:55 — Miscellaneous
 Bav through Z

Monday Afternoon

1:30- 1:55 — Mart through Miz
2:00- 2:25 — Lag through Mars
2:30- 2:55 — Joh through Laf
3:00- 3:25 — Hogh through Jog
3:30- 3:55 — Miscellaneous
Hogh through Z

Tuesday Afternoon

1:30- 1:55 — A through Bau
2:00- 3:30 — Miscellaneous
A through Z

February 5 — Wednesday, 8:00 a.m. — Class work begins.

February 11 — Tuesday — Last date one may enter an organized class for the second semester.

Summer Session 1958

June 10 — Tuesday, 8:00 a.m. to 4:00 p.m. — Registration and classification of all students, according to the following alphabetical schedule:

Tuesday Forenoon

8:00- 8:25 — A through Brac
8:30- 8:55 — Brad through Conw
9:00- 9:25 — Conx through Epp
9:30- 9:55 — Epq through Hail
10:00-10:25 — Haim through Hur
10:30-10:55 — Hus through Lind
11:00-11:25 — Line through More
(Incl Mc)
11:30-11:55 — Miscellaneous
A through More

Tuesday Afternoon

1:30- 1:55 — Morf through Rath
2:00- 2:25 — Rati through Sim
2:30- 2:55 — Sin through Tuc
3:00- 3:25 — Tud through Z
3:30- 3:55 — Miscellaneous
A through Z

June 11 — Wednesday, 7:00 a.m. — Class work begins.

June 14 — Tuesday — Last date one may enter an organized class for the summer session, with the exception of those entering for short courses starting later than June 10.

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ign Languages
..... Psychology
nal Husbandry
..... Music
..... Physics

THE GRADUATE SCHOOL

HERMAN EVERETTE SPIVEY, M.A., PH.D., Dean

INTRODUCTORY STATEMENT

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
- 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 Industry, Bacteriology, Chemistry, Economics, Education, English, Guidance and Counseling, History, Mathematics, Physics, Psychology, Political Science, and in the combined fields of Sociology and Rural Sociology. Minor work may be carried in any department offering graduate courses. The degree Doctor of Engineering is offered in Metallurgical Engineering.

ADMISSION

A student who is a graduate of a fully accredited institution of higher learning 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. Blanks for the latter may be obtained from the Registrar or from the office of the Graduate School.

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

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

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

Advanced Degrees for Faculty Members

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

The Graduate Record Examination

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

Application for Full Graduate Standing and the Graduate Record Examination

Graduate students desiring to earn a graduate degree must be approved as degree-applicants by the departments in which they intend to major and by the Graduate School. This application should be made as soon as scores on the Graduate Record Examinations are available and in any case prior to the beginning of the semester or term in which the degree is sought. The appropriate forms are available at the Graduate Office.

To be admitted as an applicant for a graduate degree a student must have met the following requirements: (1) an average of at least 2.5 (midway between B and C) on a scale of 4.0 on all previous college work; (2) a satisfactory grade (in the opinion of the department concerned) on three parts of the Graduate Record Examination (the Area Tests, the Aptitude Test, and the Advanced Test, if there is one, suitable to the student's major); and (3) a B average or better on all the graduate work completed at the University of Kentucky. A student not having a 2.5 average on all previous college work may be admitted as an applicant for a degree provided: (1) his performance on the Graduate Record Examination, in the opinion of the major area and the Dean of the Graduate School, is sufficiently high; or (2) in the judgment of the major area and the Dean of the Graduate School, he has demonstrated his competence in graduate work. (The Graduate Record Examination may be taken either before admission or during the first semester after admission. See the calendar at the front of this bulletin for the dates.)

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 degree-application 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 100 to 199 and those numbered 200 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. A course completed with a grade of D will not be given graduate credit. An overall 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.

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 and the maximum nine. Graduate students serving in the University as assistants or part-time instructors should register for less than the normal load, as determined by their advisers. Persons holding full-time working or professional assignments, whether employed by the University or not, may not take for

graduate credit toward a degree in any single semester or term more than 3 or 4 credits. Two short courses of 4 weeks or less may not be taken simultaneously. A short course may not 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 of graduate course work, or the equivalent in thesis research. In the summer session the corresponding load is 6 semester hours. Part-time residence during any semester is computed on the basis of one and one-half weeks of residence for each semester hour earned. Part-time students in the summer session receive one and one-half weeks per semester hour except for short courses of less than eight weeks, in which case residence shall not exceed the actual number of weeks involved.

Masters' candidates who wish to do research on their thesis problems do not need to register for a "thesis course" at all unless they need additional residence during their final semester, in which case they register simply for "Thesis" in order to obtain six weeks of residence—but no course credit. If in order to be eligible for veteran's subsistence they must register for more course work than they wish to, or if they are working on masters' theses which give no residence or credit, they may register for the 500 1, 2, 3 non-credit course.

Doctoral candidates working on their dissertations and in need of residence should register simply for "Dissertation", with a note of the amount of residence recommended by their graduate supervisors.

Time Limit for Degrees

No course or residence credit is given for graduate study completed more than eight years prior to the date of the commencement at which the student expects to take his degree unless such credit or residence is specifically validated by the Graduate Council on written recommendation of the director of graduate study. No course or residence credit may be validated in this manner if completed more than twelve years prior to the commencement date. (This rule is applicable to new students registering after February, 1952, and to all other students after June, 1955.)

Proficiency in English

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

Graduation

Advanced degrees may be conferred at any commencement convocation but at no other time. *Attendance at the commencement at which the candidate is scheduled to receive a degree is required unless the candidate is excused in writing by the Dean of the Graduate School.* Appropriate academic costume must be worn. The graduation fee covers the cost of the diploma, the hood and, in the case of the master's degree (with thesis), the binding of the thesis.

Students intending to graduate at a given commencement must make formal application (at the Registrar's Office) for the degree early in the semester or term of the commencement—in no case later than four weeks before graduation.

Fees

Registration fees per semester are \$65.00 for residents of Kentucky, \$125.00 for non-residents. Part-time graduate students who are legal residents of the

state pay \$7.50 per semester hour; non-residents pay \$14.00 per semester hour. Students carrying full loads in the summer session pay one-half the regular semester fee. 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 13-17.)

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 200 or above. Exceptions to this rule may be made only with the approval of the Graduate Council.

Sustained Residence Required

Candidates for masters' degrees shall spend at least two full summer terms or one semester in full-time study at the University, except in rare individual cases where specific permission to modify this regulation is obtained from the Graduate Council.

Examinations

A final oral or written examination is given all candidates for masters' degrees, not later than eight days before the close of the semester. The Dean of the Graduate School appoints examining committees of at least three members each for the purpose, selecting the members from the major and minor profes-

sors under whom the work was done. The Dean is ex-officio a member of all such examining committees. The candidate is asked to defend his thesis, if one has been written, and is examined on any subject matter related to his field.

Application for the Degree

Early in the final semester or term the student must make formal application in the Registrar's Office for his degree.

Fees

Before any master's degree is conferred, a commencement fee of \$20.00 must be paid at the Comptroller's 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 for graduate work and which wish to do so to permit students to satisfy the requirements for the M.A. and the M.S. degrees by either of two plans. The option rests with the department.

PLAN A

(See also pages 17-18.)

Credits and Courses

The candidate must complete at least 24 semester hours of graduate course work with a standing of 3.0 ("B") or better. At least 9 of these hours (except when excused in rare individual cases by special permission of the Graduate Council) must be in courses limited to graduate students (in courses numbered "200" or above).

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

Residence

The minimum residence required is one academic year of 36 weeks. This residence may be fulfilled by any combination of semesters or summer sessions which totals the required number of weeks, provided at least one full semester or two complete summer terms are spent in residence.

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, 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

.....

Language Requirements

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

PLAN B

Plan B (which is not necessarily available in all departments that have *Plan A*) 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 that in a

few departments a reading knowledge of a foreign language may not be required. A student may follow this plan only with the approval of the department concerned. Additional requirements, if any, set up by an area of study may be found in the area announcements in the Graduate School Bulletin.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN EDUCATION

See Education, pages 94-95, and General Requirements for all Advanced Degrees, pages 15-17.

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN AGRICULTURE AND MASTER OF SCIENCE IN HOME ECONOMICS

(See also pages 15-17.)

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

1. The completion of 24 semester hours of graduate work with an average standing of 3.0 or better, 36 weeks in residence, and a thesis, or at the option of the major professor, the completion of 36 semester hours of graduate work with a standing of 3.0 or better, 45 weeks in residence, and no thesis requirement. At least 9 hours must be on the "200" level.
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 any other department or departments approved by the major professor.
4. There is no language requirement for either of these professional degrees.

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

REQUIREMENTS FOR THE DEGREE MASTER OF MUSIC

(See page 69.)

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN PUBLIC HEALTH

(See also pages 15-17.)

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 15-17.)

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 prerequisite work in library science.
2. Thirty semester hours in graduate courses.
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 15-17.)

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 Civil Engineer (C.E.), Electrical Engineer (E.E.), Mechanical Engineer (M.E.), Metallurgical Engineer (Met.E.), or Mining Engineer (E.M.) will be granted only to graduates of the University of Kentucky College of Engineering who present satisfactory evidence of professional work of creditable quality in the engineering fields of their choice, extending over a period of five years, and who submit satisfactory theses as further evidence of their professional attainments.

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

An application for a professional degree must be made to the Dean of the

few departments a reading knowledge of a foreign language may not be required. A student may follow this plan only with the approval of the department concerned. Additional requirements, if any, set up by an area of study may be found in the area announcements in the Graduate School Bulletin.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN EDUCATION

See Education, pages 94-95, and General Requirements for all Advanced Degrees, pages 15-17.

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN AGRICULTURE AND MASTER OF SCIENCE IN HOME ECONOMICS

(See also pages 15-17.)

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

1. The completion of 24 semester hours of graduate work with an average standing of 3.0 or better, 36 weeks in residence, and a thesis, or at the option of the major professor, the completion of 36 semester hours of graduate work with a standing of 3.0 or better, 45 weeks in residence, and no thesis requirement. At least 9 hours must be on the "200" level.
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 any other department or departments approved by the major professor.
4. There is no language requirement for either of these professional degrees.

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

REQUIREMENTS FOR THE DEGREE MASTER OF MUSIC

(See page 69.)

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN PUBLIC HEALTH

(See also pages 15-17.)

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 15-17.)

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 prerequisite work in library science.
2. Thirty semester hours in graduate courses.
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 15-17.)

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 Civil Engineer (C.E.), Electrical Engineer (E.E.), Mechanical Engineer (M.E.), Metallurgical Engineer (Met.E.), or Mining Engineer (E.M.) will be granted only to graduates of the University of Kentucky College of Engineering who present satisfactory evidence of professional work of creditable quality in the engineering fields of their choice, extending over a period of five years, and who submit satisfactory theses as further evidence of their professional attainments.

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

An application for a professional degree must be made to the Dean of the

Graduate School and have the approval of the director of graduate study in the applicant's engineering field not less than one academic year before the degree may be granted.

The Graduate Committee will pass on the qualifications of each applicant. It may, at its discretion, require an oral examination. The applicant is expected to submit a record of his engineering experience, which should include a complete list of his professional engagements, showing in each case the length of time employed and the position held. He should give for references the names of at least three persons who are familiar with his engineering work. Preferably these persons should be connected with the organizations by whom he has 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 some original thought and be the product of the individual submitting it. Quotations and references with proper credit may be used. In general, the thesis should 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 may apply for a professional degree in another field of engineering if he has attained unusual prominence and success in that field.

Fees

The fees for a professional degree in engineering are \$15.00 for registration 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 15-17 of this bulletin.)

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

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

Admission

For information concerning admission see pages 13-14.

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 ap-

plicant 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 examination is to be administered, and the chairman schedules the examination 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 examination and of the result of the examination. 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 above the bachelor's degree (two above the master's, or its residence equivalent) 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 required after the qualifying examination before the degree is conferred. However, in rare individual cases, if a student has completed his full residence and 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 fees. Even if such permission is granted, at least a year must elapse between the qualifying examination 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 examination.

Qualifying Examinations

A qualifying examination is required of all applicants for the doctorate to determine whether the applicant should be admitted to candidacy. The examination 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. This examination 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 examination, including the time schedule of the examination. If the result is failure, the committee shall recommend the conditions to be met before another examination may be administered. The minimum time before another examination may be given 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 examination. A third examination 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 and must be satisfactory in style and composition. 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 bound, the student should bring it to the Graduate Office to have it checked for form. Two bound typewritten copies of the dissertation and two unbound 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. A standard form containing *Rules for the Use of Theses* must be prepared and must be

bound with the manuscript, before the title page. (See page 19 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 the Office of the Comptroller a fee of \$50 before taking the final examination. Even if the candidate elects to use this arrangement for publication he should understand that it is still desirable for him to have his work printed in a recognized way.

Final Examination

After the acceptance of the dissertation by the Special Committee and the Dean of the Graduate School the candidate shall be given a final oral, or, if the examining committee elects, an oral and a written examination. The examining committee shall consist of a minimum of five persons, appointed by the Dean of the Graduate School, after he has conferred with the director of graduate study for the area. (The President of the University and the Dean of the Graduate School are ex-officio members of all examining committees.) The director of graduate study (or his delegate) shall be chairman of the committee.

Other members shall include the major professor, a third representative of the department, a representative of the minor, and one member of the Graduate Faculty associated with neither the major nor minor areas. The final examination shall include a defense of the dissertation and shall be as comprehensive 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 degree at the next commencement provided he has satisfied the residence requirement after the qualifying examination.

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

Recommendation for the Degree and Attendance at Commencement

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

Attendance at commencement is required for those receiving degrees unless (for special reasons) they are excused in writing.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF EDUCATION

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

1. No languages are required for the Ed.D. degree.
2. A total of 72 semester hours is required of which at least one-third and not more than one-half must be in departments outside the College of 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 Committees are appointed. Two members shall be chosen from areas outside the College of Education.

The Registrar, the Graduate committee of the College of Education, and the Graduate Dean will evaluate credits and residence to be allowed transfer students. It is understood, however, that the Special Committee may accept 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 Head, Department of Psychology.

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. 15-17) 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 200 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 assisting 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 members, is recommended by the adviser and director of graduate study and appointed by the Dean of the Graduate School.

Eligibility

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

GRADUATE STUDENTS NOT APPLICANTS FOR DEGREES

Graduate students who are not working toward advanced degrees are not required to designate major or minor subjects, but may elect their work with a view to the special purposes for which they are in attendance at the University.

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

Should a graduate student who has not arranged for his work with a view to obtaining a degree subsequently desire to become an applicant for a degree, the number of semester hours he is to receive for work already done will be 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 of former institutions to send transcripts of work previously completed; and request references to send letters of recommendation—all at least four weeks prior to first admission.
2. On or before date of first registration consult appropriate director of graduate study (see list in this Bulletin) and plan tentative course of study. (At registration the director's signature on the classification card approving the registration is required.)
3. *Within the first week of the first term or semester apply for the Graduate Record Examination* (Area Tests, Aptitude Test, and Advanced Test, if available, in your major field), if you have not previously taken this standardized test. Apply at the University Testing Bureau, Personnel Office, Administration Building. Take test at time designated in the calendar at the front of this bulletin. (*Scores on this test are necessary before admission to full graduate standing. See page 14 of this bulletin.*)
4. Early in the first term or semester begin preparations for the language examination(s) required for the degree and arrange to take the necessary language examination(s) early in graduate career.
5. *After first term or semester apply for full graduate standing* (secure forms from the Graduate Office), if a graduate degree is sought.
6. Before the beginning of each succeeding semester or term consult the appropriate director of graduate study concerning program for the new term.
7. If doctoral applicant, during or before the fourth semester of graduate study confer with director of graduate study and graduate dean concerning Special Committee. After the appointment of the Special Committee, 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 Examination 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. *Early in the semester or term when the degree is expected, file application for the degree* (Registrar's 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 each awarded, without limitation as to the field of specialization, to doctoral candidates who possess outstanding personal qualities and professional qualifications; and several at \$1200 each awarded to outstanding students on the Master's level. The deadline for submitting applications to the Graduate Office is March 1 of each year.

HAGGIN FELLOWSHIPS AND SCHOLARSHIPS

These fellowships and scholarships, which were endowed by Margaret Voorhies Haggin in memory of her father, George Voorhies, carry a stipend of \$750 each (fellowships) and \$600 each (scholarships).

Fellows and Scholars 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 and scholars 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 ten equal monthly installments. Fellows, scholars, graduate assistants, and instructors pay the fees assessed residents of Kentucky. The appointments are made for one year only but may be renewed if it can be shown that the study and research should be continued.

These fellowships and scholarships 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 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.

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	D. T. Kinard
Agricultural Entomology	L. H. Townsend
Agricultural Extension Education	E. J. Nesius
Agronomy	E. N. Fergus
Animal Industry	W. P. Garrigou
Animal Nutrition (See Animal Industry)	
Animal Pathology	F. E. Hull
Dairying (See Animal Industry)	
Forestry (See Horticulture)	
Genetics (See Animal Industry)	
Home Economics	S. E. Erikson
Home Economics Education (See Education)	
Horticulture	C. S. Waltman
Plant Pathology (See Agronomy)	
Poultry Husbandry (See Animal Industry)	
Rural Sociology	H. W. Beers

II. ARTS AND SCIENCES

Anatomy and Physiology	R. S. Allen
Ancient Languages	J. D. Skiles
Anthropology	C. E. Snow
Art	Clinton Adams
Bacteriology	M. Scherago
Botany	H. P. Riley
Chemistry	L. R. Dawson
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)	
Hebrew (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	E. J. Humeston
Mathematics and Astronomy	J. C. Eaves
Modern Foreign Languages	A. E. Bigge
Music	E. E. Stein
Philosophy	John Kuiper
Physical Education	C. W. Hackensmith

Physics	F. L. Yost
Political Science	Amry Vandenbosch
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	H. W. Beers
Spanish (See Modern Foreign Languages)	
Speech (See English)	
Zoology	J. M. Carpenter

III. COMMERCE

Commerce	Ralph R. Pickett
Economics	M. R. Sullivan

IV. EDUCATION

Administration and Supervision	A. D. Albright
Agricultural Education	Carsie Hammonds
Business Education	V. A. Musselman
Elementary Education	Fred Harris
Foundations of Education	E. F. Hartford
Higher Education	F. G. Dickey
Home Economics Education	Ethel Parker
Music Education	J. W. Worrel
Secondary Education	Harold P. Adams

V. ENGINEERING

Agricultural Engineering	D. T. Kinard
Civil Engineering	R. E. Shaver
Electrical Engineering	H. A. Romanowitz
Mechanical Engineering	E. B. Penrod
Metallurgical Engineering	C. S. Crouse
Mining Engineering	C. S. Crouse

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

VII. 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 EDUCATION (*See Education*)

AGRICULTURAL ENGINEERING (*See Engineering*)

AGRICULTURAL ENTOMOLOGY

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. *Prerequisites: Ag. Ent. 1.*

(3) S (Townsend)

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. *Prerequisite: A. E. 1.*

(3) I, S (Townsend)

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. *Prerequisite: A. E. 1.*

(3) II, S (Townsend)

105a, b—SYSTEMATIC AND TECHNICAL AGRICULTURAL ENTOMOLOGY. Insect physiology, anatomy, ecology, and taxonomy, entomological literature and technique; studies of special groups of insects. *Prerequisites: A. E. 1, and any one of the following: 102, 103, 104.*

(3) I, II (Townsend)

201a, b—ENTOMOLOGICAL PROBLEMS. Investigations of chosen insect problems, including original work. Discussion and assignment of current insect subjects. *Prerequisites: A. E. 1, 103, 104, and 105a, b.*

(3) I, II (Price)

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.

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 (Summers)

AGRONOMY

General Courses

- 200a-d-AGRONOMY SEMINAR. Reports and discussions of problems and investigations of problems in soils, crops and plant pathology. (1 ea.) I, II (Staff)
500-1, 2, 3-THESIS. (No Credit) (Staff)

Courses in Crops

- 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. *Prerequisites: Bot. 1; Agron. 6 or consent of instructor.* (3) II, S (Sigafus)
- 102-FIELD CROP ECOLOGY. A study of the environmental factors affecting the yield and quality of field crops. Lecture and recitation, 3 hours. *Prerequisites: Bot. 1; Agron. 6 or equiv.; Agron. 61 or equiv.; consent of instructor.* (3) I (Fergus)
- 103-WEEDS. The important characteristics, identification, and control of weeds, with emphasis on identification and control of Kentucky weeds. Lecture and discussion, 2 hours. *Prerequisites: Bot. 1.* (2) II, S (Sigafus)
- 104-ADVANCED CROPS: FORAGE CROPS. A comprehensive study of forage crops with special emphasis upon their production in Kentucky. Lecture and recitation, 3 hours. *Prerequisites: Bot. 1; Agron. 6, or consent of instructor.* (3) I (Sigafus)
- 105-ADVANCED CROPS: CEREALS. A study of the grain crops in the world, in respect to adaptation, culture and uses. Lecture and recitation, 2 hours. *Prerequisites: Bot. 1; Agron. 6, or consent of instructor.* (3) II (Sigafus)
- 106-FIELD CROP IMPROVEMENT. A study of the principles involved and the techniques used in breeding crop plants. Lecture and recitation, 3 hours. *Prerequisites: Bot. 1; Agron. 6, or consent of instructor; A. I. 61 or Bot. 130.* (3) II (Loeffel)
- 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; lab or field 2 hours. *Prerequisites: Bot. 1; Agron. 6, or consent of instructor.* (3) I (Stokes)
- 109a-c-SPECIAL PROBLEMS IN CROPS. Intensive studies of specific crop problems. *Prerequisites: Bot. 1; Agron. 6, and consent of instructor.* (3 ea.) I, II, S (Staff)
- 204a-d-SPECIAL PROBLEMS IN PRODUCTION OF FORAGE CROPS. Intensive studies of research relative to particular problems in forage crop production. *Prerequisite: Consent of instructor.* (3 ea.) I, II, S (Fergus, Sigafus)
- 205a, b-SPECIAL PROBLEMS IN PRODUCTION OF TOBACCO OR CEREALS. *Prerequisite: Consent of instructor.* (3, 3) II, S (Staff)

Courses in Plant Pathology

- 123a-c-SPECIAL PROBLEMS IN PLANT PATHOLOGY. *Prerequisites: Agron. 141 or equiv., and consent of instructor.* (3 ea.) I, II, S (Diachun, Valleau)
- 141-PLANT PATHOLOGY. Significance, nature, causes, and methods of control of plant diseases. Lectures and discussion, 2 hours; lab, 2 hours. *Prerequisite: Bot. 1.* (3) II (Diachun)
- 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; lab, 4 hours. *Prerequisites: Agron. 141 or equiv., and consent of instructor.* (3) II (Valleau)
- 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; lab, 4 hours. *Prerequisites: Agron. 141 or equiv., and consent of instructor.* (4) II (Diachun)
- 245a-d-RESEARCH IN PLANT PATHOLOGY. *Prerequisites: Agron. 141 or equiv., and consent of instructor.* (3 ea.) I, II, S (Valleau)

Courses in Soils

- 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; lab, 2 hours. *Prerequisite: Agron. 61.* (3) I, S (Survant)
- 112a-d-SPECIAL PROBLEMS IN SOILS. Directed independent study of selected soil problems. *Prerequisites: Agron. 61 and consent of instructors.* (3 ea.) I, II, S (Staff)
- 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. *Prerequisite: Agron. 61.* (3) II, S (Hutcheson)
- 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; lab, 4 hours. *Prerequisite: Agron. 61. Prerequisite or concurrent: Chem. 22 or 25a.* (4) I (Massey)

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. *Prerequisites: Agron. 61 and Geol. 3, or consent of instructor.* (3) II (Bailey)

120—SOIL PHYSICS. Physical properties of soils in relation to soil management and conservation. Lecture and discussion, 2 hours; lab, 4 hours. *Prerequisites: Agron. 61 and consent of instructor.* (4) II, S (Survant)

212a-d—RESEARCH IN SOILS. Directed research on selected soil problems. *Prerequisite: Consent of instructor.* (3 ea.) I, II, S (Massey, Survant)

Courses in Botany

103—PLANT PHYSIOLOGY. A study of basic principles of plant physiology; water relations including internal movement, transpiration, and absorption; photosynthesis. Two lectures and two two-hour lab periods per week. *Prerequisites: Botany 1 or 25, Chemistry 1b or 4b or equivalents.* (4) I, S (Henrickson)

104—PLANT PHYSIOLOGY. A study of elementary metabolism; mineral nutrition; plant hormones; the physiology of vegetative and reproductive growth. *Prerequisite: Botany 1 or 25, Chemistry 1b or 4b or equivalent.* (4) II, S (Henrickson)

134—CYTOGENETICS. Chromosome aberrations and their importance in heredity and evolution. Three lectures and one two-hour laboratory period per week. *Prerequisites: Botany 3 or 130 or equivalent.* (4) I (Riley)

ANIMAL INDUSTRY

Courses in Animal Husbandry

100—ANIMAL BREEDING. History of animal improvement; survey of hereditary traits in livestock; inbreeding and outcrossing; progeny tests and herd analysis. Lecture, 3 hours. *Prerequisites: A. I. 1 and 61.* (3) II (Steele)

101—APPLIED LIVESTOCK NUTRITION. A discussion of the specific nutritional requirements of Beef Cattle, Sheep and Swine; with emphasis on recent nutritional concepts, feed formulation, and economic considerations. *Prerequisites: A.I. 81 and approval of instructors.* (3) S (Barnhart, Parsons, Woolfolk)

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; lab, 2 hours. *Prerequisites: A. I. 1. and 81.* (3) II (Woolfolk)

105—BEEF PRODUCTION. History and importance of the beef cattle industry; selection, breeding, feeding and management of beef cattle. Lecture, 2 hours; lab, 2 hours. *Prerequisites: A. I. 1 and 81.* (3) II (Parsons)

106—PORK PRODUCTION. History and importance of the swine industry; selection, breeding, feeding, and management of swine. Lecture, 2 hours; lab, 2 hours. *Prerequisites: A. I. 1 and 81.* (3) I, II (Barnhart)

109a-c—SPECIAL PROBLEMS IN ANIMAL HUSBANDRY. Approval of instructor required. (3) I, II, S (Animal Husbandry Staff)

200a-c—ANIMAL INDUSTRY SEMINAR. (1) I, II (Staff)

201a-c—RESEARCH IN MEATS. Problems involving original investigation. (3) I, II, S (Kemp)

203a-c—RESEARCH IN HORSE HUSBANDRY. Problems involving original investigation. (3) I, II, S

204a-c—RESEARCH IN SHEEP HUSBANDRY. Problems involving original investigation. (3) I, II, S (Woolfolk)

205a-c—RESEARCH IN BEEF CATTLE HUSBANDRY. Problems involving original investigation. (3) I, II, S (Garrigus, Parsons)

206a-c—RESEARCH IN SWINE HUSBANDRY. Problems involving original investigation. (3) I, II, S (Barnhart)

500-1, 2, 3—THESIS. (0) (Staff)

Courses in Dairying

120—DAIRY CATTLE BREEDING. Application of genetics to problems of breed and herd improvement; progeny testing of sires; type classification, selective registration; prominent families and strains within the leading dairy breeds. Lecture, 2 hours; lab, 2 hours. *Prerequisite: A. I. 61.* (3) II (Seath)

121—DAIRY CATTLE FEEDING AND MANAGEMENT. Application of principles of nutrition to dairy cattle feeding; current methods contributing to maximum efficiency in the production of quality dairy products on the farm. Lecture, 2 hours; lab, 2 hours. *Prerequisite: A. I. 81.* (3) I (Seath, Rust, Jacobson)

123—DAIRY BACTERIOLOGY. Application of bacteriological principles to the production and processing of dairy products, entrance of micro-organisms into dairy products, effects of their growth and methods for control. Lecture, 2 hours. *Prerequisite: Bact. 52 or 102.* (2) I (Glenn)

- 124—DAIRY BACTERIOLOGY LABORATORY. Laboratory to accompany A. I. 123, Dairy Bacteriology. Lab, 4 hours. *Prerequisite or concurrent:* A. I. 123. (2) I (Glenn)
- 126—ADVANCED DAIRY BACTERIOLOGY. Bacteriological principles and problems relating to specific dairy products and processes. Lab, 6 hours. *Prerequisite:* A. I. 124. (3) II (Morrison)
- 127—SURVEY OF DAIRY INDUSTRY. Same as A. I. 27 except that graduate students will be given additional assignments. (3) S (Staff)
- 129a-f—SPECIAL PROBLEMS IN DAIRYING. Approval of instructor required. (3) I, II, S (Dairy Staff)
- 131—DAIRY PROCESSING AND PLANT MANAGEMENT. Methods used for processing milk, butter, ice cream, cheese, and concentrated milks; fundamentals of dairy plant management. Lecture, 2 hours; lab, 8 hours. *Prerequisite:* A. I. 24. (6) II (Staff)
- 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, 1 hour; lab, 2 hours. *Prerequisite:* A. I. 21, 61 and Zool. 1. (2) II (Olds)
- 134—PRINCIPLES OF DAIRY TECHNOLOGY. Chemical and physical characteristics of dairy products; chemical, physical, and physio-chemical principles involved in dairy processing; special methods of analysis. Lecture, 1 hour; lab, 6 hours. *Prerequisites:* Math. 5, Chem. 37, A. I. 24. (4) II (Freeman)
- 139a-d—DAIRY SEMINAR. Open to seniors and graduate students. (1) II (Dairy Staff)
- 221a-c—RESEARCH IN DAIRYING. Problems involving original investigation in either dairy production or dairy manufacturing. (3) I, II, S (Dairy Staff)
- 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, 3 hours. (3) II or S (Staff)
See also A. I. 200, Animal Industry Seminar.
- 500-1, 2, 3—THESIS. (0) (Staff)

Courses in Poultry Husbandry

- 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. *Prerequisites:* A. I. 41 and 61. (3) I (Wightman)
- 141—ADVANCED POULTRY PRODUCTION. Studies of control measures in poultry diseases, nutrition, marketing; flock management and replacement. Lecture, 2 hours; lab and dem, 2 hours. *Prerequisite:* A. I. 41. (3) I (Wightman)
- 142—MARKETING AND PROCESSING POULTRY PRODUCTS. Organization and functioning of markets; grading, packaging, and handling poultry and eggs. Lecture, 1 hour; lab, 2 hours. *Prerequisites:* A. I. 41; and Ag. Econ. 100. *Same course as Ag. Econ. 109.* (2) I (Wightman, Roberts)
- 145—ADVANCED POULTRY JUDGING. Primarily for judging team candidates. Open only to those who have made good standings in the prerequisite courses. Lecture, 1 hour; lab, 4 hours. *Prerequisites:* A. I. 41 and 44. (3) I (Wightman)
- 146—A SURVEY OF THE POULTRY INDUSTRY. Same as A. I. 46 except that graduate students will be given additional assignments. (3) S (Staff)
- 147—POULTRY NUTRITION. A study of nutrients, feed ingredients, deficiencies, formulation, and feeding practices for broilers, replacement stock, and layers. Lecture, 2 hours; lab, 2 hours. *Prerequisites:* Chem. 37 and A. I. 41. (3) II (Begin)
- 149a-c—SPECIAL PROBLEMS IN POULTRY. *Prerequisite:* permission of instructor. (3) I, II, S (Wightman, Insko, Begin)
- 241a-c—RESEARCH IN POULTRY. Problems involving original investigation. (3) I, II, S (Wightman, Insko, Begin)
See also A. I. 200, Animal Industry Seminar.
- 500-1, 2, 3—THESIS. (0) (Staff)

Courses in Genetics

- 161—GENETICS. Lectures of A. I. 61 and assigned readings. Primarily for graduate students. Lecture, 3 hours. *Prerequisite:* one course in biology. (3) I, II, S (Steele)
- 162—GENETICS LABORATORY. Similar to A. I. 62 but additional work required. Primarily for graduate students. Lab, 2 hours. Concurrently with A. I. 161, at student's option. (1) I, II, S (Steele)
- 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. *Prerequisite:* A. I. 61. (3) II (Steele)
- 169a-c—SPECIAL PROBLEMS IN GENETICS. Approval of instructor required. (3) I, II, S (Steele)
- 260—PHYSIOLOGY OF REPRODUCTION. Physiological processes of reproduction in farm animals; gonadal functions; endocrine relationships; fertility; and factors affecting reproductive efficiency. Lecture, 3 hours. *Prerequisites:* A. I. 100 or A. I. 120; or A. I. 140 and A. P. 101. (3) II (Dutt)

261a-c—RESEARCH IN GENETICS. Problems involving original investigation.

(3) I, II, S (Steele)

See also A. I. 100, Animal Breeding; A. I. 120, Dairy Cattle Breeding; A. I. 140, Poultry Breeding; and A. I. 200, Animal Industry Seminar.

500-1, 2, 3—THESIS.

(0) (Steele)

Courses in Animal Nutrition

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. *Prerequisite: Chem. 37 or equivalent.*

(3) I (Baker)

282—LABORATORY METHODS IN ANIMAL NUTRITION. The use of laboratory techniques and equipment in the solution of fundamental problems of nutrition. Lecture and recitation, 1 hour; laboratory, 6 hours. *Prerequisite or concurrent: A. I. 181.*

(4) I (Grainger, Stroud)

283—ADVANCED ANIMAL NUTRITION. History and development of nutritional theories and techniques; a critical review of current literature. Lecture and recitation, 3 hours. *Prerequisite: A. I. 181.*

(3) II (Stroud)

See also A. I. 200, Animal Industry Seminar.

284a-c—RESEARCH IN ANIMAL NUTRITION. Problems involving original investigation.

(3) I, II, S (A. N. Staff)

289a-c—SPECIAL PROBLEMS IN ANIMAL NUTRITION. Approval of instructor required.

(3) I, II, S (A. N. Staff)

500-1, 2, 3—THESIS.

(0) (A. N. Staff)

ANIMAL PATHOLOGY

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)

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, Hull)

104a, b—SPECIAL PROBLEMS IN ANIMAL PATHOLOGY. *Prerequisites: A. P. 51, 101, and 102, and approval of instructor.*

(3) I, II (Behlow, Hull)

201a, b—INVESTIGATIONS IN ANIMAL DISEASES. This course is open only to persons who have a degree in veterinary medicine.

(3) I, II (Hull, Behlow)

AGRICULTURAL ECONOMICS

The degrees of Master of Science in Agriculture, Master of Science, and Doctor of Philosophy may be earned with a major in Agricultural Economics. New students should present evidence of undergraduate training and interest in agriculture, especially its economic aspects. Those without sufficient background will be expected to make up the deficiencies indicated by the department.

Graduate training in agricultural economics emphasizes training in research, and degree candidates majoring in the department will be asked to write a thesis on some phase of agricultural economics (Plan A). Courses in economic theory, offered by the College of Commerce, are required of all agricultural economics majors. Courses offered in Rural Sociology, and in other departments, may be combined for graduate training in the rural social sciences.

The courses in statistical methods offered by this department are designed for all graduate students majoring in the agricultural sciences. They furnish the statistical tools used most frequently in agricultural research.

Agricultural Marketing

100—AGRICULTURAL MARKETING. Principles and methods of marketing farm products, with attention to systems and agencies at both country and central markets. *Prerequisites: Econ. 51 and Agr. Econ. 1.*

(3) I, II (Binkley, Vennes)

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. *Prerequisite: Agr. Econ. 100.*

(3) II (Vennes)

102a—MARKETING TOBACCO. Special emphasis on the marketing of and the market system for tobacco. Application of marketing principles and methods to tobacco. *Prerequisite: Agr. Econ. 100.*

(2) I, S (Clark, C. M.)

102b—TOBACCO MARKET GRADES AND GRADING. Procedures and problems in establishing market standards for tobacco, including practice in grading. *Prerequisite or concurrent: Agr. Econ. 102a, or approval of instructor.* (1) S (Clark, C. M.)

103—MARKETING LIVESTOCK AND LIVESTOCK PRODUCTS. Analysis of livestock and dairy markets; market organization, agencies, institutions, and services; and public regulations. *Prerequisite: Agr. Econ. 100.* (2) II (Brown)

109—MARKETING AND PROCESSING POULTRY PRODUCTS. Organization and operation of markets; grading, packaging and handling poultry and eggs. Lecture, 1 hour; lab, 2 hours. *Prerequisites: A. I. 41 and Agr. Econ. 100.* Same course as Animal Industry 142. (2) I, S (Roberts, Wightman)

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. *Prerequisite: approval of instructor.* (3) I (Price)

Farm Management

110—FARM MANAGEMENT. A study of management and of the science of organizing and operating farms. *Prerequisites: Agr. Econ. 1 and Econ. 51.* (3) I, II (Bradford)

111—ADVANCED FARM MANAGEMENT. An advanced analysis of management and managing farms. *Prerequisite: Agr. Econ. 110.* (3) II (Bradford)

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. *Prerequisite: Agr. Econ. 110, or approval of instructor.* (3) S (Bradford)

115—FARM ACCOUNTING. A study of farm records and farm accounts including farm cost accounting. *Prerequisite: Agr. Econ. 110.* (2) I (Criswell)

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. *Prerequisite: Agr. Econ. 110, or approval of instructor.* (3) II (Bondurant)

117—TYPES AND SYSTEMS OF FARMING. (Even No. Years) Critical study of the business organization and management of Kentucky farm businesses. Field trips required. *Prerequisite: Agr. Econ. 110, or approval of instructor.* (3) II (Bondurant)

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. *Prerequisite or concurrent: Agr. Econ. 110.* (3) I (Byers)

Production Economics

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. *Prerequisite: Agr. Econ. 110.* (3) I (Bradford)

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. *Prerequisite: Agr. Econ. 110, and approval of instructor.* (3) S (Redman)

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, inter-regional competition, and national agricultural policies and programs. *Prerequisite: Approval of instructor.* (3) I (Redman)

220b—ECONOMICS OF AGRICULTURAL PRODUCTION: DYNAMIC APPLICATION. A continuation of 220a with application to dynamic situations. *Prerequisite: 220a, and approval of instructor.* (3) II (Halter)

Agricultural Statistics

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, Clark, H. B.)

230—STATISTICS FOR AGRICULTURAL RESEARCH—SOCIAL SCIENCES. Multiple and partial correlation and regression, tests of reliability, tabular analysis, graphic techniques and sample surveys. *Prerequisite: Agr. Econ. 130 or equivalent.* (3) II (Shuffett)

231—STATISTICS FOR AGRICULTURAL RESEARCH—PLANT AND ANIMAL SCIENCES. Analysis of variance and covariance; statistical considerations in the design of experiments; tests of significance and confidence limits. *Prerequisite: Agr. Econ. 130 or equivalent.* (3) II (Card)

Agricultural Policy and Land Economics

140—AGRICULTURAL POLICY. Historical development of principles underlying agricultural policy; objectives of agricultural policy; appraisal of current and proposed agricultural programs. *Prerequisite: Agr. Econ. 100.* (3) I (Rudd)

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. *Prerequisite: Agr. Econ. 110, or approval of instructor.* (3) II (Bondurant)

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

Agricultural Prices and Finance

150—AGRICULTURAL PRICES. Price behavior of agricultural products including supply-price relationships and general price-level relationships. *Prerequisite: Econ. 51.* (3) II (Vennes)

155—AGRICULTURAL AND FARM FINANCE. Credit needs of agriculture; problems connected with farm and market agency financing; organization and operation of agricultural credit agencies. *Prerequisite: Agr. Econ. 110.* (3) I, S (Clark, C. M. and Bradford)

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

Special Problems

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

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. *Prerequisite: approval of head of department.* (3) I, II, S (Brown, Staff)

Research Methods

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

Seminar

200a-d—AGRICULTURAL ECONOMICS SEMINAR. (Analysis of economic problems which affect agriculture). (0) I, II (Staff)

Thesis

500-1, 2, 3—Thesis (0) credit.

(Staff)

HOME ECONOMICS

Courses in Foods and Nutrition

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, 3 hours. Not open to home economics majors. (3) I, II, S (Clemmons)

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, 2 hours; lab, 3 hours. *Prerequisites: H. E. 6, 11.* (3) I, II, S (Clemmons)

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, 2 hours; lab, 2 hours. *Prerequisite or Concurrent: H. E. 102.* (3) I, II, S (Clemmons)

105a-c—EXPERIMENTAL COOKERY. Study of factors that affect results obtained in cooking and food preparation processes. Experimental work under controlled conditions. Lecture, 1 hour; lab, 4 hours. *Prerequisites: H. E. 5, 11* (3) I, II, S (Brownlie)

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. *Prerequisites: H. E. 103a, b, or approval of instructor.* (1) I, II, S (Clemmons)

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)

108a-c—SEMINAR IN NUTRITION. Investigations of recent research in nutrition. *Prerequisite: senior or graduate standing.* (1) I, II (Marlatt)

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, 2 hours; lab, 4 hours. *Prerequisites: H. E. 11, Chem. 37 or approval of instructor.* (4) I (Marlatt, Skerski)

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, 1 hour; lab, 2 hours. *Prerequisite or concurrent: H. E. 111, 102.* (2) II (Marlatt)

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. *Prerequisites: Bact. 52 and H. E. 5.* (3) I, S (Brownlie)

115a-b—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, 6 hours. *Prerequisites: H. E. 5, 6.* (3) II, S (Barkley)

119a-c—SPECIAL PROBLEMS IN FOODS AND NUTRITION. Intensive work on a specific phase of the field. *Prerequisite: senior or graduate standing.* (2) I, II (Clemmons, Marlatt)

208a-c—SEMINAR IN NUTRITION. (2) I (Marlatt)

219a-c—SPECIAL PROBLEMS IN FOODS AND NUTRITION. Independent advanced work on a specific problem. (2) I, II (Clemmons, Marlatt, Erikson)

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

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, 1 hour; lab, 2 hours. *Prerequisites: 25, 161.* (2) I, S (Guenther)

126—COSTUME DESIGN. The arts of costume today and throughout the past. Costumes are designed to meet today's needs. Lecture, 1 hour; lab, 4 hours. *Prerequisites: H. E. 27 and Art 34.* (3) I, S (Alexander)

127—ADVANCED CLOTHING. The making of foundation and creative pattern designs; also creative design through draping, with emphasis on accurate fittings. Lecture, 1 hour; lab, 4 hours. *Prerequisite: H. E. 27.* (3) II, S (Guenther)

128a-c—SPECIAL PROBLEMS IN CLOTHING AND COSTUME DESIGN. Intensive work on specific phases of the field. Senior or graduate standing. (2) I, II, S (Clark, Alexander)

129—INTERIOR DESIGN. A study of color, line, and texture as used to create effective interiors suited to modern living. Lecture, 1 hour; lab, 4 hours. *Prerequisites: H. E. 25, 61; Art 34 or approval of instructor.* (3) I, II, S (Alexander)

130a, b—INTERIOR DECORATION 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, 4 hours. *Prerequisites: H. E. 129 or approval of instructor.* (2) II (Alexander)

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, 2 hours. *Prerequisite: H. E. 27 or approval of instructor.* (2) II, S

134—ECONOMICS OF CLOTHING. The clothing industry, its influence and economy. Field trips to study mass production, class project and individual semester reports. Lecture, 2 hours. *Prerequisites: H. E. 27, 161 or approval of instructor.* (2) I (Guenther)

135—DECORATIVE TEXTILES. Survey of techniques used in applying color and design to fabrics. Individual problems, demonstrating techniques, developed. Lecture, 1 hour; lab, 2 hours. *Prerequisites: H. E. 25, Art 34.* (2) II, S (Guenther)

136a-c—SPECIAL PROBLEMS IN TEXTILES. Intensive work on specific phases of the field. Senior or graduate standing. (2) I, II, S (Guenther)

137—TAILORING. Analysis of tailoring technique in the shop and in the home. Tailored garments are planned and constructed. Lab, 4 hours. *Prerequisite: H. E. 28.* (2) I, S (Guenther)

138a-c—SPECIAL PROBLEMS IN INTERIOR DESIGN. Intensive work on specific phases of the field. Senior or graduate standing. (2) I, II, S (Alexander)

139—ADVANCED INTERIOR DESIGN. The art of interior decoration throughout the past and today. Interiors are planned to meet today's needs. Lecture, 1 hour; lab, 2 hours. *Prerequisite: H. E. 129.* (2) I, S (Alexander)

155—THE CHILD AND HIS CLOTHING. (See Child Development and Family Living.) (3) I, S (Clark)

228a-c—SPECIAL PROBLEMS IN CLOTHING AND COSTUME DESIGN. Independent advanced work on a specific problem. (2) I, II (Guenther, Alexander)

236a-c—SPECIAL PROBLEMS IN TEXTILES. Independent advanced work on a specific problem. (2) I, II, S (Guenther)

237a-c—SEMINAR IN TEXTILES, CLOTHING, COSTUME DESIGN AND INTERIOR DESIGN. Investigation of special textile, clothing, costume design or interior decoration problems. Lecture, 2 hours. (2) I, II (Guenther, Alexander)

- 238a-c—SPECIAL PROBLEMS IN INTERIOR DECORATION. Independent, advanced work on a specific problem. (2) I, II, S (Alexander)

Courses in Institution Management

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, 2 hours; lab, 2 hours. *Prerequisites: H. E. 5 and Econ. 51.* (3) I, II (Brownlie)

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. *Prerequisites: H. E. 41 and 42.* (3) II (Brownlie)

142a-c—INSTITUTION ADMINISTRATION. Application of scientific principles of institution management. Practice is given in management in different food units on the campus. *Prerequisite: H. E. 141.* (2) I, II, S (Brownlie)

143—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. *Prerequisite: H. E. 42.* (3) II (Brownlie)

149a-c—SPECIAL PROBLEMS IN INSTITUTION MANAGEMENT. Intensive work on specific problems. Senior or graduate standing. (2) I, II (Brownlie)

249a-c—SPECIAL PROBLEMS IN INSTITUTION MANAGEMENT. Independent, advanced work. (2) I, II (Brownlie)

Courses in Child Development and Family Living

152—CHILD CARE AND DEVELOPMENT. Increased understanding of children through study of the normal development, care and guidance of the preschool child. Observation and participation in nursery school. Lecture, 2 hours; lab, 2 hours. *Prerequisite: H. E. 52.* (3) I, II (Marshall, Ringo)

153—TECHNIQUES OF GUIDANCE FOR THE PRESCHOOL CHILD. An opportunity for extensive laboratory assistance in the nursery school for students who wish to develop skills in working with children. Lecture, 2 hours; lab, 4 hours. *Prerequisite: H. E. 152.* (4) II, S (McDowell)

154—FAMILY LIVING. A study of the influences which bear upon the home and family with emphasis on preparation for successful marriage and parenthood. Lecture, four hours and occasional field trips. (4) I, II, S (McDowell)

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. *Prerequisite: H. E. 52.* (3) I, S (Clark)

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, 1 hour; lab, 2 hours. *Prerequisites: H. E. 52.* (2) II, S (Ringo)

157—INFANT DEVELOPMENT. Study of development, care and guidance of the child during prenatal, natal, and infant periods. Lecture, 2 hours. *Prerequisite: A. & P. 5.* (2) S, I (Ringo)

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. *Prerequisites: H. E. 6, 11, 52.* (3) II, S (Magruder)

159a-c—SPECIAL PROBLEMS IN CHILD DEVELOPMENT AND FAMILY LIVING. Intensive work on specific problems. Senior or graduate standing. (2) I, II (McDowell)

180—AGING AND LATER MATURITY. Aging and the years of later maturity; with respect to characteristic adjustment problems and potentialities of retirement, employment, living arrangements, mental health, family relationships. (3) S (McDowell)

259a-c—SPECIAL PROBLEMS IN CHILD DEVELOPMENT AND FAMILY LIVING. Independent advanced work. (2) I, II (McDowell)

Courses in Home Management

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, 3 hours. *Prerequisites: Econ. 51; and H. E. 61.* (3) I, II, S (Wilmore)

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, 2 hours. *Prerequisites: Econ. 51; and H. E. 61.* (2) I, II (Wilmore)

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. *Prerequisite: H. E. 162a; prerequisite or concurrent: H. E. 102.* (3) I, II, S (Wilmore, Combs)

168—HOUSEHOLD EQUIPMENT. Electric and gas household equipment and small appliances; their selection, maintenance, operation and cost. Lecture, 2 hours; lab, 2 hours. *Prerequisite or concurrent: Physics 51a or b; Prerequisite: H. E. 61.* (3) I, II (Combs)

169a-c—SPECIAL PROBLEMS IN HOME MANAGEMENT. Intensive work on specific phases of home management. Senior or graduate standing. (2) I, II (Wilmore)

262—ADVANCED HOME MANAGEMENT AND FAMILY RELATIONSHIPS. A course affording opportunity for special study of social and economic problems affecting family life. Lecture, 3 hours. *Prerequisite: H. E. 162b.* (3) II (Wilmore)

269a-c—SPECIAL PROBLEMS IN HOME MANAGEMENT. Independent advanced work. (2) I, II (Wilmore)

General Courses

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. 160. (3) I (Beers)

500-1, 2, 3—THESIS.

No credit (Staff)

HORTICULTURE

102—PRINCIPLES OF SPRAY PRACTICE. A study of the principles and practice of spraying for the control of pests of horticultural crops. Lecture, 1 hour; lab, 2 hours. *Prerequisites: Hort. 1, Chem. 4a, Ag. Ent. 1.* (2) I (Waltman)

103—POMOLOGY: DECIDUOUS TREE FRUITS. A course dealing with the theory and practice of commercial tree fruit production, with major emphasis on apple growing. Lectures, 2 hours; lab, 2 hours. *Prerequisite: Hort. 1.* (3) I (Waltman)

105—POMOLOGY: SMALL FRUITS. A detailed study of the care and management of commercial plantings of strawberries, raspberries, and other bush fruits. Lecture, 1 hour; lab, 2 hours, first half; lectures, 2 hours, last half. *Prerequisite: Hort. 1.* (2) I (Waltman)

106a-c—SPECIAL PROBLEMS IN POMOLOGY. This course is designed to meet the need for advanced work. *Prerequisites: Hort. 1 and one of the following—103 or 105; and approval of instructor.* (3 ea.) I, II, S (Waltman)

110—THE PRINCIPLES OF VEGETABLE GARDENING. A study of the fundamental principles underlying commercial production of vegetables. Lectures, 2 hours; lab, 2 hours. *Prerequisites: Hort. 1, Agron. 61.* (3) I (Emmert)

111—GROWING VEGETABLE PLANTS UNDER GLASS. Production of vegetable plants grown for transplanting; types of hotbeds, cold frames, and simple greenhouse structures. Lectures, 2 hours; lab, 2 hours. *Prerequisite: Hort. 110.* (3) I (Emmert)

112a-c—SPECIAL PROBLEMS IN VEGETABLE CROPS. This course is designed to meet the need for advanced work. *Prerequisites: Hort. 1, 110, and approval of instructor.* (3 ea.) I, II, S (Emmert)

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, 2 hours; lab, 2 hours. *Prerequisites: Hort. 1, Bot. 1, 2. Offered 1955-56 and alternate years.* (3) II, S (Elliott)

121—ADVANCED LANDSCAPE. A continuation of Horticulture 120, with special emphasis on design and the use of materials. Lectures, 2 hours; lab, 2 hours. *Prerequisite: Hort. 120. Offered 1956-57 and alternate years.* (3) II (Elliott)

122—FLORICULTURE. A detailed study of specific groups of flowers such as bulbs, iris, and roses. Lectures, 2 hours. *Prerequisites: Hort. 22. Offered 1956-57 and alternate years.* (2) II (Elliott)

123—PLANT PROPAGATION. A detailed study of the methods of propagating certain horticultural plants. Includes cuttings, grafting, and budding. Lectures, 2 hours; lab, 2 hours. *Prerequisites: Hort. 1, 120; Bot. 1, 2. Offered 1955-56 and alternate years.* (3) II (Elliott)

124a-d—SPECIAL PROBLEMS IN ORNAMENTAL HORTICULTURE. This course is designed to meet the need for advanced work. *Prerequisites: Hort. 1, 120, 121; Bot. 1, 2; and approval of instructor.* (3 ea.) I, II, S (Elliott)

125—PLANTS AND PLANTING MATERIALS. A study of woody and herbaceous plants and their identification, suitability for landscape uses and the effects produced. Lecture, 1 hour; lab, 2 hours. *Prerequisites: Hort. 120 or approval of instructor. Offered 1956-57 and alternate years.* (2) II (Elliott)

200a-c—SEMINAR.

(1 ea.) I, II, S (Olney, Staff)

201a-c—RESEARCH IN HORTICULTURE. *Prerequisite: approval of instructors.* (3 ea.) I, II, S (Olney, Staff)

500-1, 2, 3—THESIS.

No credit (Staff)

Forestry

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, 2 hours; lab, 2 hours. *Prerequisites: For. 1 or 2; Bot. 1; and approval of instructor.* (3) II (Davenport)

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, 3 hours. *Prerequisite: For. 1 or 2 and approval of instructor.* (3) II (Davenport)

115—WOOD CONDITIONING. The methods and principles involved in seasoning, changes in physical properties, and preservation of wood. *Prerequisite: For. 1 or 2.* (3) I, S (Davenport)

120a-c—SPECIAL PROBLEMS IN FORESTRY. This course is designed to meet the need for advanced work. *Prerequisites: For. 110 and 111, and approval of instructor.* (3 ea.) I, II, S (Davenport)

RURAL SOCIOLOGY

(For description of degrees and activities, see Sociology, p. 84)

115—ORGANIZATION OF RURAL GROUPS. A study of the dynamics of organized groups; leadership, membership participation, and program planning in agricultural organizations and other organized rural groups. *Prerequisite: an introductory course or consent of instructor.* (3) I

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. *Prerequisite: an introductory course or consent of instructor.* (3) I (Brown)

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. Same course as H. E. 175. (3) I

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 (Brown)

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. (2) I, II (Staff)

200a-c—RESEARCH IN RURAL SOCIOLOGY. Individual graduate research with correlated study of rural social research types and methods. (2) I, II, S (Staff)

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

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) II

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) II

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 (Staff)

SOCIOLOGY (See page 84)

II. ARTS AND SCIENCES

ANATOMY AND PHYSIOLOGY

103a-d—INDEPENDENT WORK IN ANATOMY. The pursuit of some advanced problems in anatomy under the direct supervision of the instructor. Discussion period, one hour; laboratory, four hours. *Prerequisite: A. & P. 10 or the equivalent.*

(3 ea.) I, II, S (Staff)

104a-d—INDEPENDENT WORK IN PHYSIOLOGY. A study of some advanced problems in physiology under the direct supervision of the instructor. Discussion period, one hour; laboratory, four hours. *Prerequisites: A. & P. 10 or the equivalent; Chemistry 1a, b.*

(3 ea.) I, II, S (Staff)

105—ARCHITECTURE OF THE HUMAN SKELETON. Each bone is studied in detail with respect to its architecture, function, joint combination, and muscular relations. Lectures, two hours; laboratory, four hours. *Prerequisite: Junior standing.*

(4) II, S (Allen)

106—INTRODUCTION TO ENDOCRINOLOGY. The endocrine glands' general development, anatomical location, structure, and fundamental functions are studied. Lectures, three hours. *Prerequisites: A. & P. 10; Zoology 7b; Chemistry 1a, b.*

(3) I, S (Allen, Archdeacon)

107—COMPARATIVE NEURO-PHYSIOLOGY. A comparative study of Anatomy and Physiology of human nervous system with those of the lower animals. Lectures, two hours; laboratory, four hours. *Prerequisite: A. & P. 10.*

(4) I (Allen)

108—CIRCULATION, RESPIRATION AND METABOLISM. The chemical and physical phenomena of respiration, circulation, and metabolic phases are emphasized. Lectures, two hours; laboratory, two hours. *Prerequisite: A. & P. 10.*

(3) II, S (Archdeacon)

109—CELLULAR PHYSIOLOGY. An intensive study of general physiological principles with special emphasis on chemical and physical aspects of the cell. Lectures, two hours; laboratory, two hours. *Prerequisites: A. & P. 10; physics, and general chemistry.*

(3) I, S (Boyarsky)

110—INTERMEDIATE METABOLISM. Oxidation-reduction enzyme systems and intermediate metabolic phenomena are considered. Lectures, two hours; laboratory, two hours. *Prerequisites: A. & P. 10, physics and organic chemistry.*

(3) I (Archdeacon)

120—PHYSIOLOGY OF EXERCISE. A comprehensive survey of the physiological and clinical aspects of exercise. Lectures, demonstrations, three hours. *Prerequisites: A. & P. 4 and 5 or equivalent; Psychology 1; Instructor's consent.*

(3) I (Allen)

201a-i—RESEARCH IN PHYSIOLOGY. An assigned problem, in which originality must be shown, is pursued. Conference and laboratory six hours. *Prerequisites: A. & P. 10; Chemistry 130a, 130b, physical chemistry desirable; physics, one year.*

(3 ea.) I, II, S (Allen, Archdeacon, Boyarsky)

202—PHYSIOLOGICAL TECHNIQUES. Operational procedures are undertaken in gastrointestinal, hemodynamic, and respiratory systems. Lecture, one hour; laboratory, two hours. *Prerequisite: A. & P. 10 or equivalent.*

(2) I (Archdeacon)

203—EXPERIMENTAL ENDOCRINOLOGY. Abnormalities of various endocrine glands are produced experimentally and results thoroughly reported. Lecture, one hour; laboratory, two hours. *Prerequisite: A. & P. 106.*

(2) II (Allen, Archdeacon)

204a-i—GRADUATE SEMINAR IN ANATOMY AND PHYSIOLOGY. Required of all graduate students. Discussion period, one hour.

(1) I, II (Staff)

205—ADVANCED NEURO-PHYSIOLOGY. Electrical analyses of nerve fibres and synapse are considered along with nerve impulse theories, reflexes, and metabolism. Lectures, two hours; laboratory, two hours. *Prerequisites: A. & P. 107, 109.*

(3) II (Boyarsky)

210—PRINCIPLES OF PHYSIOLOGY. A general consideration of the body's various systems. Designed for majors in Psychology, Animal Husbandry, and associated fields. Lectures, two hours; laboratory, two hours. *Prerequisites: One year College Chemistry, One year College Physics.*

(3) I, II (Staff)

ANCIENT LANGUAGES AND LITERATURES

The Department of Ancient Languages 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 deficiencies in such an equivalent will plan, in consultation with the Head of the Department, such a curriculum as will make up this deficiency.

The Department offers the master's degree in five areas: (1) Latin, (2) Greek, (3) Hebrew (a minor must be taken in the classical area or in another area approved by the Department), (4) ancient languages and civilizations,

and (5) 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 9 semester hours must be in 200-courses. The candidate must also show in his course work that he can read at least one of the languages offered by the Department.

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 elect for one-fourth of his oral examination to be taken in this area.

Latin

Note: Courses in beginning Latin, Cicero, Vergil, etc., will be offered on the graduate level for students in Greek or Hebrew (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.

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

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

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

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 materials. (3) II, S

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. *Prerequisite*: permission of instructor. (3 ea.) I, II, S

Note: See also "Classics and Semitics in General" below.

Greek

Note: Courses in beginning Greek, Greek New Testament, Homer, Plato, Greek Mythology, etc., 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.

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

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. *Prerequisite*: permission of instructor. (3 ea.) I, II, S

156—GREEK TRAGEDY. Selected plays from Aeschylus, Sophocles, and Euripides. Lectures on Greek tragedy and its effect on the Western World. *Prerequisite*: A. L. 53 or 54. (3) I

157—GREEK COMEDY. Selected plays of Aristophanes. Lectures on Greek comedy and its effect on the Western World. *Prerequisite*: A. L. 156. (3) II

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. *Prerequisite*: two years of college Greek. (3) I, II, S

Note: See also "Classics and Semitics in General" below.

Hebrew

Note: Courses in beginning Hebrew and Hebrew reading in prose and in poetry 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.

154a, b—STUDIES IN SEMITIC PHILOLOGY. Courses to meet the needs of students in various areas of Semitic philology, *e.g.*, in literature, in civilization, in linguistics, etc. (3 ea.) I, II

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

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

Note: See also 151a-d, 206 and 207 under "Classics and Semitics in General" below.

Classics and Semitics in General

122a—CLASSICAL EPIC IN ENGLISH TRANSLATION. *The Iliad, The Odyssey, and The Aeneid*, with some attention to classical epics of lesser importance. The meaning of these epics to the Greeks and Romans and their effect upon later literature. *No knowledge of Greek or Latin required.* (3) I

122b—CLASSICAL DRAMA IN ENGLISH TRANSLATION. Selected tragedies and comedies of both Greek and Roman dramatists. Interpretation of the plays in the light of their meaning to the Greeks and Romans. *No knowledge of Greek or Latin required.* (3) II

151a-d—INDEPENDENT WORK IN ANCIENT LANGUAGES. Courses to meet the needs of the student will be arranged in various areas of classical 2nd Semitic philology, *e.g.*, in Greek or Latin writers, in classical civilization, in Greek or Latin linguistics, in various areas of Semitics, etc. *Prerequisite: permission of instructor.* (3 ea.) I, II, S

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. *Prerequisite: A. L. 150.* (3) I, II, S

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. *Prerequisite: Necessary command of languages involved.* (3) I, II, S

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

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 later influence. *Prerequisite: Necessary command of languages involved.* (3) I, II, S

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

ANTHROPOLOGY

103a-d—INDEPENDENT WORK IN ANTHROPOLOGY. Individual research problems in archaeology, ethnology, or physical anthropology. (Offered every year.) (3 ea.) I, II, S (Staff)

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) II (Essene)

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. *Prerequisites: Anthro. 2, 114, 115, or 116.* (3) II (Schwartz)

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) II (Schwartz)

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

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) II (Schwartz)

116—BEGINNINGS OF CIVILIZATION. Prehistory of the Near East, the earliest evidences of agriculture, pottery, smelting, writing, law codes, kingship, priesthood, and science. *Prerequisite: one course in Anthro.* (3) I (Schwartz)

117—DIFFUSION OF CIVILIZATION. Prehistory, ethnology of primitive tribes, and spread of Near Eastern civilization in Europe, the Far East, and Negro Africa. *Prerequisite: Anthro. 116.* (3) II (Essene)

118—CULTURES OF THE SOUTHWESTERN UNITED STATES. Development of sedentary and nomadic Indian peoples, from earliest times to the present. (3) I (Schwartz)

125—PHYSICAL ANTHROPOLOGY. Lecture-laboratory course on the biological nature of Man: the primates, fossil man, races, race mixture, constitutional anthropology and human growth. *Prerequisite: Anthro. 1 or three hours in any other Bio. Science.* (4) II (Snow)

126—HUMAN ANCESTRY. A lecture-laboratory course on human origins and the fossil remains of Pleistocene man throughout the world; the lineage, formation and interbreeding of modern races. *Prerequisite: 125 or special permission.* (4) II (Snow)

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. Lectures, 3 hours. *Prerequisites: Anthro. 1 and 2.* (3) I (Essene)

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. Lectures, 3 hours. *Prerequisites: Anthro. 1 and 2.* (3) II (Essene)

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

141—APPLIED ANTHROPOLOGY. Application of anthropological methods to contemporary practical problems such as acculturation, colonial administration, intercultural education, and race relations. *Prerequisite: Anthro. 2.* (3) II (Essene)

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. (3) II (Essene)

150a-d—TUTORIAL SEMINAR. Anthropological methods and theory. (2 ea.) I, II, S (Staff)

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) I, S (Staff)

185a—DESCRIPTIVE LINGUISTICS: Morphology and Syntax. An explanation of some of the ways speech-sounds are put together in patterns so as to form languages. (Same as English 185a.) *Prerequisite: Consent of instructor.* (3) I (Faust)

185b—DESCRIPTIVE LINGUISTICS: Phonology; Communication by Language. An investigation of speech-sounds and systems of speech-sounds. Also, attention to both speech and writing as communication systems. (Same as English 185b.) *Prerequisite: Anthro. 185a.* (3) II (Faust)

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. Primarily for students working toward a master's degree in anthropology. (2 ea.) I, II, S (Staff)

203a-d—RESEARCH PROBLEMS IN ANTHROPOLOGY. Intensive study in the fields of physical anthropology, archeology, and ethnology with qualified staff member. Term papers required. (3 ea.) I, II, S (Staff)

500-1, 2, 3—THESIS. (0) I, II, S (Staff)

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. In every case a written thesis is required.

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.

116a, b—PRINTMAKING. Technical instruction in printmaking processes: lithography, etching, wood cut. Open to advanced students. Six studio hours. *Prerequisite: Art 63.*
(2) I, II (Sternbergs)

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

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

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) I (Rannells)

140—RENAISSANCE ARTS 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)

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)

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, Rannells)

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)

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, Rannells)

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

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) I (Amyx)

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, studio work and reports. (2) S (Wiggs)

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

160a, b—SEMINAR IN ART. Current problems in art; correlations of theory and practice; discussions and reports. For seniors and graduates majoring in art. The Seminar is prerequisite to the comprehensive examination required for graduation. (1) I, II (Staff)

165a-c—ADVANCED PAINTING. Individual development in creative painting. *Prerequisite: 65b.*
(3) I, II, S (Amyx, Barnhart)

175a-d—INDEPENDENT WORK: HISTORY, CRITICISM. Individual research: history, criticism, aesthetics, etc. *Prerequisites: Major and a standing of 3.0 in the department.*
(3) I, II, S (Staff)

177a-d—INDEPENDENT WORK: PAINTING, PRINTMAKING. Individual work in drawing, painting and printmaking. *Prerequisites: Major and a standing of 3.0 in the department.*
(3) I, II, S (Staff)

179a-d—INDEPENDENT WORK: DESIGN, CONSTRUCTION. Individual research and experimental work in technical and theoretical problems of design. *Prerequisites: Major and a standing of 3.0 in the department.*
(3) I, II (Staff)

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. *Prerequisites: Art 143, 155 or 157; Sociology 40; Education 227 or 230; or consent of the instructor.*
(3) I, S (Amyx, Rannells)

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 influence from relativism, psycho-analysis, Gestalt psychology, mathematical and social theory. *Prerequisites: Art 143 and 151 or 153.*
(3) II (Amyx)

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. *Prerequisites: Art 165b and consent of the instructor.*
(3) I, II, S (Staff)

BACTERIOLOGY

102—GENERAL BACTERIOLOGY. Microorganisms; their morphology, classification, physiology, relation to certain fermentations, to food, to soil fertility, and to disease. Lecture and recitation, 2 hours; laboratory, 4 hours. *Prerequisite: Chem. 1b; Zoology 1 or Botany 1.*
(4) I, II, S (Scherago or Hotchkiss and others)

103—PATHOGENIC BACTERIOLOGY. Human and animal pathogenic microorganisms, especially their morphological, cultural, and pathogenic properties. Lecture, 2 hours; laboratory, 4 hours. *Prerequisites: Bact. 102 or 52; or 2b and Chem. 1b.*
(4) I, S (Scherago or Humphries)

104—APPLIED BACTERIOLOGY. A course in bacteriological analysis to supplement Courses 52 and 102. Laboratory, 4 hours. *Prerequisites: Bact. 102 or 52; or 2b and Chem. 1b.*
(2) I, II, S (Hotchkiss and others)

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, 6 hours. *Prerequisite (or to be taken concurrently): Bact. 103.*
(3) I, S (Hotchkiss)

110b—LABORATORY DIAGNOSIS. Continuation of 110a. Examination of blood continued. Laboratory diagnosis of parasitism and infectious diseases. Lab, 6 hours. *Prerequisite (or to be taken concurrently): Bact. 103.*
(3) II, S (Hotchkiss)

111—GENERAL PATHOLOGY. Effects of disease will be studied at autopsies and by the examination of fresh and museum specimens and histological sections. Lect., 2 hours; Lab, 4 hours. *Prerequisites: Anat. and Physiol. 10; Zool. 7b, 101b, and 106; Bact. 103.*
(4) I, S (Scherago, McClellan, and Hotchkiss)

120a, b—HOSPITAL LABORATORY PRACTICE. Students will be required to carry out, under supervision, the laboratory work in one of the hospitals in Lexington. Lab, 12 hours, and 18 hours, respectively. *Prerequisites: Bact. 110a, b.* (4, 6) I, II, S (Best)

125—IMMUNOLOGY AND SEROLOGY. The theories and mechanism of infection and immunity; preparation, standardization, and uses of biological products; serology. Lect., 2 hours; lab, 6 hours. *Prerequisite: Bact. 103.* (5) II, S (Scherago and Humphries)

201a-j—RESEARCH IN BACTERIOLOGY. Laboratory, 10 hours. (3) I, S (Staff)

203a—PUBLIC HEALTH BACTERIOLOGY. Public health aspects of bacteriology including the etiology, epidemiology, immunology and lab. diagnosis of infectious diseases. Lect., 2 hours; lab, 4 hours. *Prerequisite: open only to physicians and health officers or those with equivalent training.*
(3) I, S (Scherago and others)

203b—PUBLIC HEALTH BACTERIOLOGY. Continuation of 203a. Lectures and recitations, 1 hour; laboratory, 4 hours. *Prerequisite: Bact. 203a.*
(3) II, S (Scherago and others)

206—BACTERIOLOGY OF FOODS. Dairy and miscellaneous food products; food preservation; food poisoning. Standard methods for official food and public health laboratories. Lecture, 2 hours; laboratory, 4 hours. *Prerequisites: Bact. 102 or 52; or 2b and Chem. 1b.*
(4) I, S (Weaver)

207—BACTERIOLOGY OF WATER AND SEWAGE. Microbiology of water; methods of purification. Sewage disposal methods. Operation of swimming pools. Standard and other methods for examination. Lecture, 2 hours, lab, 4 hours. *Prerequisites: Bact. 102 or 52; or 2b and Chem. 1b.*
(4) II, S (Weaver)

210—CLINICAL MYCOLOGY. Methods and techniques for isolating and propagating pathogenic actinomycetes and fungi. Lab. diagnosis of fungous infections. Lab., 4 hours a week. *Prerequisites: Chem. 130b; Bact. 125.*
(2) I, S (Hotchkiss)

220—HISTORY OF BACTERIOLOGY. Conferences, 2 hours. *Prerequisite: Bact. 125.*
(2) II, S (Weaver)

222—ADVANCED GENERAL BACTERIOLOGY. Bacterial cytology; theories of staining. Microbial genetics. Taxonomy and nomenclature. Lectures and conferences, 2 hours; lab, 4 hours. *Prerequisites: Bact. 125 and Chem. 130b.*
(4) I, S (Weaver)

224—DISINFECTANTS AND ANTIBIOTICS. Chemical agents injurious to microorganisms. Practical applications and methods of testing. Conferences, 1 hour; lab, 4 hours. *Prerequisites: Bact. 2b, or 52 and 104; Chem. 130b.*
(3) II, S (Hotchkiss)

226a—METABOLISM OF MICROORGANISMS. Chemical changes produced by microorganisms; properties of their enzymes; the physiology of their growth. Lectures or conferences, 2 hours; lab, 4 hours. *Prerequisites: Chem. 130b.*
(4) I (Wiseman)

226b—METABOLISM OF MICROORGANISMS. Continuation of 226a. Lectures or conferences, 2 hours; lab, 4 hours. *Prerequisite: Bact. 226a.*
(4) II (Wiseman)

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, 2 hours; lab, 4 hours. *Prerequisite: Bact. 125; Chem. 130b and 143b.*
(4) II, S (Scherago and Humphries)

250a-j—SEMINAR. Review of current literature in bact.; presentation of papers on work in progress in the department or on assigned topics; reports on meetings of national bacteriological societies. Required of all graduate students. 2 hours. (1 ea.) I, II (Staff)

270—ELECTRON MICROSCOPY. Theory, operation and uses of the magnetic electron microscope and the vacuum unit for metal shadow casting. Lecture, 1 hour; lab, 4 hours. *Prerequisites: Physics 3b and 4b.*
(3) II, S (Edwards)

272—VIRUSES AND RICKETTSIAE. Natures, activities, and methods of laboratory cultivation of viruses and rickettsiae; their relation to bacteria, plants, and animals. Lect., 2 hours; lab, 4 hours. *Prerequisite: Bact. 125.* (4) I, S (Edwards)

BOTANY

103—PLANT PHYSIOLOGY. A study of basic principles of plant physiology; water relations including internal movement, transpiration, and absorption; pigments; photosynthesis. Two lectures and two two-hour lab periods per week. *Prerequisites: Botany 1 or 25, Chemistry 1b or 4b or equivalents.* (4) I, S (Henrickson)

104—PLANT PHYSIOLOGY. A study of elementary metabolism; mineral nutrition; plant hormones; the physiology of vegetative and reproductive growth. *Prerequisite: Botany 1 or 25, Chemistry 1b or 4b or equivalent.* (4) II, S (Henrickson)

106a-d—SPECIAL PROBLEMS. Independent work in some phase of advanced Botany. *Prerequisite: consent of instructor.* (3 ea.) I, II (Staff)

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. *Prerequisite: Botany 2.* (3) I (Smith)

114—ECOLOGY. The relationships which exist between plants and their environment, including a study of the past and present distribution of vegetation. Three lectures and one two-hour laboratory period per week. *Prerequisites: 6 credits of botany.* (4) I (Smith)

115a, b—SEMINAR. Readings and reports of special topics. Required of all senior botany majors. (1 ea.) I, II (Staff)

124—ANATOMY OF VASCULAR PLANTS. The nature and origin of primary and secondary tissues and their distribution in plant organs. Three lectures and one two-hour laboratory period. *Prerequisite: 6 hours of Botany.* (4) II

125—MYCOLOGY. The structure and classification of the fungi with emphasis on their relationships and effects on plants and animals. Two lecture-discussions and two two-hour lab periods per week. *Prerequisite: Botany 1 or equivalent. Botany 2 recommended.* (4) I (Garner)

126—ADVANCED MYCOLOGY. Detailed examination of the structure, classification and physiology of specific groups of fungi. *Prerequisite: Botany 125 or equivalent.* (4) II (Garner)

130—INTRODUCTION TO HEREDITY. Chromosomal cytology and the principles of heredity; three lectures per week. *Prerequisite: 4 credits of biological sciences.* (3) I, II, S (Riley)

132—GENES AND THEIR ACTION. The nature and action of genes. Physiological genetics. Three lectures per week. *Prerequisites: Botany 30 or 130 or equivalent.* (3) II (Riley)

134—CYTOGENETICS. Chromosome aberrations and their importance in heredity and evolution. Three lectures and one two-hour laboratory period per week. *Prerequisites: Botany 3 or 130 or equivalent.* (4) I (Riley)

141—PLANT PATHOLOGY. Significance, nature, causes, and methods of control of plant diseases. Lectures and discussion, two hours; lab, two hours. *Prerequisite: Botany 1.* (3) II (Diachun)

150a—ADVANCED SYSTEMATIC BOTANY. Systematic study of the more complex plant families, such as the grasses and composites. Collection and identification of local flora, including floristic methods. *Prerequisite: Botany 15.* (3) I (Smith)

150b—ADVANCED SYSTEMATIC BOTANY. An introduction to the methods of taxonomy, including the literature of systematic botany, monographic procedures, floristic techniques, use and care of the herbarium, plant geography, biosystematics, and related topics. *Prerequisite: Botany 15.* (3) II (Smith)

160—PLANT MICROTÉCHNIQUE. The principal methods used in the preparation of permanent slides for the compound microscope. Not open to students who have had Botany 6. Three-hour laboratory periods per week. *Prerequisite: 6 credits of botany.* (3) II

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 ea.)

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. *Prerequisite: Botany 125.* (4 ea.) (Garner)

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 ea.) (Henrickson)

213a-d—RESEARCH IN SYSTEMATIC BOTANY. Graduate students may carry on independent work that may be used in the preparation of their theses. *Prerequisite: Botany 15; Botany 114 and 130 recommended.* (4 ea.) (Smith)

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 ea.) (Riley)

- 235—PLANT CYTOTAXONOMY. Cytogenetic, geographical, ecological, and other factors that have influenced the origin and development of species of plants. Three lectures per week. *Prerequisites: Botany 15 and 134 or equivalents.* (3) II (Riley)
- 500-1, 2, 3—THESIS. (0) (Staff)

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 also.

A maximum of one-third of the work may be taken in courses lying 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.

110a, b—ADVANCED INORGANIC CHEMISTRY. A systematic course in inorganic chemistry with special emphasis upon the preparation and reactions of various types of inorganic compounds. Lectures, 2 hours. *Prerequisites: Analytical chemistry and organic chemistry.* (2 ea.) I, II, S (Starke)

111—ADVANCED INORGANIC LABORATORY. Laboratory exercises are chosen to illustrate the methods of preparation of the different classes of inorganic compounds, and to provide training in the newer techniques in the field. *Prerequisite: Chemistry 110a.* (1) II, S (Starke)

122—INSTRUMENTAL ANALYSIS. The applications of microscopic, colorimetric, spectrophotometric, polarographic, and electrometric methods. Lecture, 1 hour; lab, 6 hours. *Prerequisite: Chemistry 25b.* (3) II, S (Wagner)

125—ADVANCED QUANTITATIVE ANALYSIS. The complete analysis of a silicate mineral or ore, and the alloys of iron, copper, and aluminum. Lecture, 1 hour; lab, 6 hours. *Prerequisite: Chemistry 25b.* (3) I (Wagner)

130a, b—ORGANIC CHEMISTRY. A systematic study of organic compounds. Lecture, 3 hours; lab, 4 hours. *Prerequisite: Chemistry 1b or 2b.* (5 ea.) I, II, S (Barkenbus and Smith)

133—QUALITATIVE ORGANIC ANALYSIS. A systematic study of the separation and identification of organic compounds. Lecture, 1 hour; lab, 6 hours. *Prerequisite: Chemistry 130b or 30b.* (3) I, S (Barkenbus and Smith)

136—SYNTHETIC ORGANIC CHEMISTRY. A critical comparison of preparation methods accompanied by laboratory work and reports. Lab, 9 hours. *Prerequisite: Chemistry 130b or 30b.* (3) II, S (Barkenbus)

140a, b—PHYSICAL CHEMISTRY. The fundamental principles of chemistry are studied with emphasis upon the applications of these in the correlation of natural phenomena. Lecture, 3 hours. *Prerequisites: Analytical Chemistry, Mathematics 20b and Physics 3b.* (3, 3) I, II, S (Dawson)

141—CHEMICAL THERMODYNAMICS. Principles and applications of chemical thermodynamics. Lecture, 3 hours. *Prerequisite: Chemistry 140b.* (3) II (Plucknett)

143—PHYSICAL CHEMISTRY. For students in Agriculture and the Biological Sciences. Lecture and recitations, 3 hours; lab, 6 hours. *Prerequisites: Chemistry 1b or 4b, and 27; and Physics 1b.* (5) I (Burns)

144a, b—PHYSICAL CHEMISTRY LABORATORY. Laboratory studies in physical chemistry to accompany 140a, b. Lab, 6 hours. *Prerequisites: Analytical Chemistry, Mathematics 20b; Physics 3b.* (2 ea.) I, II, S (Eick)

145—COLLOID CHEMISTRY. Lectures, recitations, and assigned readings on the chemistry of colloids. Lectures and recitations, 2 hours. *Prerequisite: Chemistry 140b.* (2) II (Black)

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. Lecture and recitation, 3 hours; lab, 3 hours. *Prerequisites: Chemistry 22, Mathematics 20b, and Physics 3b.* (4 ea.) I, II (Dawson, Eick)

150a, b—PHYSIOLOGICAL CHEMISTRY. A study of the chemistry of living processes. Lectures and recitations, 3 hours; lab, 3 hours. *Prerequisites: Chemistry 1b or 4b, 25a, and 130b.* (4 ea.) I, II (Smith)

- 160a, b—INDUSTRIAL CHEMICAL PROCESSES AND STOICHIOMETRY. A survey of the chemistry of various manufacturing processes, with some emphasis on calculations involving stoichiometrical relationships. Lecture, 2 hours. *Prerequisite: Chemistry 140b.* (2 ea.) I, II (Meadow)
- 164a, b—INDUSTRIAL CHEMICAL PRINCIPLES. Fundamental principles applied to problems in industrial chemistry and chemical engineering. Lecture, 2 hours. *Prerequisite: Chemistry 140b.* (2 ea.) I, II (Plucknett)
- 181—CHEMICAL LITERATURE. Training in the use of chemical literature. One hour per week. *Prerequisite: Junior or Senior Standing.* (1) I (Black)
- 182—LABORATORY ARTS. The fabrication of chemical apparatus of glass, metal, and plastics. *Prerequisite: Major in the Department of Chemistry with Junior standing.* (2) I (Eick)
- 188a, b—SEMINAR. Reports and discussions on recent research and current chemical literature. Required of all seniors. Attendance at the seminar for two semesters is required before the one hour of credit is earned. (0, 1) I, II (Staff)
- 215a, b—RADIOCHEMISTRY. The chemistry of the radioactive elements and other substances involved in nuclear reactions. Lecture, 2 hours. *Prerequisite: Chemistry 140b.* (2 ea.) I, II (Starke)
- 220—ADVANCED QUALITATIVE ANALYSIS. A study of qualitative analysis for the anions and the separation and detection of the less common elements, employing a physicochemical method of approach to the theory of separation. Lecture, 1 hour, lab, 6 hours. (3) I (Wagner)
- 221—SEMIMICRO QUANTITATIVE ANALYSIS. The applications of semimicro and micro techniques to the quantitative analysis of both organic and inorganic substances. Lecture, 1 hour; lab, 6 hours. *Prerequisite: Chemistry 140b.* (3) (Smith)
- 223—OPTICAL METHODS OF ANALYSIS. An intensive study of the theory and applications of each of the following methods: emission spectroscopy, absorption spectrophotometry, colorimetry, refractometry, and polarimetry. Lab, 6 hours. *Prerequisite: Chemistry 122 and 140b.* (2) (Hammaker)
- 227—MICROSCOPIC ANALYSIS. Qualitative and semi-quantitative analysis of microgram amounts of various cation groups in a single drop under a microscope. Laboratory, 6 hours. *Prerequisite: Chemistry 21b.* (2)
- 228—PRINCIPLES OF ANALYTICAL CHEMISTRY. An advanced study of the theory and practice of quantitative analysis. Lectures and discussions, 3 hours. *Prerequisite: Chemistry 140b.* (3) II (Wagner)
- 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. Lecture, 3 hours. *Prerequisite: Chemistry 130b.* (2 ea.) I, II (Barkenbus)
- 232—STEREOISOMERISM OF CARBON COMPOUNDS. Optical isomerism; polarimetry; stereochemistry of biphenyls and related compounds; cis-trans isomerism; and stereochemistry of the sugars. Lecture, 3 hours. *Prerequisite: Chemistry 130b.* (3) II (Smith)
- 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. Lecture, 2 hours. *Prerequisites: Chemistry 130b and 140b.* (2) I (Patterson)
- 238—PRINCIPLES OF ORGANIC CHEMISTRY. A general survey of the field of organic chemistry. Lecture, 4 hours. *Prerequisite: Chemistry 130b or equivalent.* (4) I (Barkenbus)
- 244—PHASE RULE. Lectures and assigned readings on the theory and applications of the phase rule. Lecture, 2 hours. *Prerequisite: Chemistry 140b.* (2) II (Sears)
- 246—CHEMICAL KINETICS. Studies of chemical reactions from the standpoint of velocity and mechanism. Lecture, three hours. *Prerequisite: Chemistry 140b.* (3) (Plucknett)
- 248—PRINCIPLES OF PHYSICAL CHEMISTRY. An advanced course dealing with the fundamental principles of physical chemistry. *Prerequisites: College physics, integral calculus, and one course in physical chemistry.* (4) I (Dawson)
- 288a-h—GRADUATE SEMINAR. Reports and discussions on recent research and current literature. Required of all graduate students. (1 ea.) I, II (Staff)
- 290a-1—RESEARCH IN CHEMISTRY. Work may be taken in the following fields, subject to the approval of the Departmental Graduate Committee: Analytical Chemistry, Industrial Chemistry, Inorganic Chemistry, Organic Chemistry, or Physical Chemistry. (5 ea.) I, II, S (Staff)
- 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. Lecture, 2 hours. *Prerequisite: Chemistry 110b.* (2) II
- 314—NON-AQUEOUS SOLUTIONS. A study of the properties of non-aqueous solutions and reactions in non-aqueous media. Lecture, 2 hours. *Prerequisite: Chemistry 140b.* (2) II (Dawson)
- 322—ELECTRICAL METHODS OF ANALYSIS. The theory and application of potentiometric, polarographic, and conductometric measurements. Lecture, 1 hour; lab, 3 hours. *Prerequisites: Chemistry 122 and 140b.* (2) I (Wagner)

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. Lecture, 2 hours. *Prerequisite: Chemistry 234.* (2)

336—HETEROCYCLIC COMPOUNDS. Occurrence, preparation, and properties of cyclic compounds containing oxygen, sulfur, and nitrogen. Lecture, 2 hours. *Prerequisite: Chemistry 130b.* (2) (Smith)

339a, b—TOPICS IN ORGANIC CHEMISTRY. Selected topics which may include heterocyclic organic compounds, natural and synthetic dyes, carbohydrates, nitrogen compounds, and other recent advances in the field of organic chemistry. Lecture, 2 hours. *Prerequisite: Chemistry 130b.* (2 ea.) I, II (Staff)

340—ELECTROCHEMISTRY. Modern theories of solutions. Applications of electrochemical methods in determining the properties of solutions. Polarization. Electrolysis. Equilibrium in solutions of electrolytes. Lecture, 3 hours. *Prerequisite: Chemistry 140b.* (3) I (Black)

341—QUANTUM CHEMISTRY. An introduction to quantum mechanics with emphasis on the aspects closely related to chemistry. *Prerequisites: Chemistry 140b and differential equations.* (2) (Plucknett)

342—STATISTICAL THERMODYNAMICS. The study of chemical thermodynamics from the viewpoint of the statistical treatment of systems rather than from the classical approach. *Prerequisites: Chemistry 141 and differential equations.* (2) (Plucknett)

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. Lecture, 2 hours. *Prerequisites: Chemistry 140b and Mathematics 105.* (2 ea.)

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 seminar. 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 18-20.)

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 examination, the final examination, and the dissertation, see the discussion of these elsewhere in this bulletin or consult the Department.

101—THE 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)

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)

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)

105—CHAUCER. Extensive reading in the chief works of Chaucer with assigned problems relating to Chaucer and his age. (3) I (Cutler, Moore)

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) I (Ward)

106b—ENGLISH ROMANTIC PROSE. The novel, the essay, and literary criticism are studied. Special attention is given to Lamb, Hazlitt, DeQuincey, Scott, and Jane Austen,

- and to the critical prose of Wordsworth, Coleridge, and Shelley. (3) II (Ward)
- 107a—VICTORIAN POETS. An extensive study of the ideas of the chief poets of the Victorian era, with special emphasis on the works of Tennyson, Browning, Arnold, Swinburne, and Rossetti. (3) I (Shine)
- 107b—VICTORIAN PROSE. A study of Macaulay, Mill, Carlyle, Ruskin, Newman, Arnold, Huxley, and related writers of the period in the field of prose. (3) II (Shine)
- 108a—PRINCIPLES OF LITERARY CRITICISM. A course designed to show criticism as a growth and development in an historical survey and to give a corpus of critical opinion about literature. (3) (Adler)
- 108b—PRINCIPLES OF LITERARY CRITICISM. A continuation of 108a, which is not prerequisite although desirable. (3) (Adler)
- 109—PRE-SHAKESPEARIAN DRAMA. A course in English origins, beginning with the *Quem Quaeritis* Trope and extending through the works of the early Elizabethans. (3) I (Stroup)
- 110a—SHAKESPEARE: THE COMEDIES. Shakespeare's comedies will be studied in detail. (3) I (Black, Evans)
- 110b—SHAKESPEARE: THE TRAGEDIES. A continuation of English 110a, with special attention to the great tragedies. (3) II (Black, Evans)
- 111a—THE EIGHTEENTH CENTURY BRITISH NOVEL. A study of the novel from its beginning in English literature to the advent of Scott. (3) (Cooke)
- 111b—THE NINETEENTH CENTURY BRITISH NOVEL. A study of the novel in English literature from Scott through Gissing. (3)
- 113—THE AMERICAN NOVEL BEFORE 1900. A study of the American novel from the beginnings to Henry James. (3)
- 116—THE CONTEMPORARY DRAMA. A course designed to show the development and tendencies in Continental, British, and American dramatic literature, 1850 to date. (3) (Adler)
- 117a—WORKSHOP IN IMAGINATIVE WRITING. Chief attention will be directed to the short story, but time will also be given to the novel. Manuscripts will be analyzed, but primary attention will be given to the theory and conventions of fiction writing. *Prerequisite: English 80 and/or consent of instructor.* (2) I (Summers)
- 117b—WORKSHOP IN IMAGINATIVE WRITING. A continuation of English 117a. Emphasis on application of fictional techniques in student copy. Designed to bring about a fuller understanding of the conventions set forth in 117a and to bring practice closer to theory. *Prerequisite: English 117a and/or consent of instructor.* (2) II (Summers)
- 123a—AMERICAN LITERATURE BEFORE 1860. A survey intended to show the development of American life, thought, and letters from the beginnings to 1860. (3) (Spivey, Jacobs)
- 123b—AMERICAN LITERATURE AFTER 1860. A survey intended to show the development of American life, thought, and letters from 1860 to the present. (3) (Spivey, Jacobs)
- 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) I (Stroup)
- 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) II (Stroup)
- 127a—LITERATURE OF THE BIBLE. A survey of the Old Testament as the literature of the Jewish people. (3) (Bellamy)
- 127b—LITERATURE OF THE BIBLE. A survey of the New Testament as the literature of the early Christians. (3) (Bellamy)
- 130a—COMPARATIVE LITERATURE. Extensive reading of literary masterpieces from Homer to Montaigne. The readings are in English translations, but a reading knowledge of at least one foreign language is desirable. (3) I (Brady)
- 130b—COMPARATIVE LITERATURE. A continuation of English 130a, which is not prerequisite, although desirable. From Montaigne to Anatole France. (3) II (Brady)
- 131a-d—INDEPENDENT WORK. For advanced students of high standing. Each pursues a course independently, under the guidance of a staff member, writes a paper embodying the results of his study, and takes an examination. (3) I, II (Staff)
- 134—HISTORY OF THE STAGE. Designed to give the student a knowledge of dramatic history in relation to the problems of staging. Laboratory work is offered to acquaint the student with the present-day developments of historic devices and techniques of staging. (3) I (Rhodes)
- 137—STAGE PRODUCTIONS IN SCHOOL AND COMMUNITY. Designed for teachers and community theatre workers. The problems of staging under circumscribed conditions, minimum essentials of play production, and means of constructing or supplying these needs. (3) I (Briggs)
- 138—ADVANCED ORAL INTERPRETATION. The cutting and adapting of three-act plays for oral presentation. *Prerequisite: English 38 or permission of instructor.* (3) (Sterrett)
- 143—EDGAR ALLAN POE. A comprehensive study of Poe's works. (3)

- 145—ELIZABETHAN DRAMA, EXCLUSIVE OF SHAKESPEARE. A survey of English drama from the early Elizabethans until the closing of the theatre. (3) (Stroup)
- 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)
- 146b—ADVANCED DISCUSSION. An intensive study of discussion as democracy in action. Ample time devoted to practice discussions. (3) (Blyton)
- 147—THE AGE OF JOHNSON. From 1740 to 1789. Johnson and his circle: Burke, Goldsmith, Gray, Walpole, Cowper, The Pre-Romantic movement. (3) I (Cooke)
- 148—A 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) I (Jansen)
- 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. English 148 is not a prerequisite. (3) II (Jansen)
- 152—THE AGE OF POPE. Addison and Steele, Swift, Pope, Defoe, and other contemporary figures. (3) (Cooke)
- 153—THE DRAMA OF THE RESTORATION AND EIGHTEENTH CENTURY. A study of the dramatic types that arose between the closing of the theatres in 1642 and the death of Sheridan. (3) (Cooke)
- 155a—CONTEMPORARY AMERICAN POETRY. An examination of the forces which have modified poetry in England and America since 1830; and a study of the major modern poets. (3) (Jacobs)
- 155b—CONTEMPORARY BRITISH POETRY. A continuation of English 155a, which is not prerequisite, although desirable. (3) (Moore)
- 156a—THE MODERN AMERICAN NOVEL. Novels chosen for their enduring value rather than historical importance; attention given to shifting techniques of fiction and to contrasting interpretations of the American scene. (3) (Jacobs)
- 156b—THE MODERN 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)
- 157—TEACHING OF SPEECH. An analysis of the field of speech education as related to the teacher of speech. (3) (Blyton)
- 158—ADVANCED ARGUMENTATION AND DEBATE. The function of argumentation and debate in a democracy, plus a much more detailed and critical examination of the logic of argument than is covered in English II. (3) (Blyton)
- 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)
- 160—THEORY AND TECHNIQUE OF 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) I (Briggs)
- 161—THEORY AND TECHNIQUE OF 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) II (Briggs)
- 162—THEORY AND TECHNIQUE OF 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, etc. (3) II (Rainey)
- 163—SCENIC DESIGN. A study of form, line, and color as applied to the stage. Practical work in the building of model sets and in the application of these models to the major productions. (3) (Rainey)
- 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. *Prerequisite: English 6.* (3) (Sterrett)
- 165—THE LYRIC IN ENGLISH. A course designed to trace the development of English lyrical poetry through close study of representative specimens, past and present. (3) (Moore)
- 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) I (Robinson)
- 174—WRITING THE FULL-LENGTH PLAY. The writing of a full-length play is required during the semester. *Prerequisite: English 172.* (3) (Robinson)
- 180—ENGLISH 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 will be required to do quite a bit of writing. (3) (Ward)
- 185a—DESCRIPTIVE LINGUISTICS: MORPHOLOGY AND SYNTAX. An explanation of some of the ways speech-sounds are put together in patterns so as to form languages. *Prerequisite: consent of instructor.* (3) I (Faust)

- 185b—DESCRIPTIVE LINGUISTICS: PHONOLOGY; COMMUNICATION BY LANGUAGE. An investigation of speech-sounds and systems of speech-sounds. Also, attention to both speech and writing as communication systems. *Prerequisite: English 185a.*
(3) II (Faust)
- 203—OLD ENGLISH. A study of Old English language and literature.
(3) I (Moore)
- 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 the varying concepts of "correctness."
(3) II (Cutler)
- 205—SURVEY OF MIDDLE ENGLISH LITERATURE. Romance, drama, lyrics, and ballads.
(3) II (Cutler and Moore)
- 206a-d—SEMINAR: STUDIES IN THE ENGLISH ROMANTIC PERIOD. Studies to be centered upon one of the following: a particular author or small group of authors, a literary *genre*, or a literary movement during the Age of Wordsworth. (3 ea.) (Ward)
- 210—SEMINAR: BIBLIOGRAPHICAL STUDIES. This course is required of all candidates for the M.A. degree. It should be taken at the beginning of graduate work.
(3) (Brady)
- 212a-d—SEMINAR: STUDIES IN MEDIEVAL LITERATURE. Studies in Old English poetry and prose. Cynewulf, Beowulf, Alfred and his circle, Middle English, Chaucer.
(3 ea.) Cutler, Moore)
- 213a-d—SEMINAR: STUDIES IN RESTORATION AND EIGHTEENTH CENTURY LITERATURE. Emphasis upon one: Johnson and his circle, Swift, the Romantic Revolt, the foreign relations of English Literature in the eighteenth century, or the theory and practice of Neoclassicism.
(3) (Cooke)
- 214a-d—SEMINAR: STUDIES IN VICTORIAN LITERATURE. Intensive studies in the social and literary significance of Arnold, Browning, Tennyson, Mill, Carlyle, and Ruskin.
(3) (Shine)
- 215a-d—SEMINAR: STUDIES IN LITERARY CRITICISM. These seminars seek primarily to present the problems of criticism, structural and historical. Critical backgrounds will be stressed so that critical studies in English literature may be made.
(3) (Graduate Staff)
- 216a-d—SEMINAR: STUDIES IN AMERICAN LITERATURE BEFORE 1900. Studies to be centered upon one of the following: a particular author or a small group of authors, a literary *genre*, a literary movement, or a restricted period of time prior to 1900.
(3 ea.) I (Spivey, Jacobs)
- 217a-d—SEMINAR: STUDIES IN CONTEMPORARY AMERICAN LITERATURE. Studies to be centered upon one of the following: a particular author or a small group of authors, a literary *genre*, a literary movement, or a restricted period of time subsequent to 1900.
(3 ea.) I (Spivey, Jacobs)
- 224a-d—SEMINAR: STUDIES IN ENGLISH LITERATURE FROM 1500 TO 1660. A preliminary survey of the literary and cultural trends of the period is followed by directed research based upon the work of one writer, one group of writers, or one literary type.
(3) (Stroup)
- 247a—SPECIAL TOPICS IN DRAMATIC ARTS. Study and research on special topics and problems, depending on the needs of students. Generally offered as an independent study course.
(3) (Staff)
- 247b—SPECIAL TOPICS IN SPEECH. Study and research on special topics and problems, depending on the needs of students. Generally offered as an independent study course.
(3) (Staff)
- 500-1, 2, 3—THESIS. (0) I, II (Graduate Staff)

FRENCH (See *Modern Foreign Languages*)

GEOGRAPHY

- 100—REGIONAL GEOGRAPHY OF ANGLO-AMERICA. A regional study of natural resources, industries, and economic and social developments of the United States, Canada and Alaska. *Prerequisite: one geography course or permission of instructor.*
(2) I, S (Withington)
- 101—GEOGRAPHY OF KENTUCKY. Emphasis upon problems involving the physical environment of Kentucky, human activities, distribution of population, and sequent occupation with special reference to regional and interregional adjustments. *Prerequisite: one geography course or permission of instructor.*
(2) II, S (Schwendeman)
- 102—REGIONAL GEOGRAPHY OF LATIN AMERICA. Study of the countries and geographic regions of Mexico, Central America, and South America. Special reference will be made to inter-American relationships. *Prerequisite: one geography course or permission of instructor.*
(2) I (Schwendeman)
- 103—REGIONAL GEOGRAPHY OF EUROPE. The European continent exclusive of the U.S.S.R. Discussion of environmental factors on a continental and regional basis. Population problems, economic adjustments, and political significance of resources. *Prerequisite: one geography course or permission of instructor.*
(2) I (Karan)

104—REGIONAL GEOGRAPHY OF ASIA. A study of Asiatic countries and their geographic foundations. Major emphasis is given to the problems and development of the U.S.S.R., India, China, and Japan. *Prerequisite: one geography course or permission of instructor.* (2) II (Karan)

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. *Prerequisite: one geography course or permission of instructor.* (2) II (Field)

106—REGIONAL GEOGRAPHY OF AFRICA. A study of African peoples, countries and colonies from the viewpoint of their adjustment to the natural regions. *Prerequisite: one geography course or permission of instructor.* (2) II (Field)

110—ADVANCED ECONOMIC GEOGRAPHY. A course to enable upper division students to carry on more detailed analyses of the various commodities and activities which contribute to national and international economic life. *Prerequisite: Geography 10.* (2) II (Withington)

112—CONSERVATION OF NATURAL RESOURCES. A study of the bases, needs, and problems of conserving natural resources. *Prerequisite: Geography 10 or permission of instructor.* (2) II (Withington)

120—CLIMATOLOGY. A study of the elements and controls of climate and of world climatic patterns. *Prerequisite: Geography 1, Elements, or permission of instructor.* (3) II (Karan)

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. *Prerequisites: Geog. 1 and 134 or 136 for Geography students, or permission of instructor for students offering field experience in allied subjects such as Geology.* (3 ea.) (Staff)

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 area studies; (e) other topics may be elected by consent of instructor. *Prerequisite: permission of instructor.* (3) I, II, S (Staff)

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 Geography 133 and undertaking a study of a special problem related to the course. (Geography 133 can be elected only by students regularly or previously enrolled in an upper division 2 credit course.) (1 ea.) I, II, S (Staff)

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

136—APPLIED CARTOGRAPHY. Map compilation techniques as directed by Army Map Service specifications. (3) I (Field)

140—GEOGRAPHICAL FOUNDATIONS OF WORLD POWER. A study of the influence of location, size, form, surface, climate, and natural resources to national power. Consideration will be given to such modern theories as geopolitics. *Prerequisite: one geography course or permission of instructor.* (2) I (Schwendeman)

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. *Prerequisite: A prior major or minor in Geography.* (3 ea.) (Staff)

230a, b—ADVANCED FIELD STUDIES. Advanced field study and preparation of a report which shall include both manuscript and graphic material. *Prerequisites: Geog. 1, 134 or 136, and 130 for Geography students, or permission of instructor for students offering field experience in allied subjects such as Geology.* (3 ea.) (Staff)

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 of related subjects with the basic literature and evolution of the broad field of geography. (3) II (Staff)

500-1, 2, 3—THESIS. (0)

GEOLOGY

101a—PALEONTOLOGY. A study of fossil invertebrates, their nature, classification, and geological distribution. One lecture, four hours laboratory per week. *Prerequisites: Geology 60a, b; and general zoology or background in zoology.* (3) I (McFarlan)

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

105a-i—INDEPENDENT WORK IN GEOLOGY. Directed work in independent investigations. Thesis required. (3 ea.)

107a-f—ADVANCED FIELD GEOLOGY. A field course in geologic mapping involving problems of local structure and stratigraphy. Six hours a week in the field. *Prerequisites: Geology 10a, b.* (2) I, II (McFarlan)

112—ECONOMIC GEOLOGY. Mineral deposits other than petroleum and natural gas. Distribution, mode of occurrence, origin, methods of search for, and uses. *Prerequisites: Geology 60a, 60b; and 61a, b.* (4) (Brown)

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. Practice in geological field methods. See special announcement. Required of major students. *Prerequisites: Geology 60a, b.* (7) S (McFarlan)

119a, b—REPORT ON FIELD WORK IN REGIONAL GEOLOGY, 118a, b. (1 ea.)

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

120b—GEOLOGY OF KENTUCKY. The mineral resources of the state, their distribution, origin, and uses. Fossil record. (3) (McFarlan)

126a-d—SEMINAR. (1 ea.)

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. *Prerequisites: Geology 60a, 60b; and general elementary physics.* (2) (Roberts)

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

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

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

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 2 lectures and one laboratory per week. *Prerequisites: Physics 1a, b; Geology 130.* (3) (Nelson)

210a—STRATIGRAPHIC PALEONTOLOGY. Regional Stratigraphy. Succession of faunas and the use of fossils for stratigraphic correlation. Lecture, 1 hour; laboratory, 4 hours. (3) I (McFarlan)

210b—STRATIGRAPHIC PALEONTOLOGY. A continuation of 210a. One lecture, four hours laboratory per week. (3) II (McFarlan)

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. *Prerequisites: Geology 61a, b, and Physics 1a, b.* (3) (Brown)

212b—SEDIMENTARY PETROLOGY. The classification and interpretation of sedimentary rocks with emphasis on those aspects which relate to the occurrence of Petroleum. (4) (Roberts)

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. *Prerequisite: Geology 212a.* (3) (Brown)

213—ADVANCED ECONOMIC GEOLOGY. Lecture, 2 hours; laboratory, 2 hours. (3) (Nelson)

217a-d—SEMINAR. (1 ea.)

500-1, 2, 3—THESIS. (0)

GERMAN (See Modern Foreign Languages)

GREEK (See Ancient Languages)

HEBREW (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 examination 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

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. *Prerequisite: History 5a or equivalent.* (3) I (Hopkins)

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. *Prerequisite: one year of American or European history.* (3) I (Gilliam)

105b—THE AMERICAN REVOLUTION, 1763-1789. *Prerequisite: one year of American or European history.* (3) II (Taylor)

106a—COLONIAL LATIN AMERICA. A survey of the founding and development of the Latin American Colonies and their struggle for independence. (3) I (Staff)

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) II (Staff)

124a—SOCIAL AND CULTURAL HISTORY OF THE UNITED STATES TO 1830. This course deals with changing phases of social and cultural life in America. (3) I (England)

124b—SOCIAL AND CULTURAL HISTORY OF THE UNITED STATES SINCE 1830. This course is a continuation of 124a. (3) II (England)

- 132—HISTORY OF AMERICAN AGRICULTURE. A survey of American agricultural history. (3) I, II (Wall, Hopkins)
- 140a-d—INDEPENDENT WORK. Under special conditions selected students may investigate special problems, with weekly reports to the instructor. (2) (Staff)
- 141—TUTORIAL READING. (1) (Staff)
- 146—HISTORY OF THE UNITED STATES, 1877-1901. American history from the end of reconstruction to the turn of the century. (3) I (Wall)
- 147—RECENT HISTORY OF THE UNITED STATES. An intensive study of the principal movements and episodes in the history of the people of the United States from the Spanish-American War to the present. *Prerequisite: one year of American history.* (3) I (Clark, Wall)
- 151a—THE AMERICAN FRONTIER. A course dealing specifically with American expansion westward from the original colonies. *Prerequisites: History 5a, b or equivalents.* (3) I (Clark, Eaton)
- 151b—THE AMERICAN FRONTIER. A continuation of 151a. It will consider the Trans-Mississippi West. *Prerequisites: as for History 151a.* (3) II (Clark, Eaton)
- 180a—HISTORY OF THE OLD SOUTH. A study of the colonial beginnings and expansion of southern life, economics, and society. *Prerequisite: History 5a or equivalent.* (3) I (Eaton, Kirwan)
- 180b—THE SOUTH IN THE CIVIL WAR AND RECONSTRUCTION. 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. *Prerequisite: History 5b or equivalent.* (3) II (Eaton, Kirwan)
- 180c—HISTORY OF THE NEW SOUTH. The evolution of southern life and society, agrarian politics, relationships with other sections, industrial growth, and new leadership. *Prerequisite: History 180a.* (3) II (Clark)

II. England and the British Empire

- 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) I (Cone)
- 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) II (Cone)
- 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. *Prerequisite: one year of college history.* (3) II (Cone)
- 135a—THE BRITISH EMPIRE TO 1860. Review of the various elements affecting Great Britain and its Empire between 1783 and 1860. (3) I (Cone)
- 135b—THE BRITISH EMPIRE SINCE 1860. A continuation of 135a. Great Britain and the growth of the Dominions and the Commonwealth since 1860. (3) II (Cone)
- 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) II (Cone)
- 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) I (Cone)

III. European History

- 110—POLITICAL AND ECONOMIC HISTORY OF MEDIEVAL EUROPE. A study of the institutional development of medieval Europe. Special emphasis will be placed on those political, economic and constitutional aspects of the growth of medieval states. (3) I (Staff)
- 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) II (Staff)
- 114—THE RENAISSANCE AND REFORMATION. The course is designed for a study of the birth of modern spirit and institutions. *Prerequisite: History 8a or 4a.* (3) I (McCloy)
- 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. *Prerequisite: History 4a and 4b or 8a and 8b.* (3) II (McCloy)
- 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) II (McCloy)
- 119b—THE NINETEENTH CENTURY. Starting with the fall of Napoleon, this course treats the successive political changes in 1823, 1830, 1848 and 1871. (3) II (Lunde, Kraehe)

120—THE TWENTIETH CENTURY. A study of recent and contemporary movements, chiefly in Europe. (3) I (Kraehe)

145—RUSSIA SINCE 1900. This course will trace the development of Russia through the revolutionary upheavals of the present century, to a proletarian and industrial state under the soviet regime. (3) II (Staff)

171—EUROPE IN THE EIGHTEENTH CENTURY. The development of the absolute state with special emphasis on France under Louis XIV; the evolution of Russia and Prussia as new European powers. *Prerequisite: History 4a or its equivalent.* (3) II (Lunde)

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. *Prerequisites: History 4a and 4b.* (3) (Kraehe)

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) I (McCloy)

185b—CULTURAL HISTORY OF EIGHTEENTH CENTURY EUROPE. This course is designed to give a survey of European culture during the 1700's, treating the sciences, literature, history, philosophy, the fine arts, and the industrial arts. (3) II (McCloy)

IV. The Far East

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). *Prerequisite: History 8a or equivalent.* (2) I (Vandenbosch)

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. *Prerequisite: History 8b or equivalent.* (2) II (Vandenbosch)

194—THE UNITED STATES IN THE PACIFIC AND THE FAR EAST SINCE 1898. This course presents the policies which resulted in annexation of Hawaii and the Philippines, the announcement of the so-called open door policies and the integrity of China, with their historic development. (2) I (Vandenbosch)

Courses in the "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 "300" group, which is concerned with problems and the practice of research.

202—THE AMERICAN REVOLUTION. Seminar. (3) II (Gilliam)

206—THE CONFEDERATION OF THE U. S. (3) (Eaton)

247a-d—SEMINAR IN RECENT UNITED STATES HISTORY. Intensive studies in the political, social, and cultural history of the United States since 1914. Different topics will be stressed in rotation. (3) (Clark, Wall)

280—EUROPEAN HISTORIOGRAPHY. (3) I (Kraehe, McCloy)

281—AMERICAN HISTORIOGRAPHY. (3) I (Clark, England)

282—HISTORICAL CRITICISM. (3) (Staff)

Courses in the "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 thesis). It is desirable that the student take the Senior Seminar before enrolling in "300" courses. Two class hours and 1 conference hour.

American Group

300a-d—SEMINAR IN AMERICAN DIPLOMACY. (3) I (Hopkins)

315a-d—HENRY CLAY (AND HIS TIMES). (3) (Clark, Eaton)

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)

365—THE AMERICAN CIVIL WAR. Seminar. (3) (Eaton, Kirwan)

366—RECONSTRUCTION. (3) (Eaton, Kirwan)

European Group

320a-d—ORIGINS OF THE GREAT WAR. Seminar. (3) II (Kraehe)

331—SEMINAR IN MODERN BRITISH HISTORY. (3) II (Cone)

350a-d—SEMINAR IN THE FRENCH REVOLUTION. (3) (McCloy)

HISTORY OF EDUCATION (See *Education—Foundations of*)

HYGIENE AND PUBLIC HEALTH

- 100a—PUBLIC HEALTH. A consideration of environmental sanitation and its relationship to the control of preventable diseases. (3) I, S (Hamilton)
- 100b—PUBLIC HEALTH. A survey of the various fields of public health administration for official and voluntary agencies. (3) II, S (Heinz)
- 104—MATERNAL AND CHILD HEALTH. Problems in maternal and child health. (2) II, S (Heinz)
- 110—HEALTH EDUCATION. A course dealing with principles of health education. (3) II, S (Heinz)
- 111a-f—INDEPENDENT WORK IN HYGIENE AND PUBLIC HEALTH. (3) I, II, S (Heinz)
- 115—COMMUNICABLE DISEASES. A study of communicable diseases with reference to causal agents, transmission, and their methods of prevention and control. *Prerequisite: Bact. 52 or equivalent.* (3) II, S (Hamilton)
- 118—VITAL STATISTICS. Statistics of population, deaths, births and morbidity; the collection and analysis of vital statistics. (3) I, S (Heinz)
- 120a—MENTAL HYGIENE. An introduction to mental hygiene including a consideration of the cause, treatment and prevention of mental disorders. (3) I, S
- 122—SCHOOL AND COMMUNITY HEALTH. To develop an idea of the cooperative nature of school health work and the importance of connecting it with adult work in the community. (2) I, S (Heinz)
- 150a, b—PROBLEMS IN HEALTH EDUCATION. An individual problems course for students and teachers in service, based upon a systematic attack upon the health problems of a school. (2) II, S (Heinz)
- 200—EPIDEMIOLOGY. A survey of the principles and methods of epidemiology. (3) I, II, S (Hamilton)
- 203—PUBLIC HEALTH RECORDS. (2) I, II, S (Staff)
- 204—MATERNAL AND CHILD HEALTH. A study of the principles of maternal, prenatal, infant and child care. (2) I, S (Heinz)
- 212a—PUBLIC HEALTH ADMINISTRATION. A consideration of the principles of public health administration. (3) I, S (Heinz)
- 212b—PUBLIC HEALTH ADMINISTRATION. A continuation of Hygiene 212a. (2) II (Heinz)
- 218a—VITAL STATISTICS. Application of the statistics of population, births, deaths, etc. in Public Health. (3) I, S (Heinz)
- 218b—VITAL STATISTICS. A continuation of Hygiene 218a. (2) II, S (Staff)
- 225a—COUNTY HEALTH PRACTICE. (3) I, II, S (Staff)
- 225b—COUNTY HEALTH PRACTICE. (2) I, II, S (Staff)
- 290—SEMINAR. (1) I, II, S (Staff)
- 500-1, 2, 3—THESIS. (0) (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.

- 100a—NEWS REPORTING. Instruction and practice in news gathering, news evaluation, and news writing. *Prerequisite: Journalism 22.* (3) I, II (McCauley)
- 100b—NEWS REPORTING. A continuation of Journalism 100a with emphasis on special fields of information. *Prerequisite: Journalism 100a.* (3) I, II, S (Plummer)
- 101—COPYREADING AND EDITING. Instruction and practice in newspaper desk-work. Preparation of local, state, telegraph, and features; picture editing, and page make-up. Lecture, 1 hour; laboratory, 4 hours. *Prerequisite: Journalism 100a.* (3) I, II (McCauley)
- 102—COMMUNITY JOURNALISM. A study of the problems which confront the community weekly and the small city daily. (3) I, S (Portmann)
- 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 (Portmann)
- 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)
- 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. *Prerequisite: permission of the School.* (3) I, II, S (Moore)

107—EDITORIAL WRITING. A study of editorials, editorial columns, and editorial pages. Publication of copy encouraged. *Prerequisite: Journalism 22.* (2) I, II (McCauley)

108—HISTORY OF JOURNALISM. A study of the rise and development of American journalism and newspapers. *Prerequisite: permission of School.* (3) II (Portmann)

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)

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 (Portmann)

111—VERBAL CRITICISM. A study of words and their synonyms with reference to developing accuracy in use of the English language in journalistic work. (3) I, II, S (McCauley)

112—CRITICAL WRITING FOR THE PRESS. The function of criticism in journalism. Reviewing of motion pictures, plays, concerts, and books for newspapers with emphasis upon student work in Kentucky newspapers. (3)

114—NEWSPAPER ADVERTISING AND PROMOTION. Relations of newspapers with retail advertisers; newspaper advertising department organization; advertising rate structures; classified advertising; legal advertising; organization and development of the promotion department. (3) I, II (Smith)

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, 2 hours; laboratory, 4 hours. (3) II (Portmann)

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)

120—SEMINAR IN PUBLIC OPINION. A detailed examination of techniques developed and used by the press in influencing public opinion. Specific cases studied. *Prerequisite: permission of School.* (3) (Moore and Plummer)

123—FEATURE WRITING. Instruction and practice in writing features. Lectures, readings, and reports directed toward discovering, gathering, organizing, writing, and marketing feature articles. *Prerequisite: permission of School.* (3) I, II (Moore)

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. *Prerequisite: permission of School.* (3) II, S (Moore)

127—REPORTING PUBLIC AFFAIRS. Instruction and practice in reporting the news originating in courts and other public institutions. *Prerequisites: Journalism 100b and permission of School.* (3) II (McCauley)

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)

150—RADIO NEWS SCRIPTS. Instruction and practice in writing news and features material for radio presentation. *Prerequisite: Journalism 22.* (2) I, II (Moore)

LATIN (See Ancient Languages)

LIBRARY SCIENCE

Professional courses leading to the master's degree are designed primarily for majors in library science, but non-majors may be admitted on approval of the Head of the Department. Students in the College of Education who are working for the M.A. or M.S. in Education may elect courses in library science to fulfill requirements for teacher-librarians. Those interested should consult with the Department for guidance in the selection of all such courses.

The Department offers the master's degree according to Plan A and the professional degree of Master of Science in Library Science. (See pages 18-20.) Nine hours of library science at the 100 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.

101a-d—INDEPENDENT WORK. Conferences, assigned readings, reports, etc. *Prerequisites: L. S. 129, 133, 145, 152, and either 113 or 121.* (1 ea.) I, II, S (Staff)

121—LIBRARIES AND LIBRARIANSHIP. An orientation course designed to give students a general understanding of libraries and library work. (3) I, S (Martin)

- 127a—BOOKS AND RELATED MATERIALS FOR CHILDREN AND YOUNG PEOPLE. Designed for school librarians but open to students preparing to work with children and young people in public libraries as well. (3) I, S (Wofford)
- 127b—BOOKS AND RELATED MATERIALS FOR CHILDREN AND YOUNG PEOPLE. A continuation of 127a. *Prerequisite: L. S. 127a.* (3) II, S (Wofford)
- 129—CATALOGING AND CLASSIFICATION. A study of the fundamental principles and methods of classification and cataloging books and related materials. (3) I, S (Lecky)
- 133—REFERENCE AND BIBLIOGRAPHY. A study of the essential reference works, including dictionaries, encyclopedias, atlases, yearbooks, and periodical indexes. (3) I, S (Humeston)
- 139—LIBRARY PRACTICE. Observation and supervised practice in a school library. This course fulfills a requirement for school librarians. *Prerequisites: L. S. 113, 129 and two of the following courses: 127a, 127b, 133.* (3) I, II, S (Roser)
- 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, II, S (Wofford)
- 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 (Martin)
- 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
- 201a-d—PROBLEMS IN LIBRARY SCIENCE. Individual conferences, assigned readings, and reports on the investigation of chosen problems and areas in library science. *Prerequisite: 9 hours of library science at the 200 level.* (1 ea.) I, II, S (Staff)
- 212—THE PUBLIC LIBRARY. A study of the public library as a functioning institution. (3) I, S (Martin)
- 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. *Prerequisites: Library science courses leading to provisional certification (18 hours).* (3) II, S (Wofford)
- 214—THE COLLEGE AND UNIVERSITY LIBRARY. A study of the college and university library as a functioning institution. (3) I, II, S (Humeston)
- 227—PROBLEMS IN READING FOR CHILDREN AND YOUNG PEOPLE. Considers reading interests and needs of younger readers, especially the retarded and superior, as well as studies in the field. *Prerequisite: L. S. 127a, b or equivalent.* (3) II, S (Wofford)
- 229—ADVANCED CATALOGING AND CLASSIFICATION. Expansion of the principles and methods of classification and cataloging books and related materials. *Prerequisite: L. S. 129 or equivalent.* (3) II, S (Lecky)
- 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)
- 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. *Prerequisite: L. S. 133 or equivalent.* (3) II, S (Lecky)
- 235—GOVERNMENT PUBLICATIONS. A study of the problems of acquisition, preparation, and use of international, federal, state, and local government publications. *Prerequisite: L. S. 133 or equivalent.* (3) II (Lecky)
- 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)
- 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 (Martin)
- 252—ADVANCED BOOK SELECTION. Emphasis on the more imaginative and creative forms of literature and their place in libraries. *Prerequisite: L. S. 152 or equivalent.* (3) II, S (Martin)
- 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 (Humeston)
- 287—NON-BOOK MATERIALS. The function, evaluation, selection, acquisition, preparation for use, and preservation of non-book materials in a library program. *Prerequisites: L. S. 129, 133, 145 or equivalent.* (3) II, S (Lecky)

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.

101a-f—INDEPENDENT WORK IN MATHEMATICS. Reading courses for upper division and graduate students. *Prerequisite: consent of the Department.* (3 ea.) (Staff)

102—VECTOR ANALYSIS. Contents: the algebra and calculus of vectors; applications to geometry, electricity, and physics; harmonic functions and potentials. *Prerequisite: M. and A. 20b.* (3) (Cowling)

103—THEORY OF EQUATIONS. Topics included: solutions of cubic and quartic equations; ruler and compass constructions; roots of unity; solutions of numerical equations, systems of linear equations, symmetric functions, and resultants. *Prerequisite: M. and A. 20a.* (3) (Eaves)

105a—DIFFERENTIAL EQUATIONS. A first course including first order linear differential equations, homogeneous equations, exact equations, second order equations with constant coefficients, and numerous applications. *Prerequisite: M. and A. 20b.* (3) I, II, S (Levin, Pignani)

105b—DIFFERENTIAL EQUATIONS. Further study of ordinary differential equations, special types, singular solutions, and integration in series. *Prerequisite: M. and A. 105a.* (3) (Pignani, Levin)

106a, b—ADVANCED CALCULUS. Continuous functions, differentiable functions, infinite series, implicit functions, Riemann integral, the gamma and beta functions, line surface and space integrals. *Prerequisite: M. and A. 25 or equivalent.* (3 ea.) (Horne, Royster)

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. *Prerequisite: consent of instructor.* (3) (Pence)

116—ANALYTIC MECHANICS. Topics included: composition and resolution of forces, statics of a particle, moments, couples, center of gravity, friction, simple harmonic motion, work, energy, and constrained motion. *Prerequisite: M. and A. 20b.* (3) (Staff)

118—SOLID ANALYTIC GEOMETRY. Contents: Systems of planes, plane coordinates, the concept of infinity, transformation of coordinates, surfaces, coordinate systems. *Prerequisite: M. and A. 20a.* (3) (Brown)

119—COLLEGE GEOMETRY. Introduction to a wide and extensive body of synthetic geometry. It concerns the geometry of the triangle and the circle, and requires only the known Euclidean concepts. *Prerequisite: consent of instructor.* (3) (Pence)

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. *Prerequisite: M. and A. 25.* (3) (Cowling)

122—ACTUARIAL MATHEMATICS. Theory of mortality tables, life annuities, term premiums, terminal reserves, joint-life annuities and insurances. *Prerequisite: M. and A. 20b.* (3) (Eaves)

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. *Prerequisite: consent of instructor.* (3) I (Pence)

126—INTRODUCTION TO HIGHER ALGEBRA. Integral domains, polynomials, groups, vector spaces, matrices. *Prerequisite: M. and A. 26, or consent of the instructor.* (3) (Eaves, Levin)

127a, b—INTRODUCTION TO HIGHER GEOMETRY. Emphasis on fundamentals common to all geometry. Geometries associated with the projective group and the group of circular transformations. *Prerequisite: M. and A. 27 or its equivalent.* (3, 3) (Pence)

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. *Prerequisite: M. and A. 35.* (3) (Staff)

128b—THE OPERATIONAL CALCULUS. The theory of the inverse Laplace Transformation. Applications in advanced boundary value problems. Fourier Transforms and applications. *Prerequisite: M. and A. 128a.* (3) (Staff)

129—PROBABILITY. Theorems of total and compound probability, Bernoulli's Theorem, Bayes' Theorem, Poisson Law, Expected value, Law of large numbers. Distribution functions and characteristic functions. *Prerequisite: M. and A. 25.* (3) (Staff)

130—INTRODUCTORY TOPOLOGY. Elementary set theory and general topological phenomena, properties of continuous functions, metric spaces, the topology of the real line and plane. *Prerequisite: Consent of instructor.* (3) (Goodman, Horne)

132—THE CALCULUS OF FINITE DIFFERENCES. A study of the methods of differencing, interpolation, finite integration, summation of series, approximate integration and difference equations. *Prerequisite: M. and A. 25.* (3) (Eaves)

141—INTRODUCTION TO THEORY OF NUMBERS. Divisibility, prime numbers, congruences and residues, Diophantine equations. *Prerequisite: consent of instructor.* (3) (Eaves)

144a-f—PROBLEM SEMINAR. Reports on current research papers. Problems from various fields of mathematics. *Prerequisite: consent of instructor.* (2 ea.) (Senior Staff)

146—ALGEBRAIC METHODS IN ENGINEERING. Study of number systems, matrices, determinants, and Boolean Algebra with applications to electrical networks, machine computation, and other engineering problems. *Prerequisite: M. and A. 20b.* (3) (Eaves, Levin)

- 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 numerical solutions of ordinary differential equations. *Prerequisite: M. and A. 35 or consent of instructor.* (3) (Levin)
- 161a-d—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 100 courses. *Prerequisite: Teaching experience in the field of mathematics and consent of the instructor.* (3 ea.) (Eaves, Pence)
- 201a-f—INDEPENDENT WORK IN MATHEMATICS. Reading courses in the 200 group for graduate students. (3 ea.) (Senior Staff)
- 202a, b—ALGEBRAIC CURVES. Topics include general properties of algebraic curves, the theory of residuation, singular points, covariant curves, unicursal curves, systems of curves. *Prerequisite: M. and A. 127b.* (3) (Pence)
- 204a, b—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. *Prerequisite: M. and A. 105b.* (3) (Staff)
- 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. *Prerequisite: consent of instructor.* (3) (Staff)
- 206—THEORY OF GROUPS. Permutation groups, isomorphisms, the group postulates, abstract groups, automorphisms, homomorphisms, quotient groups, Abelian groups, Galois groups. *Prerequisite: M. and A. 236, or consent of instructor.* (3) (Levin)
- 207a, b—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. *Prerequisite: M. and A. 106b.* (3, 3) (Goodman, Royster)
- 208a, b—FUNCTIONS OF REAL VARIABLE. Brief discussion of real numbers; continuous functions, semi-continuous functions, functions of bounded variations; Stieltjes Integral, measure and integration. *Prerequisite: M. and A. 106b, or consent of instructor.* (3, 3) (Cowling, Goodman)
- 209a-f—SELECTED TOPICS IN THE THEORY OF COMPLEX VARIABLES. Analytic continuation, functions with natural boundaries, gap theorems, over-convergence, entire functions, Dirichlet series. *Prerequisite: consent of instructor.* (3 ea.) (Cowling or Goodman)
- 210—ADVANCED MATHEMATICAL STATISTICS. Theory of sampling, the Chi-square distribution, testing statistical hypotheses. *Prerequisite: M. and A. 120.* (3)
- 212a, b—SUMMABLE INFINITE PROCESSES. Fundamental limit idea applied to infinite sequences, infinite series, infinite products, etc. Summability of Cesaro, Holder, Abel, Borel, and Leroy. *Prerequisite: M. and A. 106b, or consent of instructor.* (3, 3) (Cowling)
- 213—FOURIER SERIES. Expression of a general periodic function as a Fourier series, sufficient conditions for convergence, Fejer's theorem, applications. *Prerequisite: M. and A. 106b.* (3) (Cowling)
- 214—POTENTIAL FUNCTIONS. Topics considered: Attraction of bodies, Newtonian potential function, theorems of Green and Gauss, level surfaces, spherical harmonics. *Prerequisite: M. and A. 105b.* (3) (Staff)
- 220a, b—MATHEMATICS SEMINAR. (2, 2) (Senior Staff)
- 221—TENSOR ANALYSIS. Topics considered: the theory of tensors, quadratic, differential forms, Riemannian geometry, pseudo-Euclidean geometry. *Prerequisite: consent of instructor.* (3) (Cowling)
- 222—ORTHOGONAL SYSTEM OF FUNCTIONS. This course supplements 221. Eigen value problems for linear differential equations, systems of orthogonal functions, spherical harmonics, hypergeometric and related functions, completeness. *Prerequisite: consent of instructor.* (3)
- 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. *Prerequisite: consent of instructor.* (3) (Cowling)
- 226a, b—HIGHER ALGEBRA. Groups, rings, fields, Galois theory, linear algebras, hypercomplex numbers, ideals. *Prerequisite: M. and A. 126, or consent of instructor.* (3, 3) (Levin)
- 227a, b—HIGHER GEOMETRY. Topics include: Projective spaces, groups of collineations, invariants and covariants, Cremona transformations, the plane cubic and quartic, space curves, the cubic surface. *Prerequisite: M. and A. 127b.* (3, 3) (Pence)
- 230—GENERAL TOPOLOGY. Embedding and metrization, compact spaces, uniform spaces and function spaces. *Prerequisites: M. and A. 130.* (3) (Horne)
- 231—ADVANCED DIFFERENTIAL EQUATIONS. Existence theorems, partial differential equations, linear equations with periodic coefficients, classical equations, equations in infinitely many variables. *Prerequisite: M. and A. 105b.* (3) (Pignani)

232a, b—LINEAR SPACES. Topological spaces, metric spaces, vector spaces, Banach space, with applications to summability theory, infinite systems of linear equations, spectral theory. (3, 3) (Cowling)

233a, b—SELECTED TOPICS IN TOPOLOGY. Topological algebras, algebraic topology, topologies in lattices. *Prerequisite: M. and A. 230a and b, or consent of instructor.* (3 ea.) (Goodman, Horne)

236—THEORY OF MATRICES. Study of matrix algebra and canonical forms. *Prerequisite: M. and A. 126, or consent of instructor.* (3) (Eaves)

241—NUMBER THEORY. Peano's Axioms, continued fractions, quadratic fields, algebraic integers, p-adic numbers, etc. *Prerequisites: M. and A. 126 and 141.* (3) (Staff)

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, eigenvalues of matrices. *Prerequisite: M. and A. 146 or 153 or equivalent with consent of instructor.* (3) (Levin)

261a-d—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. *Prerequisite: Teaching experience in the field of mathematics and consent of instructor.* (3 ea.) (Eaves, Staff)

500-1, 2, 3—THESIS. This course is designed for graduate students working for advanced degrees. The time-credit is on the same basis as for any other course but no point-credit is given. (0) (Senior Staff)

Astronomy

251a—CELESTIAL MECHANICS. Topics included: rectilinear motion, central forces, potential and attraction of bodies, and the problem of two bodies. *Prerequisite: M. and A. 105a.* (3)

251b—CELESTIAL MECHANICS. Orbit computation, the problem of three bodies, and perturbations. *Prerequisite: M. and A. 251a.* (3)

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

101a, b—ADVANCED PHONETICS. This course is especially planned for teachers of phonetics both in high school and in college. (3, 3) I, II, S (Schick)

102a—FRENCH LITERATURE OF THE NINETEENTH CENTURY. A study of French Romanticism. Lectures and reading. (3) I, II, S (Walker)

102b—FRENCH LITERATURE OF THE NINETEENTH CENTURY. A study of Realism and Naturalism in France. Lectures and reading. (3) I, II, S (Walker)

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 (Ryland)

103b—FRENCH LITERATURE OF THE SEVENTEENTH CENTURY. The plays of Moliere, Corneille and Racine. (3) I, II, S (Ryland)

104a, b—ADVANCED FRENCH GRAMMAR. A study of the finer points of French grammar. (3, 3) I, II, S (Schick)

105a, b—FRENCH LITERATURE OF THE XVIII CENTURY. A study of the representative writers of the XVIII century, with special attention given to Voltaire and Rousseau. (3, 3) I, II, S (Walker)

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, 3) I, II, S (Schick)

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, 2) I, II, S (Ryland)

180a-d—INDEPENDENT WORK IN FRENCH. (3 ea.) I, II, S (Staff)

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, 1) I, II (Ryland)

193—THE TEACHING OF MODERN FOREIGN LANGUAGES. A course for teachers and prospective teachers of Spanish, French, or German. (3) S (Server)

- 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, 3) I, II, S (Ryland)
- 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, 3) I, II, S (Rea)
- 203a, b—SEMINAR IN FRENCH LITERATURE. (3, 3) I, II, S (Staff)
- 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, 3) I, II, S (Rea)
- 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) I, II, S (Hegeman, Ryland, and Server)
- 500-1, 2, 3—THESIS. (0) I, II, S (Staff)

German

- 121a-d—INDEPENDENT WORK IN GERMAN. This course is designed for students who wish to do advanced work in German on any subject. It is limited to majors in the Department. (3 ea.) I, II, S (Staff)
- 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 each 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 courses 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.
- 123—PROSEMINAR IN KLEIST. (3) I (Whitaker)
- 124—PROSEMINAR IN HAUPTMANN. (3) II (Bigge)
- 125—PROSEMINAR IN SCHILLER. (3) I (Hegeman)
- 126—PROSEMINAR IN GRILLPARZER. (3) II (Whitaker)
- 127—PROSEMINAR IN THOMAS MANN. (3) I (Bigge)
- 128—PROSEMINAR IN LESSING. (3) II (Hegeman)
- 129—PROSEMINAR IN HEBBEL. (3) I (Whitaker)
- 130—PROSEMINAR IN SUDERMANN. (3) II (Whitaker)
- 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 (Hegeman)
- 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 (Staff)
- 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 (Staff)
- 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 (Ubben)
- 193—THE TEACHING OF MODERN FOREIGN LANGUAGES. A course for teachers and prospective teachers of Spanish, French, or German. (3) S (Server)
- 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)
- 221b—THE GERMAN NOVELLE. This course traces the origin and development of the German Novelle from Goethe to Thomas Mann. (3) II (Whitaker)
- 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)
- 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 (Hegeman)
- 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) I, II, S (Hegeman, Ryland, and Server)

500-1, 2, 3—THESIS.

(0) I, II, S (Staff)

Spanish

181a, b—ADVANCED SPANISH GRAMMAR AND COMPOSITION. A study of the finer points of Spanish grammar. (3, 3) I, II, S (Server)

182a, b—SPANISH LITERATURE OF THE XVII CENTURY. Selected literature of the Golden Age; Cervantes, the picaresque novel, leading dramatists. (3, 3) I, II, S (Hernández)

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, 3) I, II, S (Server)

184a, b—SPANISH AMERICAN LITERATURE. A study of representative writers and principal literary productions of Spanish America. Outside reading of 2000 to 2500 pages of selected works. (3, 3) I, II, S (Server)

185a—SPANISH LITERATURE OF THE XIX CENTURY. A study of Spanish Romanticism and the works of the leading Constumbristas. (3) I, II, S (Server)

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 (Server)

186a-d—INDEPENDENT WORK IN SPANISH. (3 ea.) I, II, S (Staff)

191a, b—TUTORIAL SEMINAR FOR MAJORS IN THE ROMANCE LANGUAGES. A survey course which will attempt to give the student a comprehensive picture of Spanish literature from 1600 to the present. Required of all Majors in Spanish during the senior year. (1, 1) I, II (Server)

193—THE TEACHING OF MODERN FOREIGN LANGUAGES. A course for teachers and prospective teachers of Spanish, French, or German. (3) S (Server)

281a—OLD SPANISH. A study of the vocabulary and grammar of Old Spanish, contrasting and comparing it to modern Spanish. (3) I, II, S (Server)

281b—OLD SPANISH. Reading of texts in Old Spanish. (3) I, II, S (Server)

282a, b—SEMINAR IN SPANISH LITERATURE. (3, 3) I, II, S (Staff)

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) I, II, S (Hegeman, Ryland, and Server)

500-1, 2, 3—THESIS.

(0) I, II, S (Staff)

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.

Entrance Examinations—All candidates must qualify through examination in the proposed field of concentration, and in basic theory and 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.

A minimum of four hours in graduate theoretical subjects.

A minimum of 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 Counterpoint.

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 94-95)**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.

102—VOCAL PEDAGOGY. 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)

106a, b—PIANO LITERATURE. A survey of music written for the piano, emphasizing problems in performance of standard piano literature. (2) I, II, S (Karp and Patch)

107—VOCAL LITERATURE. A study of the development of solo song literature. (3) I, S (Jenness, Kiviniemi)

108a, b—HISTORY AND LITERATURE OF THE ORGAN. A study designed to give the student a practical knowledge of the development of the organ, its construction, the literature, and teaching materials. (2) I, II, S (Blackburn)

113a, b—COUNTERPOINT. A study of Counterpoint based on the 16th Century and 18th Century contrapuntal techniques. Original compositions and analysis. *Prerequisites: Music 51a, b; 52a, b.* (2) I, II, S (Kinney, Wright)

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 (Lewis)

116a, b—CONDUCTING. A study of the technique and practice of the fundamentals of conducting. (2) I, II (Fitzgerald, Rabin)

117a, b—ORCHESTRATION. This course includes a study of the individual instruments of the orchestra and band with practice in scoring for these instruments. (2) I, II, S (Kinney)

119a, b—COMPOSITION AND ORCHESTRATION. A basic course in original composition and orchestration. *Prerequisites: Music 53b and 121.* (2) I, II, S (Wright)

123—SURVEY OF CONTEMPORARY MUSIC. A stylistic study of representative compositions of the twentieth century. (2) I, S (Kinney)

124a, b, c—OPERA WORKSHOP. (1) S (Jeness, King, Kiviniemi)

125—MUSIC EDUCATION WORKSHOP: CHORAL. An intensive study of choral literature and interpretation through lectures, demonstrations, and participation. (1) S (Staff)

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. (1) S (Staff)

127—MUSIC EDUCATION WORKSHOP: THE SCHOOL ORCHESTRA. A study of school orchestra methods, materials, and administration, and specific stringed instrument teaching problems. This unit convenes during the annual meeting of the University of Kentucky Summer All-State High School Orchestra. (1) S (Staff)

128—MUSIC EDUCATION WORKSHOP: THE SCHOOL BAND. A study of concert and marching band organizations on the secondary school level, with brass, woodwind, percussion, and conducting clinics. (1) S (Staff)

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)

135—HISTORY OF AMERICAN MUSIC. A study of music in America from colonial times to the present. (3) II, S (Howell, Kinney, Wright)

145—SUPERVISION OF MUSIC. Administrative problems in public school music. Lecture, 1 hour; lab, 1 hour each week. *Prerequisite: Music 129a, b.* (1) II, S (Lewis)

200a, b, c—ADVANCED COMPOSITION AND ORCHESTRATION. *Prerequisite: Music 119a, b.* (2) I, II, S (Wright)

202—THEORY REVIEW. A review of the fundamentals of music theory. (0) I, S (Wright)

203—CHORAL LITERATURE AND TECHNIQUE. An advanced interpretive study of major choral compositions. (2) I, S (Lewis)

204—ADVANCED BAND TECHNIQUE. An advanced course with concentration on band organization and materials, conducting, and band arranging. (2) II, S (Fitzgerald)

205—MEDIEVAL AND RENAISSANCE MUSIC. An advanced study of the musical developments during these periods. (3) II, S (Howell, Stein)

214—ADVANCED CONDUCTING. Advanced studies in conducting techniques, score reading, and interpretation. *Prerequisite: Music 116a, b.* (2) II, S (Fitzgerald, Rabin)

215a-h—PIANO. (2) I, II, S (Karp, Montgomery, Patch)

216a-h—STRINGS. (2) I, II, S (Kinney, Rabin, Wright)

217a-h—VOICE. (2) I, II, S (King, Kiviniemi, Jeness)

218a-h—ORGAN. (2) I, II, S (Blackburn)

219—SYMPHONIC LITERATURE. An intensive study of orchestral literature. (3) II, S (Howell, Kinney, Wright)

220—RESEARCH METHODS. Studies in basic research techniques and materials in the field of music. (2) I, S (Howell, Stein)

222a—INDEPENDENT WORK IN MUSIC EDUCATION. (2) I, II, S (Fitzgerald, Howell, Kinney, Lewis, Stein, Wright)

222b—INDEPENDENT WORK IN MUSIC THEORY. (2) I, II, S (Fitzgerald, Howell, Kinney, Lewis, Stein, Wright)

222c—INDEPENDENT WORK IN MUSICOLOGY. (2) I, II, S (Fitzgerald, Howell, Kinney, Lewis, Stein, Wright)

223a, b—PEDAGOGY OF THEORY. The teaching of music theory. (2) I, II, S (Wright)

224a, b—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)

225a, b—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)

226—SIXTEENTH CENTURY COUNTERPOINT. The study of sixteenth century counterpoint techniques through analysis and composition. (2) According to Demand (Wright)

231a-h—WOODWIND INSTRUMENTS. (2) I, II, S (Lutz, Stein)

232a-h—BRASS AND PERCUSSION INSTRUMENTS. (2) I, II, S (Fitzgerald, Worrel)

MUSIC 242 and EDUCATION 242—ADMINISTRATION AND SUPERVISION OF PUBLIC SCHOOL MUSIC. Current trends in school music, curricula, testing programs, and other supervisory procedures. (3) II, S (Fitzgerald, Worrel)

MUSIC 243 and EDUCATION 243—ADVANCED METHODS AND MATERIALS IN EDUCATION. A survey and evaluation of new public school music methods and materials. (2) I, S (Fitzgerald, Worrel)

MUSIC 244 and EDUCATION 244—HISTORY AND PHILOSOPHY OF MUSIC EDUCATION. A survey of the historical developments and basic philosophies of public school music. (2) I, S (Fitzgerald, Worrel)

PHILOSOPHY

101a—HISTORY OF PHILOSOPHY—ANCIENT AND MEDIEVAL. A survey of the philosophical thought of ancient Greece and Rome, and of medieval Christendom. (3) I (De Boer)

101b—HISTORY OF PHILOSOPHY—MODERN. A survey of modern European and American philosophy from the Renaissance to contemporary times. (3) II (Kuiper)

102—CONTEMPORARY PHILOSOPHY. A study of contemporary philosophic tendencies, notably neorealism, critical realism, critical monism, pragmatism, idealism, neoscholasticism, existentialism, and logical positivism. (3) I (Melzer)

106—REPRESENTATIVE MODERN PHILOSOPHIES. A study in the original works of the chief figures in modern philosophy. Special attention will be given to Descartes, Spinoza, Locke, Hume, and Kant. (3) (Kuiper)

110—THE MAKING OF THE MODERN MIND. A study of the intellectual 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)

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)

118—PLATO AND ARISTOTLE. Plato's development of a theory of the world and of practice, studies in selected dialogues. Analysis of passages in Aristotle's major works on natural philosophy, metaphysics, knowledge, ethics, and politics. (3) II (De Boer)

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)

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)

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)

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) II (Melzer)

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. Lectures, discussions, reports. (Same as Art 153.) (3) I (Amyx)

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. *Prerequisite: 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) I, II (Jack)

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) S (Kuiper)

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)

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)

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)

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 "200" or above. The candidate shall complete at least two-thirds of this 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 "200" courses 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 a graduate curriculum in the following areas of specialization:

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. Rehabilitative 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 all graduate students:

P.E. 240—Seminar	2 hrs.
P.E. 241—Current Studies and Trends	3 hrs.
P.E. 250—Curriculum and Program Development	3 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

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)

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. *Prerequisite: Physical Education 41 or consent of instructor.* (2) I, S (Lancaster, Clay)

142—COACHING ADVANCED FOOTBALL. Lecture and recitation on the theory of football. Special emphasis is placed on generalship, signal systems, scouting and conditioning of players. Two hours per week. *Prerequisite: Physical Education 42 or permission of instructor.* (2) II, S (Collier, McCubbin)

143—HISTORY AND PRINCIPLES OF PHYSICAL EDUCATION. Study of the historical development of physical education and an interpretation of the biological, psychological, and sociological principles of physical education. Three hours per week. (3) I, S (even years) (Hackensmith, Carr)

144—PHYSICAL EDUCATION IN THE SECONDARY SCHOOL. Required for teacher certification in physical education. Theory and practice in methods of teaching physical education activities and supervising programs in the secondary school. One hour per week of lecture, and four hours lab. (3) II, S (Carr, Clay)

145—INTRODUCTION TO TESTS AND MEASUREMENTS. The construction 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)

158a—SPORTS OFFICIATING FOR MEN. The theory and practice of officiating football, volleyball, basketball, swimming, and other sports. Officiating in college intramurals and high school athletics will be required. One hour lecture, two laboratory. (1) I, S (Johnson)

158b—SPORTS OFFICIATING FOR MEN. The theory and practice of officiating basketball, track, baseball, tennis, and other sports. Officiating in college intramurals and high school athletics will be required. One hour lecture, two hours laboratory. (1) II, S (Johnson)

159a—SPORTS OFFICIATING FOR WOMEN. Instruction, interpretation of rules, and practice in officiating field hockey, volleyball, basketball, and other sports. Preparation for Women's National Officials rating in athletics. One hour lecture, two hours laboratory. (1) I, S (Bell)

159b—SPORTS OFFICIATING FOR WOMEN. Instruction, interpretation of rules and practice in officiating basketball, softball, tennis, and other sports. Preparation for Women's National Officials rating in athletics. One hour lecture, two hours laboratory. (1) II, S (Blanton)

165—SAFETY IN PHYSICAL EDUCATION. Designed to prepare majors to teach safety education or to serve as a school safety coordinator. Provides a knowledge of all common areas of safety education but emphasizes safety in athletics, physical education and recreation. (2) I, S (even years) (Seaton)

169a, b—STUDENT TEACHING IN PHYSICAL EDUCATION. See Secondary Education, College of Education. (9) I, II (Gilb, Clay)

172—KINESIOLOGY. Study of muscular and mechanical factors in bodily movements. Three hours lecture per week. *Prerequisites: Anatomy and Physiology 4 and 5.* (3) I, S (odd years) (Hackensmith)

173—REMEDIAL PHYSICAL EDUCATION. A study of the prevention and treatment of physical defects. Two hours lecture and two hours practice per week. *Prerequisite: Physical Education 172.* (3) II, S (even years) (Hackensmith)

174—TECHNIQUES OF REHABILITATION. A practical course in rehabilitation techniques employed in hospitals and rehabilitation centers. Emphasis is upon the use of recreational therapy. Four hours per week lab. *Prerequisite: Physical Education 173 or consent of instructor.* (2) I (Jokl)

175—FIELD WORK IN REHABILITATION. A course involving clinical practice in therapeutic exercise under medical supervision. Designed to qualify students as Exercise Therapists and to prepare those entering allied fields of rehabilitation. One hour lecture and four hours laboratory per week. *Prerequisite: Physical Education 173, or permission of instructor.* (3) II (Jokl)

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)

181—CAMPING IN EDUCATION. Purpose, history, organization, and conduct of camps of various types. *Prerequisite: Physical Education 81 or permission of instructor.* (2) I, S (Kauffman)

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. One hour lecture and two hours laboratory. (1) II, S (even years) (McCubbin, Staff)

183—INTERPRETATIONS 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)

185—COMMERCIAL RECREATION. Consideration of socio-economic aspects of commercial recreation and of the development of operational techniques. Designed for students and operators of commercial recreation facilities. *Prerequisite: Sociology 40 or permission of instructor.* (3) II, S (Kauffman)

190—HISTORY AND SURVEY OF DANCE. The study of the evolution of dance through the cultural periods of history and the correlation of social structure and dance forms. Open also to male students. Three hours per week.

(3) II, S (odd years) (Blanton)

191—RHYTHMICAL FORM AND ANALYSIS. A functional study of rhythm presented in relation to movement. Open also to male students. One hour lecture and recitation, and two hours laboratory.

(2) II (Blanton)

192—DANCE COMPOSITION. Dance choreography, program planning, directing, staging and costuming. Formal program required of all students. Two hours lecture and recitation; four hours lab per week. *Prerequisite: Physical Education 91.*

(4) I (Blanton)

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

240—SEMINAR. Required of all graduate students upon entrance. A review of current literature in the field. Guidance in thesis writing. Two hours per week.

(2) I, II, S (Carr, Hackensmith)

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)

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 (Seaton)

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, Shively)

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 lab.

(3) I, S (Hackensmith)

250—CURRICULUM AND PROGRAM DEVELOPMENT. A study of fundamental principles basic to the development of the overall 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. *Prerequisites: P. E. 140, 143, 144.*

(3) I, S (even years) (Carr)

251—FACILITIES, CONSTRUCTION, AND EQUIPMENT. Principles and standards for maintaining facilities, and planning construction; purchase and care of equipment. *Prerequisite: P. E. 140.*

(2) II, S (odd years) (Seaton)

280—PROBLEMS IN RECREATION. Current problems in recreation are identified and analyzed by the application of appropriate research techniques. Designed recreationists, school people, and community workers.

(2) I, S (Kauffman)

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. *Prerequisite: P. E. 180 or consent of instructor.*

(3) I, S (Kauffman)

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. *Prerequisites: P. E. 90, 91, 190, 195.*

(3) II, S (odd years) (Blanton, Karsner, Lewis)

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:

101—ORIENTATION IN MODERN PHYSICS FOR TEACHERS. Review of fundamentals of Physics. Discussion of problems associated with high school physics teaching. Recent developments in Physics. *Prerequisite: employment as high school science teacher.*

(3) S (Staff)

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. *Prerequisites: Physics 3b, 4b; and Mathematics 20b.*

(4) (Gildart)

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. *Prerequisites: Physics 3b, 4b; and Mathematics 20b.*

(3) (Dardis)

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 spectrographic analysis. *Prerequisites: Physics 3b, 4b; and Mathematics 20b.* (3) (Hanau)

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. *Prerequisites: Physics 3b, 4b; and Mathematics 20b.* (3) (Gildart)

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 operator. *Prerequisites: Physics 3b, 4b; and Mathematics 20b.* (3) (Staff)

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. *Prerequisites: Physics 104 and Mathematics 20b.* (3) (Hanau)

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. *Prerequisites: Physics 3b, 4b; and Mathematics 20b.* (3) (Staff)

120—X-RAY TECHNIQUE. An introductory lecture and laboratory course in X-Ray technique. The course deals with operation of X-ray equipment, and practice in the radiography of the extremities, chest, head, teeth, etc. *Prerequisite: Physics 1b.* (2) (Cochran)

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. *Prerequisites: Physics 3b, 4b; and Mathematics 20b.* (3) (Becker)

123b—HEAT AND THERMODYNAMICS. A continuation of 123a, dealing with thermodynamic functions, thermodynamic equilibrium, the phase rule of phase equilibria, ionic equilibrium, electromotive force and free energy, surface phenomena, radiation. *Prerequisite: Physics 123a or equivalent.* (3) (Becker)

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. *Prerequisites: Physics 3b, 4b; Mathematics 20b.* (3) (Gildart)

125a-d—INDEPENDENT WORK IN PHYSICS. (3 ea.) (Staff)

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 spectrographic methods. *Prerequisite: Physics 110 or 108.* (2) (Hanau)

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. *Prerequisite or corequisite: Physics 111 or equivalent.* (2) (Cochran)

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, plus generators, saw-tooth generators, etc. *Prerequisite or concurrent: Physics 114 or equivalent.* (2) (Staff)

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. *Prerequisite: Physics 155a.* (2) (Cochran)

137—EXPERIMENTAL PHYSICS: HEAT AND SOLID STATE. Thermal and electrical conductance in solids, photoelectric effect, photoresistive effect, rectification, transistor action, diffusion, Hayne's experiment. *Prerequisite: Physics 124.* (2) (Gildart)

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. *Prerequisite: Physics 108.* (2) (Hanau)

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. *Prerequisites: Physics 3b, 4b; Mathematics 20b.* (3) (Kenney)

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. *Prerequisite: Physics 155a.* (3) (Kenney)

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. *Prerequisite: Physics 155b.* (3) (Cochran)

204—CLASSICAL MECHANICS. The methods of Lagrange and Hamilton and their application to particles, systems of particles, and continuous media; variational principles; transformation theory. *Prerequisites: Physics 104; Mathematics 105a.* (3) (Becker)

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. *Prerequisites:* two "100" courses in physics and Mathematics 105a. (3) (Yost)

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. (3) (Staff)

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. *Prerequisites:* Physics 111; Mathematics 105a; and Electrical Engineering 133 or equivalent. (3) (Staff)

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. *Prerequisites:* Physics 111, and either 110 or 155a; and Mathematics 105a. (3) (Hanau)

213—ELECTROMAGNETIC THEORY. A lecture course dealing with the application of classical electromagnetic theory to the optical phenomena of reflection, refraction, polarization, and absorption. *Prerequisites:* Physics 111 and 108; and Mathematics 105a. (3) (Kern)

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. *Prerequisites:* Physics 111 or 114; and Mathematics 105a. (3) (Staff)

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. *Prerequisite:* Physics 217b or equivalent. (3) (Kern)

215b—QUANTUM THEORY. A continuation of 215a 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. *Prerequisite:* Physics 215a or equivalent. (3) (Yost)

217a—THEORETICAL PHYSICS. A course of lectures presenting the basic aspects of theoretical physics in a unified way. Representative topics: advanced dynamics, hydrodynamics, elasticity. *Prerequisites:* two "100" courses in physics; and Mathematics 105a. (4) (Kern)

217b—THEORETICAL PHYSICS. A continuation of 217a, dealing with statistical mechanics, thermodynamics, electrodynamics, relativity, quantum theory. *Prerequisite:* Physics 217a or equivalent. (4) (Kern)

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. *Prerequisites:* Physics 123a, b; and Mathematics 105a. (3) (Kern)

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 ea.) (Senior Staff)

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. *Prerequisites:* Physics 215a or equivalent. (3) (Gildart)

226a, b—RESEARCH IN PHYSICS. (3 ea.) (Senior Staff)

227a, b—RESEARCH IN PHYSICS. (5 ea.) (Senior Staff)

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. *Prerequisites:* Physics 217a or equivalent. (3) (Kern)

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. *Prerequisites:* Physics 215a or equivalent. (3) (Kern)

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. *Prerequisite:* Physics 215a or equivalent. (3) (Cochran)

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. *Prerequisites:* Physics 123b and 217a. (3) (Kern)

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. *Prerequisites:* Physics 217b or equivalent. (3) (Kenney)

500-1, 2, 3—THESIS. A course intended for graduate students who are prepared to undertake special problems. Except in the case of a purely mathematical problem the entire time is to be devoted to work in the laboratory. (0) (Senior Staff)

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 three of the six fields of political science listed below. At least sixteen 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 requires a qualifying examination during the second year of graduate work. Of the total semester hours presented by the candidate at least twelve 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 and International Law and Diplomacy, with the exception in each case of the field in which the candidate writes his dissertation. A minor in a related field may be substituted for two of the six fields of political science, subject to the approval of the other department and of the candidate's committee. Candidates for the doctor's degree in a related department desiring a minor in political science must pass a preliminary examination in two of the six fields of political science. At least six semester hours of the work in political science must be in courses not open to undergraduates. 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

170—POLITICAL PARTIES. An analysis of pressure groups and a discussion of the organization and functions of political parties in the United States. (3) I (Shannon)

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 (Shannon)

179—POLITICAL LEADERSHIP. Investigation and discussion of the relations between leaders and led in politics. (3) II, S (Shannon)

Related Courses in Other Departments

Psychology 104—Social Psychology.

II. Public Administration

140—RURAL LOCAL GOVERNMENT. A study of local government in rural America with particular emphasis upon county government. (3) (Vanlandingham)

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)

177a—INTRODUCTION TO PUBLIC ADMINISTRATION. A study of theories of administration problems of line management and of staff and auxiliary functions, and the problem of administrative responsibility. (3) I, S (Kammerer)

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 (Kammerer)

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 (Kammerer)

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 (Kammerer)

Related Courses in Other Departments

Economics 102—Labor Problems.

Economics 104—Public Finance.

Economics 124—State and Local Taxation.

Economics 130—Labor Legislation

Law 153—Taxation.

Law 167—Administrative Law.

Social Work 100—Public Welfare Administration.

Social Work 130a—Community Organization.

Social Work 151—Public Assistance.

III. Theory

171a—EARLY POLITICAL THEORY. The political theories of Plato and Aristotle, and Roman political thought. Thomas Aquinas, Dante, Christian political thought. (3) I (Shannon)

171b—MODERN POLITICAL THEORY. Study of the writings of Machiavelli, Hobbes, Locke, Burge, Rousseau, Bentham, Mill and Marx. (3) II (Shannon)

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 (Shannon)

202—NATIONAL AND REGIONAL PLANNING. A survey of conditions leading to efforts at planning. A study of the theories and principles of planning; a detailed investigation of the regional life of elected areas. (3) II, S (Shannon)

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 (Shannon)

Related Courses in Other Departments

Philosophy 101a, b—History of Philosophy.

IV. Comparative Government

155a—COMPARATIVE GOVERNMENT — PARLIAMENTARY DEMOCRACIES. A study of the governments of Great Britain and the Dominions, France, and Scandinavia. (3) I, S (Drennon)

155b—COMPARATIVE GOVERNMENT — TOTALITARIAN STATES. A study of the totalitarian states of Europe and Asia. (3) II, S (Drennon)

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 (Vandenbosch)

V. Public Law

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)

159b—AMERICAN CONSTITUTIONAL DEVELOPMENT. Continuation of the above survey from 1870 to the present. (3) II (Trimble)

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 (Kammerer)

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)

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 131a, b—English Constitutional History.

Law 149—Municipal Corporations.

Law 161a, b—Constitutional Law I and II.

VI. International Law and Diplomacy

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 (Staff)

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)

160—AMERICAN FOREIGN RELATIONS. An examination of the chief principles and problems of American policies, the control and conduct of American foreign relations. (3) I, S (Vandenbosch)

165—WORLD POLITICS. A study of the most significant problems of world politics, including the fundamental factors governing international relations, and the conflicting interests in organizing world peace. (3) I, II, S (Vandenbosch)

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)

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)

217—CONTEMPORARY AMERICAN DIPLOMATIC PROBLEMS. An examination of the more important current problems of American foreign policy. (3) I, S (Vandenbosch)

500-1, 2, 3—THESIS.

(0) (Staff)

Related Courses in Other Departments

Economics 127—International Economic Policies.

History 100a, b—The Diplomacy and Foreign Policy of the United States.

History 120—Europe in the Twentieth Century.

History 135a, b—The British Empire.

History 145—Russia since 1900.

History 176—France since 1870.

History 177—Germany since 1870.

History 190a, b—The Far East.

Law 164—Conflict of Laws.

PSYCHOLOGY

The Department's graduate program includes work leading to the master's degree and the Ph.D. degree in the fields of general, clinical, or counseling psychology. 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 26)

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.

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. *Prerequisite: Psychology 1.* (3) I (White)

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. *Prerequisite: Psychology 1.* (4) II (Meyers)

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. *Prerequisite: Psychology 1.* (4) I (Meyers)

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. *Prerequisite: Psychology 1.* (3) I, II (Pattie)

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. *Prerequisite: Psychology 1.* (3) I (Newbury)

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. *Prerequisite: Psychology 1.* (4) II (Newbury)

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. *Prerequisite: Psychology 1.* (2) II (Newbury)

120a-d—INDEPENDENT WORK IN PSYCHOLOGY. Designed for advanced students who undertake minor research problems to be conducted in regular consultation with the instructor. *Prerequisite: major in the Department with a standing of 3.0 in psychology courses.* (2 ea.) I, II, S (Staff)

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. *Prerequisite: Psychology 1.* (3) I (Blanton)

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. *Prerequisite: Psychology 1.* (3) I

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. *Prerequisite: Psychology 7.* (3) II (Estes)

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. *Prerequisite: Psychology 1.* (3) I (Mellenbruch)

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. *Prerequisite: Psychology 1.* (3) II (Mellenbruch)

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. *Prerequisite: Psychology 1.* (3) I, S (Diehl)

130b—SPEECH PATHOLOGY: AN INTRODUCTION TO THERAPY. Observation and discussion of and limited supervised experience with therapeutic techniques and procedures of speech therapy. *Prerequisite: 130a or may be taken concurrently with 130a.* (3) II, S (Diehl)

131—STUTTERING AND ITS CORRECTION. The nature, causes and treatment of stuttering, with emphasis on therapeutic procedures. *Prerequisite: Psychology 130a.* (3) II (Diehl)

132—SPEECH MECHANISMS. A detailed investigation of the speech musculature: respiration, phonation, resonance, and articulation. Voice disorders and cleft palate will be given special emphasis. *Prerequisite: Psychology 130a.* (3) I (Diehl)

133—INTRODUCTION TO CLINICAL AUDIOLOGY. Topics covered are the auditory stimulus, air and bone conduction thresholds, masking, speech audiometry and auditory rehabilitation. *Prerequisite: Psychology 130a.* (3) II (Kodman)

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. *Prerequisite: Psychology 1.* (2) I (Watson)

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. *Prerequisite: Psychology 1, 8.* (3) I, II (Estes, Pattie)

201a—SEMINAR IN PSYCHOLOGY. One two-hour discussion each week on a research problem under investigation by a graduate student or staff member. (1) I, II (Staff)

201b-m—SEMINAR IN PSYCHOLOGY. Continuation of 201a. These numbers are provided for registration in succeeding semesters. (1) I, II (Staff)

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)

203b-h—PROBLEMS IN PSYCHOLOGY. Continuation of research. These numbers are provided for registration in subsequent semesters. (2) I, II, S (Staff)

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. (3) II (White)

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)

210b-h—RESEARCH IN PSYCHOLOGY. Continuation of research. These numbers are provided for registration in succeeding semesters. (3) I, II, S (Staff)

211—MENTAL WORK AND FATIGUE. A laboratory course. Two hours devoted to experiments and two hours discussion each week. *Prerequisite: an advanced course in experimental psychology and elementary statistics, or equivalent.* (3) I

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. *Prerequisite: Psychology 108 or equivalent.* (3) II

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. *Prerequisite: Mathematics 4 or equivalent.* (3) I (Calvin)

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)

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) I, II, S (Blanton)

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)

225—PRACTICE IN TESTING: INTELLIGENCE TESTS. This course provides advanced laboratory practice in the measurement of intelligence by individual techniques. Six hours a week. *Prerequisite: Psychology 150 or equivalent.* (3) I, II (Estes)

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. *Prerequisite: Psychology 8.* (3) II (Mellenbruch)

231a, b—PSYCHOLOGICAL THEORIES. An examination of theories of learning, perception, and personality. The relation of these theories to psychological research will be examined. *Prerequisite: Psychology 108, 113, 222.* (3) I, II (Blanton, Meyers, Modrick)

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. *Prerequisite: Psychology 215.* (3) I (Mellenbruch)

234b—TEST STANDARDIZATION. A continuation of 234a. 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. *Prerequisite: Psychology 234a.* (3) II (Mellenbruch)

235—DIAGNOSIS AND COUNSELING IN COUNSELING PSYCHOLOGY. An advanced course in diagnosis and application of theories, techniques and tools in counseling psychology. *Prerequisite: A graduate major in psychology or education.* (3) II

237—CLINICAL TESTING. Practical experience in the application of clinical diagnostic techniques to a variety of pathological subjects. *Prerequisite: Psychology 225.* (2) I, II

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. *Prerequisite: Psychology 219, 225.* (3) I, II (Dimmick)

252—PSYCHOTHERAPY. Theories and techniques of psychotherapeutic procedures including directive, non-directive, and play therapies. Demonstration and supervised experience in these techniques. *Prerequisite: Completion of one year of graduate study in psychology.* (3) II (Purcell)

253—PSYCHOPATHOLOGY. Problems of differentiation between the various neuroses and psychoses with emphasis upon the affective and conative factors. *Prerequisite: Psychology 114, 231b.* (4) (Dimmick)

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. *Prerequisites: Psychology 108 and 113.* (3) II (Modrick)

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) I

300b—MEDICAL THERAPEUTIC PROCEDURE. This course presents the history, rationale, indications, procedures, and results of psychotherapeutic methods. (1) II

310a—PRACTICUM IN CLINICAL PSYCHOLOGY. Students rotate among five different institutions, including neuropsychiatric hospitals, reformatories, institutes for the feeble-minded, and child guidance clinics. *Prerequisite: Psychology 219, 225, 251a.* (3) I, II (Blanton)

310b-h—PRACTICUM IN CLINICAL PSYCHOLOGY. Continuation of 310a. These numbers are provided for registration in succeeding semesters. (3) I, II (Blanton)

311a-h—PRACTICUM IN COUNSELING PSYCHOLOGY. Supervised experience in application of diagnostic and interviewing techniques in a Counseling Service. (3) I, II, S (Dimmick)

312a—PRACTICUM IN CHILD PSYCHOLOGY. Nine hours of supervised work each week. (3) I, II

312b-h—PRACTICUM IN CHILD PSYCHOLOGY. Continuation of 312a. These numbers are provided for registration in succeeding semesters. (3) I, II

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. *Prerequisite: Psychology 130a, b.* (3) II (Diehl)

431a-p—SPECIAL FIELD PRACTICUM. An intensive course in field work for students working toward the doctorate with a major in clinical psychology. Minimum of twenty hours a week. (1) I, II, S (Dimmick)

500-1, 2, 3—THESIS. (0)

RADIO ARTS

While no advanced degrees are offered at present with a major in Radio Arts, 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, three studio control rooms, library, record room, sound effects room, and complete 16 mm film equipment and editing facilities.

101—RADIO 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)

102—ADVANCED RADIO ANNOUNCING. One recitation or lecture period and two hours laboratory per week. The study of techniques and theory pertaining to specialized radio announcing, news commentating, public events, man-on-the-street, the interview round-table participation and moderation, public forum on the radio, master of ceremonies, concert announcing and intermission comment. *Prerequisite: Radio Arts 2a, or permission of instructor.* (2) (Hallock)

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)

105a—RADIO SCRIPT WRITING. One recitation and two hours laboratory 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.

106a—RADIO PRODUCTION. One recitation and two hours laboratory per week. The fundamentals of radio production, including program planning, casting, rehearsals. Practice in production. (2) (Hallock)

106b—RADIO PRODUCTION. Conferences and laboratory three hours per week. A continuation of 106a. Advanced practice in radio production involving research on assigned projects for radio presentation in educational broadcasts. *Prerequisites: Radio Arts 105a, and 106a, or permission of instructor.* (2) (Press)

110—PROSEMINAR. One recitation per week. Lectures and outside readings devoted to radio and its relation to other communications media from the standpoint of structure, function, process, basic tools of research, control, content, radio as a channel, the audience, and effect. *Prerequisite: permission of instructor.* (1) (Press)

111—CINEMATOGRAPHY. One recitation and two hours laboratory 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. *Prerequisite: consent of instructor.* (2) (Hallock)

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.

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 security legislation. *Prerequisite: two courses in social work.* (3) II (Wetzel)

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. (3) I, S (Theobald)

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. *Prerequisite: two courses in social work or special permission.* (2) I (Gail)

111a-d—INDEPENDENT WORK. Conferences, assigned readings, reports on minor research problems. Open to majors in the department by special permission. (1 ea.) I, II, S (Staff)

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. *Prerequisite: two courses in social work or special permission.* (2) II (Theobald)

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. *Prerequisite: two courses in social work.* (3) I (Wetzel)

122—FIELD OF SOCIAL WORK. Function, method, and philosophy of contemporary social work. The divisions of the field (case work, group work, community organization) and the professional status of social work will be considered. (3) I, II, S (Wilson)

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)

130b—COMMUNITY ORGANIZATION FOR SOCIAL WELFARE. A continuation of 130a with special emphasis on the organization and function of national and international welfare agencies. *Prerequisite: S.W. 130a or permission of instructor.* (3) II (Wetzel)

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)

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. *Prerequisite: S.W. 140a or permission of instructor.* (3) II (Wilson)

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. *Prerequisite (or to be taken concurrently): S.W. 122.* (3) II (Wetzel)

217—GENERIC SOCIAL CASE WORK. An introductory course for graduate students with emphasis upon the application of case work in problems of increasing complexity. *Prerequisite: S.W. 113, or special permission.* (2) II (Theobald)

221—ADVANCED SOCIAL CASE WORK I. An advanced course built around the theoretical aspects of case work problems encountered by the students in their field work, and supplemented by cases presenting other problems. (2) II

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 sociology: The Department of Sociology in the College of Arts and Sciences and the De-

partment 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 Consultation Service, offering professional assistance in studies and surveys.
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.

101—SOCIAL DEPENDENCY. A study of poverty and social dependence and of measures for their alleviation and reduction, with special attention to present private and public activities in this direction, including social insurance. (3) I

102—SOCIAL PATHOLOGY. A systematic examination of the various types of social disorganization, with particular emphasis upon the sociological explanation of underlying factors. *Prerequisite: one sociology course.* (3) II (Ball)

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 measures for the prevention of crime. (3) I, II, S (Kaplan)

104—SOCIAL PSYCHOLOGY. (Same as Psychology 104) Description and explanation of social phenomena in terms of the original and acquired reaction systems of the individual. Topics given special attention: crowds, mob behavior, propaganda, and nationalism. *Prerequisite: Psychology 1a, b.* (3) I, II, S (White)

105—SOCIAL THEORY: PLATO TO COMTE. The social theories of representative social thinkers, together with a brief study of their lives and the time in which they lived. Extensive reading of their works. *Prerequisite: one sociology course.* (3) I

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 (Sutton)

107—COMPARATIVE SOCIOLOGY. A study of the dynamics of culture as shown in a primitive, a peasant, and a modern culture system. (3) I (Sanders)

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. *Prerequisite: two sociology courses.* (3) I, II, S (Gladden)

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. *Prerequisite: Sociology 109a or permission of instructor.* (3) I, II, S (Gladden)

114a-d—INDEPENDENT WORK. Study of some special topic by duly authorized students. For sociology majors only. (1 ea.) I, II, S (Staff)

121—POPULATION PROBLEMS. A study of movements and trends in population, with respect to race, age, birth-rates, etc. *Prerequisite: Sociology 124 or its equivalent.* (3) I

122—CONTEMPORARY SOCIOLOGICAL THEORY. A study of the leading developments in sociological theory and methodology from Comte to the present time. *Prerequisite: two sociology courses.* (3) II (Anderson)

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. *Prerequisite: one sociology course.* (3) I (Ball)

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. *Prerequisites: one sociology and one economics course.* (3) I (Sutton)

127—SOCIAL CLASSES. A systematic treatment of the factors underlying differentiation and stratification, with particular attention to caste and class; social mobility in American society. *Prerequisite: one sociology course.* (3) I (Anderson)

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. *Prerequisite: senior standing of social science majors; others by arrangement.* (3) II, S (Anderson)

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)

130—SOCIAL SYSTEMS. A study of the different social systems, including experimental communities that have been proposed or attempted in human society from the earliest times to the present. (3) S

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 132a, b) (3 ea.) S

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. Lectures, 3 hours (Same as Anthropology 142). (3) (Essene)

164—THE BALKANS: THE STUDY OF A PEASANT SOCIETY. A description of the basic social structure of the Balkan region and an analysis of the social changes occurring in the peasant way of life. Countries covered are Albania, Bulgaria, Greece, Rumania, and Yugoslavia. (3) II, S (Sanders)

170—THE CITY. 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. *Prerequisite: an introductory sociology course or with approval of instructor.* (3) II (Sutton)

201a, b—SOCIOLOGY SEMINAR. Consideration mainly of methods of research and of current sociological literature. (2 ea.) I, II, S (Staff)

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 special reading under supervision. (1) I, II, S (Staff)

205a, b—SEMINAR IN SOCIAL PSYCHOLOGY. (Same as Psychology 205a-b) 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. (3 ea.) II

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) II (Gladden)

224—MINORITY GROUPS. A sociological scheme of analysis is applied to the special problems of adjustment arising from ethnic group relations and culture contracts. (3) I (Coleman)

225—SYSTEMATIC SOCIOLOGY. An intensive study of certain selected sociological theorists such as Weber, Durkheim, Simmel, Pareto, and others. (3) I (Sanders)

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) II (Gladden)

230—EDUCATIONAL SOCIOLOGY. (Same as Education 230.) A course in the sociological foundations of education. (3) II, S (Hartford)

260—PROBLEMS IN EDUCATIONAL SOCIOLOGY. An advanced course in the application of sociological findings to education, including consideration of southern regional problems and potentialities. *Prerequisite: 12 semester hours of graduate work including Education 230 or equivalent.* (Same as Education 260.) (3) S

500-1, 2, 3—THESIS. (0) I, II, S (Staff)

RURAL SOCIOLOGY (See Agriculture)

ZOOLOGY

101—MICROTECHNIQUE. A course in the technique of preparation of animal tissues for microscopic study. Practice in imbedding, staining, sectioning, mounting, and identification of tissues. *Prerequisite: Zoology 1.* (4) I, II, S (Brauer)

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. *Prerequisite: Zoology 1.* (4) II, S (Barbour)

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 arthropod classes. *Prerequisite: Zoology 1.* (3) I

103b—GENERAL ENTOMOLOGY. Continuation of 103a. 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. *Prerequisite: Zoology 103a.* (3) II

104—HISTOLOGY. Histology of the organs. A continuation of Courses 101 in which the studies are based on the organs and special attention given to pathology. *Prerequisite: Zoology 101.* (3) I, II, S (Brauer)

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. *Prerequisite: Zoology 1.* (4) I, S (Edney)

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. *Prerequisite: Zoology 1.* (4) II, S (Brauer)

107—HEREDITY. Lectures and laboratory on principles of heredity, variation and eugenics. *Prerequisite: Zoology 1.* (3) I, S (Carpenter)

108—EVOLUTION. An advanced lecture course on some of the fundamental principles of organic evolution. *Prerequisite: Zoology 1.* (3) II, S (Carpenter)

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. *Prerequisite: Zoology 21 or consent of instructor.* (3) I (Barbour)

110a-f—INDEPENDENT WORK. Special problems for individual students who are capable of pursuing independent investigations. For Zoology Majors. (3 ea.) I, II, S (Staff)

111—ADVANCED MICROTECHNIQUE. Special methods in histological technique for students of Zoology, Pathology or Anatomy. *Prerequisite: Zoology 101, 102.* (3) I, II, S (Brauer)

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. *Prerequisite: Zoology 1.* (4) I

114a-f—ZOOLOGICAL SEMINAR. Reports on: technical papers in scientific journals, book review, recent developments in Zoology, scientific meetings. Required of all majors in Zoology. (1 ea.) I, II (Staff)

117—MEDICAL PROTOZOOLOGY. The etiology, epidemiology, pathology, diagnosis, prophylaxis and control of parasitic protozoa, with special emphasis on life cycles and detailed studies of the protozoan parasites of man. Given alternate years. *Prerequisite: Zoology 105 or consent of instructor.* (4) II, S (Edney)

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. *Prerequisite: Zoology 105 or consent of instructor.* (4) II, S (Edney)

123—MEDICAL ENTOMOLOGY. Study of Arthropod vectors of disease. Structure, collection, identification, control measures and life history studies. Given alternate years. *Prerequisite: Zoology 105 or consent of instructor.* (4) I, S (Edney)

126—SPECIATION. Mechanisms of Evolution. A discussion of modern theories and problems concerning the formation of animal and plant species. Three hours per week. *Prerequisite: Zoology 108.* (3) I, II (Carpenter)

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. *Prerequisite: Zoology 1.* (4) II (Barbour)

141—MAMMALOLOGY. Designed to acquaint the student with the mammals of eastern North America, their taxonomy, adaptations and natural history. Given alternate years. *Prerequisite: Zoology 1.* (4) I (Barbour)

157—INVERTEBRATE ANATOMY. An advanced course on the comparative anatomy of invertebrate animals with special attention paid to phylogeny, organology, and taxonomy. *Prerequisite: Zoology 1.* (4) I (Brauer)

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. *Prerequisite: Zoology 27 or 106.* (3) I (Brauer)

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 conclusions. Progress reports required at intervals.

202a-d—PROBLEMS IN ORNITHOLOGY. (3) I, II, S (Barbour)

205a-d—PROBLEMS IN PARASITOLOGY. (3) I, II, S (Edney)

206a-d—PROBLEMS IN EMBRYOLOGY AND HISTOLOGY. (3) I, II, S (Brauer)

209a-d—PROBLEMS IN ECOLOGY. (3) I, II, S (Barbour)

212a-d—PROBLEMS IN ICHTHYOLOGY. (3) I, II, S

216a-d—PROBLEMS IN SPECIATION. (3) I, II, S (Carpenter)

221a-d—PROBLEMS IN HERPETOLOGY & MAMMALOLOGY. (3) I, II, S (Barbour)

500-1, 2, 3—THESIS. *Prerequisites: the bachelor's degree in Zoology, permission of instructor and evidence of capacity for research.* (0) (Staff)

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 in economics and business, including completion of the following courses or their equivalent:

Principles of Economics	3 hrs.
Principles of Accounting	6 hrs.
Principles of Marketing	3 hrs.
Labor Economics	3 hrs.
Money and Banking	3 hrs.
Statistical Method	3 hrs.
Corporation Finance	3 hrs.
Business Law	6 hrs.
Industrial Management	3 hrs.

3. Admission to study for the degree requires the completion of 27 semester hours of the foregoing courses. The remaining courses, if numbered above 100, may be taken during graduate study and presented as electives toward the 30 semester-hour course requirement. The candidate is not eligible for the M.B.A. degree until he has completed all of the foregoing courses in either undergraduate or graduate study.
4. A minimum of 18 semester hours must be presented in courses numbered 200 or above. The remaining 12 required hours may be taken in any approved courses numbered 100 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:

200—Business Economics	3 hrs.
237—Advanced Business Management	3 hrs.
256—Research and Report Writing	3 hrs.
An advanced course in Accounting	2 or 3 hrs.
Two of the following courses:	6 hrs.
217—Corporate Financial Policy (Econ. 211, Adv. Money & Banking, may be offered to meet the finance course requirement.)	
238—Production Management	
255—Adv. Personnel Management	
260—Adv. Marketing Management	
Electives	13 or 12 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 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 Degree of Master of Science

In addition to the general regulations of the Graduate School, the candidate for the master's degree in economics or commerce must satisfy departmental requirements as outlined below.

He must have a knowledge of course material in accordance with the following distribution:

- (1) The fundamentals of economic history.
- (2) Advanced economic theory which for economics majors must include both current economic theory and its historical development, while for commerce majors it may be confined to modern or current theory.
- (3) A knowledge of elementary statistics.
- (4) A knowledge of introductory accounting.
- (5) Knowledge of a reasonable range of institutional economics courses which must include money and banking and public finance and two additional fields, for example, labor and public utilities for economics majors, or marketing and management for commerce majors.

With the advice and consent of the Director of Graduate Study and the dean, the student may modify the requirement as to the spread of institutional courses in economics and commerce.

The student's major and minor fields in terms of courses must be approved by the Director of Graduate Study.

A thesis must be written in the student's field of major interest.

The student must acquire at least one semester hour in the economics seminar which is to be taken preferably during the second half of his residence period. By this time he will be ready to begin on his thesis and report at intervals before the seminar.

The candidate must pass a written comprehensive examination on the range of subject matter and an oral examination on the thesis.

The Doctor's Degree with a Major in Economics

Before taking the qualifying examination through which the student secures the status of a candidate for the degree of Doctor of Philosophy as required by the regulations of the Graduate School, it is expected that the student will have met the requirements for the master's degree as to general distribution of course material or the substantial equivalent.

The scope of the qualifying examination will include a comprehensive written test of the student's ability to deal with economics materials and will cover the following classes of subject matter: (1) elementary accounting, statistics, and economic history; (2) advanced economic theory; (3) four other fields in economics or in business; (4) a minor subject closely related to economics, such as business administration, political science, agricultural economics, or sociology.

If the student has passed an examination covering the range of course

material required for the master's degree, with the approval of his special committee, the examination need not include the subjects in class one.

The oral part of the examination 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:

Economic theory: Economics 110, 115, 203, 204, 218a, b; and Farm Econ. 202a, b, 203.

Economic history: Economics 125, 134, 147 and 148.

Statistics: Economics 107, 150 and 210; Commerce 149, 171 and 172; Math. 120; and Psy. 215.

Private Finance: Economics 105, 154, 209, 211; Commerce 117, 129, 131, 160, 217, 231.

Public Finance: Economics 104, 124, 206a, b, 207a, b, 285; Commerce 133 and 159; Law 153, 161; and Political Science 177a, b.

Industrial relations: Economics 102, 130, 155, 166, 255; Law 180; Psychology 127; and Political Science 177b.

Utilities and transportation: Economics 103 and 126; and Law 150, 161.

Accounting: Commerce 108, 113, 118, 129, 132a, b, 133, 146, 159, and 222.

Industrial management: Commerce 118, 137, 138, 139, 145 and 237; Economics 155; and Psychology 127.

Marketing: Commerce 119, 136, 140, 141, 149 and 260; Economics 127; and Ag. Econ. 101.

Risk and risk bearing: Commerce 143 and 144; Economics 200; and Law 145.

Normally two or three courses should represent the minimum level of achievement in each field covered by the qualifying examination, and economic theory should include a course in business cycles.

Of the total semester hours presented by the candidate for the degree not less than fifteen semester hours must represent courses and seminars numbered 200 and above.

DESCRIPTION OF COURSES

COMMERCE

101a-c—SECRETARIAL JOB TRAINING. This course is designed to provide laboratory and office experience for senior secretarial students. *Prerequisite*: Commerce 14b. (1 ea.) I, II (Thomas)

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. *Prerequisite*: Commerce 96b. (2) I (Haun)

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 and Lewis)

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. *Prerequisite*: Commerce 96b. (3) II (Beals)

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. *Prerequisite*: Economics 52 and Commerce 7b. (3) I, II (Pickett)

118—COST ACCOUNTING. The place of cost accounting in the general field of accounting, special records and cost statistics, and application to particular businesses. *Prerequisite*: Commerce 7b. (3) I (Beals)

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. *Prerequisite*: Commerce 60. (3) II (McIntyre)

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. *Prerequisite: Commerce 118.* (3) II (Beals)

129—CREDIT AND STATEMENT ANALYSIS. The theory underlying credit-granting; credit administration; analysis and interpretation of financial statements. *Prerequisite: Commerce 7a.* (2) I (Haun and Beals)

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. *Prerequisite: Economics 52.* (3) II (Pickett)

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. *Prerequisite: Commerce 96b.* (3 ea.) I, II (Haun and Beals)

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. *Prerequisite: Commerce 96b.* (3) II (Haun)

136—SALES MANAGEMENT. The case method is used, supplemented with outside reading and written reports. *Prerequisite: Commerce 60.* (3) I (McIntyre)

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 and Haynes)

138—CASES IN MANAGEMENT. Emphasizes production, plant layout, wage payments, personnel management, production control, and related problems. *Prerequisite: Commerce 137.* (3) II (Haynes)

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. *Prerequisite: Economics 52.* (3) II (Coolsen)

140—PROBLEMS IN ADVERTISING. A study of specific problems confronted by the marketing executive in the use of advertising as a selling tool, and of the general economic effects of advertising. *Prerequisite: Commerce 62.* (2) I (McIntyre)

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. *Prerequisite: Economics 52.* (3) I (Coolsen)

143—LIFE INSURANCE. Economics of life insurance; organization and control; special forms of life insurance; fundamental principles of rate-making. *Prerequisite: Economics 52.* (3) I (Hargreaves)

144—PROPERTY AND CASUALTY INSURANCE. Public control; nature of contracts; analysis of reserve functions and rate-making processes. *Prerequisite: Economics 52.* (3) II (Pickett)

145—OFFICE MANAGEMENT. Planning and scheduling of work; employment procedures; supervision of employees, re-training, promotion; equipment. (3) II (Speck)

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. *Prerequisite: Commerce 96b.* (3) II (Grady)

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. *Prerequisites: Commerce 60 and a course in statistics.* (3) I (Coolsen)

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 (Speck)

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. *Prerequisite: Commerce 7b.* (2) II (Beals)

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)

170—CONTROLLERSHIP. The organizational position of the Comptroller, his functions and objectives; his methods and procedures. *Prerequisites: Commerce 96a and 118.* (3) I (Haun)

171—STATISTICAL QUALITY CONTROL. Elementary probability theory, control charts, acceptance sampling plans including single, double and sequential sampling. (2) I (Christian)

172—SAMPLING TECHNIQUES. Application of sampling theory and significance testing in economic research, practical problems in sample design. (2) II (Christian)

175—PUBLIC UTILITY ACCOUNTING. Accounting problems peculiar to public utilities, especially as to (1) large investment in plant, (2) volume of transaction with customers and (3) accounting requirements of regulatory bodies. (2) I (Beals)

177a—COLLEGE BUSINESS MANAGEMENT. Elements of management organization, budgetary procedure, financial accounting, procurement techniques and property manage-

ment as applied in the business administration of colleges. (2) S (Peterson)

177b—COLLEGE BUSINESS MANAGEMENT. Elements of personnel management, public relations, investments and finance as related to college business management. (2) S (Peterson)

177c—COLLEGE BUSINESS MANAGEMENT. Case problems in plant operation, purchasing, insurance, bookstore operation and legal aspects of college management. (2) S (Peterson)

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)

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. *Prerequisite: Commerce 133.* (3) II (Haun)

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. *Prerequisite: appropriate undergraduate courses in accounting and finance.* (3) II (Pickett)

237—ADVANCED BUSINESS MANAGEMENT. A functional study of business management. Control devices and procedures for carrying out and testing policies. (3) II (Haynes)

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 (Haynes)

260—ADVANCED MARKETING MANAGEMENT. A critical study of significant trends, controversial issues and advanced techniques in the fields of marketing. (3) II (Coolsen)

ECONOMICS

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. *Prerequisite: Economics 52.* (3) I (Carter)

103—TRANSPORTATION. Railway, waterways, highways, airways. Rates, services, management, regulation. *Prerequisite: Economics 52.* (3) I (Tolman)

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. *Prerequisite: Economics 52.* (3) I (Martin and Sullivan)

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. *Prerequisite: Economics 52.* (3) I, II (Masten)

107—STATISTICAL METHOD. Introduction to the sources of business data, the use of calculating machinery, tabulation, simple charts and graphs, the averages, dispersion, correlation, and time series analysis. (3) I (Christian and Stroup)

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. *Prerequisite: Economics 52.* (3) I, II (Haynes)

112a-f—INDIVIDUAL WORK IN ECONOMICS. Students confer individually with the instructor. (1 ea.) I, II (Staff)

115—VALUE AND DISTRIBUTION THEORY. The major emphasis is on current theory. (3) I (Sullivan)

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)

125—EVOLUTION OF ECONOMIC INSTITUTIONS. The rise of economic institutions such as property rights, capital formation, contractual labor, *et cetera.* *Prerequisite: Economics 2 or permission of instructor.* (3) II (Jennings)

126—ECONOMICS OF PUBLIC UTILITIES. Growth and development of public utilities; valuation; rate-making; financing; the holding company; regulation; current problems; accounting. *Prerequisite: Economics 52.* (3) I (Haynes)

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. *Prerequisite: Economics 52.* (3) II (Sullivan)

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. *Prerequisite: Economics 52.* (3) II (Carter)

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 (Jennings)

147—AMERICAN BUSINESS LEADERS. Biographical sketches of a selected list of men including their business achievements and their relationships to the economic and social

- life of their time. *Prerequisite: Economics 3 or permission of instructor.* (2) I (Jennings)
- 148—EUROPEAN BUSINESS LEADERS. Biographical sketches of a selected list of men including their business achievements and their relationships to the economic and social life of their time. *Prerequisite: Economics 2 or permission of instructor.* (1) II (Jennings)
- 150—ADVANCED BUSINESS AND ECONOMIC STATISTICS. Advanced time series analysis, multiple and partial correlation, elementary analysis of variance and experimental design. (3) II, S (Stroup)
- 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. *Prerequisite: Economics 52.* (3) II (Pickett)
- 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. *Prerequisite: Economics 52.* (3) II (Carter)
- 160—BUSINESS COMBINATIONS. Forms of combination; the problem of monopoly; federal and state anti-trust legislation and court decision. *Prerequisite: Economics 52.* (2) II (Tolman)
- 165—COMPARATIVE ECONOMIC SYSTEMS. A study of capitalism, socialism, fascism, communism and cooperation, with attention to current experiments in economic planning. *Prerequisite: Economics 52.* (3) I (Masten)
- 166—PERSONNEL PROBLEMS. A case course in the problems of supervision of employees, and the personnel policies which promote productive efficiency. *Prerequisite: Economics 155.* (2) II (Carter)
- 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 (Johnson)
- 186—ECONOMIC RESEARCH. The sources, uses and application of statistical information in the analysis of economic problems. *Prerequisite: Econ. 52 and Econ. 107.* (3) II (Stroup)
- 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)
- 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 ea.) I, II (Carpenter)
- 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. *Prerequisite: Economics 52.* (3) I (Hargreaves)
- 204—SURVEY OF ECONOMIC THEORY SINCE THE AUSTRIAN SCHOOL. This course is virtually a continuation of course 203. (3) II (Hargreaves)
- 206a—MUNICIPAL FINANCE. City and county budget and related problems are studied in reports and seminar. (2) I (Martin)
- 206b—MUNICIPAL FINANCE. City and county debt, purchasing, treasury, and revenue problems are studied in reports and seminar. (2) II (Martin)
- 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)
- 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 (Carpenter)
- 210—RESEARCH STATISTICS. 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. *Prerequisite: an elementary course in statistics.* (2) II (Stroup)
- 211—ADVANCED MONEY AND BANKING. A theoretical study of contemporary money and banking institutions with emphasis on central bank functions. (3) II (Masten)
- 212a-f—RESEARCH PROBLEMS IN ECONOMICS. Students confer individually with the instructor. (1 ea.) I, II (Staff)
- 218a, b—ECONOMIC THEORY. An intensive course covering the whole field of contemporary economic theory and the various analytical techniques used therein. *Prerequisite: Economics 52.* (3 ea.) I, II (Haynes)
- 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)
- 256—RESEARCH AND REPORT WRITING. Investigations of business problems: sources, procedures, analysis, and presentation. (3) I (Haynes)
- 285—GOVERNMENT FINANCE ADMINISTRATION. Government budget; accounting, debt, purchasing, treasury, revenue, 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)

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 15-17, 22-27 of this Bulletin. In addition, two other requirements are prescribed by the College of Education for all doctoral candidates. First, students must be in full-time residence for at least one regular semester, and preferably one full year, during the course of their work at the University. Second, 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. 26)

(For information concerning the doctoral program in Counseling and Guidance, see p. 26)

There are two plans of work leading toward the degree of Master of Arts 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 200 or higher.
4. At least 12 semester hours must be outside the field of education. This regulation does not apply to those persons majoring in the field of educational administration. (Note: This requirement is effective for all students entering the Graduate School the Second Semester 1954-55 or after and for all students after September 1, 1957.)
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. Written final examinations will be required of all candidates for the degree of Master of Arts in Education. In certain instances the oral examination may also 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 200 or higher.
4. At least 12 semester hours must be outside the field of education. This regulation does not apply to those persons majoring in the field of educational administration. (Note: This requirement is effective for all students entering the Graduate School the second semester 1954-55 or after and for all students after September 1, 1957.)
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. Written final examinations will be required of all candidates for the degree of Master of Arts in Education. In certain instances the oral examination may also 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 Cierley, Harris, Moore

Secondary Teachers

General Hartford, Sorenson, Adams, Cierley, Ogletree

Agriculture Hammonds, Binkley

Art Cierley, Haines, Amyx

Business Education	Musselman, Thomas, Humphreys
Home Economics	Parker, Gorman
Industrial Education	Baker
Music	Cierley, Worrel, Stein
Physical Education	Seaton, Clay, Carr, Adams
Elementary Principal	Harris, Moore, Eckel
Secondary Principal	Meece, Eckel, Albright, Adams, Ogletree
Guidance Counselors	Elton, Hartford, McDaniel, Sorenson
Supervisor	Adams, Albright
Attendance Officer	Meece, Eckel, Albright
Superintendent	Meece, Eckel, Albright

Suggested Graduate Curricula

	Semester Hours
<i>For Superintendents</i>	
Ed 200a, b Philosophy of Education	3
Ed 201 Foundations in Education	5
Ed 202 Local School Administration	3
Ed 203 Constitutional and Legal Basis of Public School Administration	3
Ed 207 School Buildings and Equipment	3
Ed 212 The Elementary School	3
Ed 213 State School Administration	3
Ed 214 The Secondary School	3
Ed 220 Comparative Education	3
Ed 225 Supervision of Instruction	3
Ed 227 Principles of Curriculum Construction	3
Ed 229 The Elementary Principal	3
Ed 230 Educational Sociology	3
Ed 231 Business Administration and Finance of Public Education	3
Ed 232 High School Administration	3
Ed 255a Guidance and Counseling in Today's Schools	3
<i>For Principals</i>	
Ed 201 Foundations in Education	5
Ed 212 The Elementary School	3
Ed 214 The Secondary School	3
Ed 225 Supervision of Instruction	3
Ed 227 Principles of Curriculum Construction	3
Ed 229 The Elementary Principal	3
Ed 232 High School Administration	3
Ed 255a Guidance and Counseling in Today's Schools	3
<i>For Supervisors and Helping Teachers</i>	
Ed 201 Foundations in Education	5
Ed 202 Local School Administration	3
Ed 212 The Elementary School	3
Ed 214 The Secondary School	3
Ed 225 Supervision of Instruction	3
Ed 227 Principles of Curriculum Construction	3
Ed 229 The Elementary Principal	3
Ed 232 High School Administration	3
<i>For Guidance Counselors</i>	
Education (Required):	
*Ed 223 Educational Statistics	3
Ed 227 Principles of Curriculum Construction	3
Ed 230 Educational Sociology	3
Ed 255a, b Guidance and Counseling in Today's Schools	3 ea.
Education (Electives):	
Ed 122 Educational Tests and Measurements	3
Ed 254 Problems in Educational Psychology	3
Psychology (Required):	
Psy 150 Psychological Testing	3
*Psy 215 Psychometrics	3
Psy 225 Practice in Testing: Intelligence Tests	3
Psy 311 Practicum in Counseling Psychology	3

* Only one required.

Psychology (Electives):

Psy 114	Abnormal Psychology	3
Psy 121	Counseling Psychology	3
**Psy 124	Mental Hygiene	3
Psy 125	Experimental Child Study	3
**Psy 226	Psychological Measuring Instruments	3

For Critic Teachers on the Elementary Level

Ed 201	Foundations in Education	5
Ed 212	The Elementary School	3
Ed 224	Organization and Supervision of Student Teaching	3
Ed 225	Supervision of Instruction	3
Ed 227	Principles of Curriculum Construction	3
Ed 229	The Elementary Principal	3

For Critic Teachers on the Secondary Level

Ed 201	Foundations in Education	5
Ed 214	The Secondary School	3
Ed 224	Organization and Supervision of Student Teaching	3
Ed 225	Supervision of Instruction	3
Ed 227	Principles of Curriculum Construction	3
Ed 232	High School Administration	3

For High School Teachers Majoring in Education

Ed 201	Foundations in Education	5
Ed 214	The Secondary School	3
Ed 227	Principles of Curriculum Construction	3
Ed 254	Problems in Educational Psychology	3
Ed 255a, b	Guidance and Counseling in Today's Schools	(each) 3

For Elementary Teachers Majoring in Education

Ed 201	Foundations in Education	5
Ed 212	The Elementary School	3
Ed 227	Principles of Curriculum Construction	3
Ed 229	The Elementary Principal	3
Ed 254	Problems in Educational Psychology	3

For Music Majors

Ed 201	Foundations in Education	5
Ed 242	Administration and Supervision of Public School Music	3
Ed 243	Advanced Methods and Materials in Music Education	2
Ed 253	History and Philosophy of Music Education	2
Ed 254	Problems in Educational Psychology	3

For Business Education Majors

Ed 201	Foundations in Education	5
Ed 208a	Problems in Business Education	3
Ed 255a	Guidance and Counseling in Today's Schools	3
Ed 256	The Social Business Subjects in High School	3
Ed 257a	Seminar in Business Education	3
Ed 259	The Commerce Curriculum	3
Ed 271	Administration and Supervision of Business Education	3

For Agricultural Education Majors

Ed 201	Foundations in Education	5
Ed 214	The Secondary School	3
Ed 227	Principles of Curriculum Construction	3
Ed 280	Method in Teaching Vocational Agriculture	3
Ed 287b	Selecting Teaching Materials	3
Ed 287c	Adult-Farmer Schools	3
Ed 287d	Directing Farm Practice	3
Ed 287f	Young-Farmer Schools	3

For Home Economics Education Majors

Ed 261	Supervision in Home Economics Education	3
	(For Supervision of Student Teachers)	
Ed 263	Current Problems in Home Economics Education	3
Ed 264	Modern Trends in Home Economics Education	3
Ed 268	Home Economics Curriculum Construction	3
Ed 269	Evaluation in Home Economics Education	3
Ed 265 or 222	Research in Home Economics Education	3

For Industrial Education Majors

Ed 171a, b	Principles and Philosophy of Industrial Education	(each) 3
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** Strongly recommended as first electives in Psychology.

Ed 123	Vocational Guidance	3
Ed 183a, b	Methods in Industrial Education	(each) 3
Ed 134	Organization and Operation of Part-Time and Evening Classes	3
Ed 214	The Secondary School	3
Ed 201	Foundations in Education	5
Ed 232	High School Administration	3
Ed 227	Principles of Curriculum Construction	3

GRADUATE COURSES IN EDUCATION

DIVISION OF ADMINISTRATION

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 (Eckel)

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

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 (Meece)

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. *Prerequisites: Education 202, 213, or 232.* (3) II, S (Meece)

207—SCHOOL BUILDINGS AND EQUIPMENT. Measurement and evaluation of existing school building facilities, planning new buildings, determining suitable equipment, and financing the building program. *Prerequisite: Education 202 or its equivalent.* (3) Eckel

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 (Albright)

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)

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 (Albright and Meece)

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. *Prerequisites: Education 202 and 225.* (3) II, S (Meece, Adams, Eckel, and Albright)

229—THE ELEMENTARY PRINCIPAL. Problems involved in the organization and administration of a modern elementary school. (3) I, S (Harris and Moore)

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 (Meece)

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 (Eckel and Albright)

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) (Albright)

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) (Trabue)

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) (Meece)

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 (Mills)

301a, b—RESEARCH PROBLEMS IN EDUCATIONAL ADMINISTRATION. An independent research course for the study of special problems in educational administration. *Prerequisites: one year of graduate work.* (3) I, II, S (Meece and Albright)

321a, b—RESEARCH PROBLEMS IN HIGHER EDUCATION. An independent research course for the study of special problems in higher education. *Prerequisites: one year of graduate work.* (3) I, II, S (Trabue)

DIVISION OF FOUNDATIONS OF EDUCATION

119—THE ELEMENTARY SCHOOL PUPIL. The psychology of the child in the primary and intermediate grades. *Prerequisite: one course in psychology.* (2) I, S (Sorenson)

122—EDUCATIONAL TESTS 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)

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 132a, b) (3) S (Staff)

147—THE SECONDARY SCHOOL PUPIL. The psychology of the pupil in junior and senior high school. *Prerequisite: one course in Psychology.* (2) II, S (Sorenson, Reed, Van Horne, Adams)

148—EDUCATIONAL PSYCHOLOGY. Application of psychology to the problems of learning and teaching. (3) I, II, S (Sorenson)

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 (Adams)

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 (Sorenson, Elton)

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. *Prerequisite: 12 semester hours in education.* (3) I, II (Hartford)

201—FOUNDATIONS IN EDUCATION. An intensive study in various fields which contribute to the development of educational theory and practice. (5) I, S (Hartford and Staff)

205—REVIEW OF CURRENT EDUCATIONAL LITERATURE. An extensive study of current educational literature as found in educational periodicals. *Prerequisite: 12 semester hours in education.* (3) II, S (Hartford)

217—GENERAL HISTORY OF EDUCATION. A survey of the history of education from the Greek period to the present. (3) (Hartford)

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)

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)

220—COMPARATIVE EDUCATION. Comparisons of modern national systems of education. (3) II, S (Hartford)

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. *Prerequisite: 12 semester hours in education.* (3) II (Sorenson)

223—EDUCATIONAL STATISTICS. A non-mathematical study of the applications of statistical and graphical methods to educational data. (3) I (Sorenson)

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 (Hartford and Staff)

230—EDUCATIONAL SOCIOLOGY. A course in sociological foundations of education. (3) II, S (Hartford)

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)

241a, b—SEMINAR IN FOUNDATIONS OF EDUCATION. A critical study of selected problems in the foundations of education areas. (3) S (Hartford)

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 200a, b, 219, and 230. (3) I, II, S (Hartford)

254—PROBLEMS IN EDUCATIONAL PSYCHOLOGY. A critical survey of the psychological theories and research applicable to educational practices. *Prerequisite: one year of psychology.* (3) II, S (Sorenson)

255a, b—GUIDANCE AND COUNSELING IN TODAY'S SCHOOLS. A course for those concerned with an effective program of guidance; deals with principles and techniques for the formulation and evaluation of a complete guidance program including inventories, counseling, placement, and follow-up. (3) S (Elton)

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 122, 147, or 254. (3) I, II, S (Sorenson, Elton, McDaniel)

260—PROBLEMS IN EDUCATIONAL SOCIOLOGY. An advanced course in the application of sociological findings to education including consideration of Southern regional problems and potentialities. *Prerequisites:* 12 semester hours of graduate work including Education 230 or equivalent. (3) S (Hartford)

275—ADVANCED PROBLEMS IN PHILOSOPHY OF EDUCATION. A critical study of philosophical problems which relate to present day education. *Prerequisites:* teaching experience and 6 semester hours in philosophy of education. (3) (Hartford)

DIVISION OF INSTRUCTION

Business Education

104—FOUNDATIONS OF BUSINESS EDUCATION IN THE HIGH SCHOOL. The origin, status, and objectives of business education in the secondary school. Required of business education majors. (3) I (Musselman)

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)

158b—TEACHING BOOKKEEPING AND ACCOUNTING. Methods, materials, and techniques used in the teaching of bookkeeping and accounting. (3) I, S (Musselman)

184—TEACHING OFFICE APPLIANCES. Methods and materials used in teaching the various office appliances. Dictating machines, mimeographs, mimeoscopes, addressing machines, filing devices, calculating machines, and other office appliances are used. (2) II, S (Musselman)

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. (2) II, S (Musselman)

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)

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)

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)

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)

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)

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)

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)

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)

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)

Curriculum and Instruction

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 (Cierley)

127—THE ELEMENTARY CURRICULUM. The philosophy and techniques of curriculum construction and some practical work in construction. (3) (Harris and Moore)

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)

175j-z—MODERN EDUCATIONAL PROBLEMS. A brief survey of some of the problems in modern education. (3) (Staff)

176—THE JUNIOR HIGH SCHOOL. A study of the junior high school age pupil, the Curriculum, current problems, and administration of the modern junior high school. (3) I, II, S (Staff)

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 (Staff)

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)

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 (Cierley)

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 programs. (3) II, S (Adams)

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)

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)

234—PROBLEMS OF CURRICULUM MAKING. The selection of materials in the elementary and secondary fields, types of units used in modern instruction, and the various educational agencies that may be used to make the school a real community center. (3) I (Musselman, Moore)

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 (Staff)

246—MOTION PICTURES IN EDUCATION. The history of the educational motion picture, technique in the use of films, educational scenario writing, grading and scoring films, and motion picture appreciation. (3)

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 (Staff)

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 (Adams, Ogletree)

305a, b—RESEARCH PROBLEMS IN CURRICULUM AND SUPERVISION. An independent research course. Students confer individually with the instructor. *Prerequisite: one year of graduate work.* (3) I, II (Adams, Ogletree)

Elementary Education

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. (2) II (Haines)

141—PROBLEMS IN DIAGNOSTIC AND REMEDIAL READING. Prevention, diagnosis and corrective measures for reading difficulties. Study of investigations and literature in this field. (3)

172—THE TEACHING OF READING. A study of major factors in learning to read. Objectives, readiness, abilities needed for silent and oral reading. Methods of word attack, diagnostic and corrective techniques. Testing and materials for each level. (3) II

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) II

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)

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, use of illustrative materials, and excursions. (3) I (Moore, Harris)

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 (Harris, Moore)

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 212 or 229. (2) I, II (Harris, Moore)

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. *Prerequisite: Master's degree or by permission.* (4) II (Harris)

308a, b—RESEARCH PROBLEMS IN ELEMENTARY EDUCATION. An independent research course. Students confer individually with the instructor. *Prerequisite: one year of graduate work.* (3) I, II (Harris)

Music Education

242—ADMINISTRATION AND SUPERVISION OF PUBLIC SCHOOL MUSIC. A study of current trends in school music, curricula, testing programs, and other supervisory procedures. (3) (Worrel)

243—ADVANCED METHODS AND MATERIALS IN MUSIC EDUCATION. Survey and evaluation of new public school music methods and materials. (2) (Worrel)

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) (Worrel)

Secondary Education

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)

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 (Adams)

248a, b—INDEPENDENT WORK IN SECONDARY EDUCATION. An independent work course for students who have done a minimum of 12 semester hours of graduate work including Education 214 or 232. (3) I, II, S (Cierley, Adams)

307a, b—RESEARCH PROBLEMS IN SECONDARY EDUCATION. An independent research course. Students confer individually with the instructor. *Prerequisite: one year of graduate work.* (3) I, II, S (Adams)

DIVISION OF VOCATIONAL EDUCATION

Agricultural Education

181—TEACHING VOCATIONAL AGRICULTURE. Preparation for teaching of agriculture. About one-half of the course is practice. (15) I, II (Hammonds, Binkley)

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)

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)

188—FARM PRACTICE SUPERVISION. Practice and directed study in supervising farming programs in vocational agriculture. (1) I, II, S (Hammonds, Binkley)

280—METHOD OF TEACHING VOCATIONAL AGRICULTURE. The principles of method applied to the teaching of agriculture. *Prerequisite: experience in teaching vocational agriculture.* (3) S (Hammonds)

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)

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)

285a-d—MODERN PROBLEMS IN AGRICULTURAL EDUCATION. Class work (not individual-problem work) on modern problems in agricultural education. (3) I, II, S (Hammonds)

287a—ADVANCED PROBLEMS IN AGRICULTURAL EDUCATION. Specific problems selected according to the needs of the individuals. (3) I, II, S (Hammonds)

287b—SELECTING TEACHING MATERIALS. Selection of specific references and other teaching materials to be used in the teaching of vocational agriculture. (3) S

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

287d—DIRECTING FARM PRACTICE. Supervised farming as a method of teaching; standards, planning, supervision, and records. (3) S (Hammonds)

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

287f—YOUNG-FARMER SCHOOLS. Content and method of teaching young-farmer courses in vocational agriculture. (3) S

289a, b—RESEARCH IN AGRICULTURAL EDUCATION. Individual problems of importance to agricultural education. (3) I, II, S (Hammonds)

Distributive Education

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)

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. *Prerequisites: Education 112 and 128.* (3) I, II, S (Baker)

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 ea.) I, II, S (Baker, McDowell)

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)

Home Economics Education

160—TECHNIQUE OF TEACHING HOME ECONOMICS. A study of methods of teaching as applied to home economics. *Prerequisites: Home Economics 26, 27, and 61; and Education 147.* (3) I, II (Parker)

165—ADULT EDUCATION IN HOME ECONOMICS. Problems in teaching vocational homemaking in day, part-time, and evening schools. *Prerequisite: Education 160. Prerequisite (or to be taken concurrently): Education 162.* (3) I, II, S (Parker, Smith)

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 (Parker)

261—HOME ECONOMICS SUPERVISION. A course planned primarily to help prepare teacher-trainers and supervisors of home economics education. *Prerequisites: Education 160 and 162; teaching experience; and permission of instructor.* (3) I, S (Parker)

263—CURRENT PROBLEMS IN HOME ECONOMICS EDUCATION. Recent developments in home economics education. *Prerequisites: Education 160 and 162; teaching experience.* (3) II, S (Parker)

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 (Parker)

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 (Parker)

266a-c—SEMINAR IN HOME ECONOMICS EDUCATION. Individual investigations and reports on special problems in home economics education. (3) I, II, S (Parker)

267—DIRECTED SUPERVISION IN HOME ECONOMICS EDUCATION. This course includes practice in teaching for observation by others, student teaching, and school visiting. *Prerequisites: two years of teaching experience and Education 261.* (3) I, II (Parker)

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. *Prerequisites: Education 160 and 162.* (3) S (Parker)

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. *Prerequisite: teaching experience.* (3) I, S (Parker)

Industrial Education

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

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)

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 are emphasized. (2) I, II, S

137—SPECIAL PROBLEMS IN INDUSTRIAL EDUCATION. The supervised study of approved problems in industrial education on a research basis. (2) I, II, S (Baker)

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

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 (Baker)

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 (Baker)

Vocational Education

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)

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)

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, Parker, Baker)

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V. ENGINEERING

Students desiring to take any of the following courses should have the prerequisites indicated in each case. Courses numbered 200 and above are offered to graduates 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.

ENGINEERING GENERAL

Engineering Administration

102—ENGINEERING ADMINISTRATION. A study of the methods, procedures, and principles involved in engineering analyses, contracts, specifications, estimates and valuations, and administration of engineering projects. *Prerequisite: senior classification.*
(3) I, II (Elsley)

Applied Mechanics

100—STRENGTH OF MATERIALS. A study of stress and strain due to direct forces, shear, bending, torsion, eccentric loads and combined stresses. Lecture and recitation, four hours. *Prerequisites: Appl. Mech. 3 and Math. 20b.*
(4) I, II, S (Hawkins, Barber, Adams, Land)

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. *Prerequisite: Appl. Mech. 100.*
(3) I, II, S (Hawkins, Adams)

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, four hours. *Prerequisites: Appl. Mech. 4 or 7, and 100. Prerequisite (or to be taken concurrently): Math. 35.*
(4) I, II (Hawkins, Barber)

Fire Protection and Safety Engineering

101a—FIRE PROTECTION ENGINEERING. A study of building materials and construction relative to fire prevention and the analysis of common fire hazards. Lecture and recitation, two hours a week. *Prerequisite: junior classification.*
(2) I (Gard)

101b—FIRE PROTECTION ENGINEERING. A study of special fire hazards, principles of fire insurance ratings, and laws and ordinances governing fire prevention and protection. Lecture and recitation, two hours a week. *Prerequisite: junior classification.*
(2) II (Gard)

101c—FIRE PROTECTION ENGINEERING. A study of fire protection methods including water supply, fire fighting equipment, town grading, alarm systems and special extinguishing devices. Lecture and recitation, two hours a week. *Prerequisite: junior classification.*
(2) I (Gard)

102—SAFETY ENGINEERING. A study of safety methods including industrial accident prevention, accident statistics and analysis, industrial safety hazards, protective equipment, transportation and general safety. Lectures and recitation, two hours a week. *Prerequisite: junior classification.*
(2) II (Gard)

AGRICULTURAL ENGINEERING

Note: It is contemplated that for candidates for the degree of Master of Science in Agricultural Engineering, Agr. Engr. 200, 201, and 202 will be required. Also, additional work in agricultural engineering must be selected to include a minimum of two other graduate courses, at least one of which must be in the 200 series.

Courses for Agricultural Students

101a-c—SPECIAL PROBLEMS. This course is designed to permit students to make an intensive study of some phases of Agricultural Engineering in which they are particularly interested. Approval of instructor required.
(2 ea.) I, II, S (Staff)

102—DAIRY EQUIPMENT. Engineering principles involved in the construction, operation, and management of machinery and equipment used in processing dairy products. Lecture, two hours. *Prerequisite: Agr. Engr. 15.* (2) II (Kelley)

104—FARM ELECTRIFICATION. Designed to give students information on how to obtain electric service and on the problems involved in selecting and using farm and home electrical equipment. Lecture, two hours; lab, two hours. (3) I, II (Kelley)

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. Lectures, two hours; lab, two hours. (3) I, II, S (Brooks)

106—FARM POWER AND MACHINERY. Selection, operation, and maintenance of farm machinery with emphasis on power-driven machines. Analysis of the machinery needs of farms, adjustments, and servicing of machines. Lecture, one hour; lab, four hours. (3) S (Young)

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, construction methods, use of various building materials and costs. Lecture, one hour; lab, four hours. (3) S (Brooks)

Courses for Engineering Students

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. *Prerequisites: Agr. Engr. 20 and M. E. 134.* (3) I (Young)

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. *Prerequisites: A. M. 100, E. D. 1b.* (4) II (Brooks)

121b—FARM BUILDINGS AND EQUIPMENT. Continuation of Agr. Engr. 121a with more advanced study devoted to several of the same topics. Lecture, two hours; lab, two hours. *Prerequisite: Agr. Engr. 121a.* (3) I (Brooks)

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. *Prerequisite: M. E. 107 or C. E. 120.* (4) II (Brooks)

122b—SOIL AND WATER CONSERVATION ENGINEERING. Continuation of Agr. Engr. 122a with more advanced study devoted to several of the same topics. Lecture, three hours. *Prerequisite: Agr. Engr. 122a.* (3) I (Brooks)

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. *Prerequisite: E. E. 101.* (3) II (Kelley and Kinard)

200a-c—SEMINAR. Weekly meetings with members of the staff for reports and discussion on research and current trends and practices in agricultural engineering. One class hour. *Prerequisite: Graduate status.* (0) I, II, S (Staff)

201—RESEARCH METHODS IN AGRICULTURAL ENGINEERING. A study of research techniques and methods used in agricultural engineering. *Prerequisite or concurrent: Agr. Econ. 130 or equivalent.* (3) I, II, S (Kinard)

202—INSTRUMENTATION IN AGRICULTURAL ENGINEERING RESEARCH. The principles and applications of measuring instruments and devices for obtaining experimental data. *Prerequisite or concurrent: Agr. Engr. 201.* (3) I, II (Kinard)

203—ADVANCED FARM MACHINERY. 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. *Prerequisite: Agr. Engr. 120.* (3) I, II (Young)

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 formal class or as a special problems course. *Prerequisite: Agr. Engr. 121a.* (3) I, II (Brooks)

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. *Prerequisite: Agr. Engr. 124.* (3) I, II (Kinard)

206—ADVANCED SOIL AND WATER CONSERVATION ENGINEERING. Analysis of selected problems dealing with land improvement 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. *Prerequisite: Agr. Engr. 122a.* (3) I, II (Brooks)

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

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offered as a formal class or as a special problems course. *Prerequisites: Agr. Engr. 121a and 124.*
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CIVIL ENGINEERING

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; laboratory, three hours. *Prerequisite: junior classification.* *Prerequisite (or to be taken concurrently): Geol. 12b.* (3) I, II (Pendley)

110a—REINFORCED CONCRETE. Theory and design of beams, slabs, girders and columns as related to building frames, retaining walls and bridges. Lecture and recitation, three hours. *Prerequisite: Civ. Engr. 171a.* (3) I, II (Leggett)

110b—REINFORCED CONCRETE. Continuation of Civ. Engr. 110a, with special emphasis on complete structures. Lecture and recitation, one hour; drawing room, three hours. *Prerequisite: Civ. Engr. 110a.* (2) I, II (Mory)

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. Lecture and recitation, two hours; laboratory, three hours. *Prerequisite: Consent of instructor.* (3) I (Blythe)

120—HYDRAULICS. Mechanics of fluids under static and dynamic conditions. Fundamentals as found in any standard elementary textbook. Lecture and recitation, two hours. *Prerequisites: Appl. Mech. 4 and 100.* (2) I, II, S (Cheek)

123—HYDRAULICS LABORATORY. Experimental investigation and application of some of the more important principles covered in Civ. Engr. 120. Laboratory, three hours. *Prerequisite (or to be taken concurrently): Civ. Engr. 120.* (1) I, II, S (Cheek)

126—HYDROLOGY. Occurrence, control and utilization of water particularly as a problem of Civil and Sanitary Engineering. *Prerequisite: Civ. Engr. 120.* (2) I, II (Cheek)

130a—HIGHWAY ENGINEERING. Highway organization, administration, and finances. Planning and geometric design of highways. Soils, drainage, earthwork, soil stabilized and low type roads. Lecture, two hours; laboratory, three hours. *Prerequisite: Civ. Engr. 107.* (3) I, II (Pendley, Blythe)

130b—HIGHWAY ENGINEERING. Materials, construction and maintenance of intermediate and high type roads including all types of bituminous surfaces, macadams and Portland cement concrete. Lecture, two hours; laboratory, three hours. *Prerequisite: Civ. Engr. 130a.* (3) I, II (Chambers, Blythe)

151—WATER SUPPLY AND WATERWORKS. Rainfall and run-off, surface and underground sources of supply. The purification plant and its operation. Distribution and pressure problems. Pipe networks. Lecture and recitation, two hours. *Prerequisite: Civ. Engr. 120. Concurrent with Civ. Engr. 152.* (2) I, II (Cheek)

152—SEWERS AND SEWAGE DISPOSAL. Sanitary and storm sewers, flow problems. Disposal plants and their operation. Lecture and recitation, two hours. *Prerequisite: Civ. Engr. 120. Concurrent with Civ. Engr. 151.* (2) I, II (Cheek)

157—SANITARY ENGINEERING FOR HEALTH OFFICERS. For County Health Officers only. Stress is laid upon preventative rather than curative measures. The theory portion of Civ. Engr. 24 is included so the doctor will better understand the problems of the sanitarian. (2) S (Cheek)

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. *Prerequisites: Civ. Engr. 151 and 152.* (3) I, II (Cheek)

159—DESIGN AND OPERATION OF WATERWORKS AND SEWERS. General designs of water treatment and sewage disposal plants; distribution and collection systems; practice in the more common laboratory tests used in the plants. Lab. and drawing room, six hours. *Prerequisites: Civ. Engr. 151 and 152.* (2) I, II (Cheek)

171a—THEORY OF STRUCTURES. Analytical and graphical analysis of stresses in simple and indeterminate structures, including beams, girders, trusses, towers and building frames. Lecture and recitation, three hours. *Prerequisite or concurrent: A.M. 100.* (3) I, II (Leggett)

171b—THEORY OF STRUCTURES. Continuation of Civ. Engr. 171a with emphasis on indeterminate structures. Lecture and recitation, three hours. *Prerequisite: Civ. Engr. 171a.* (3) I, II (Mory, Leggett)

173a—STEEL STRUCTURES. Design and details for various types of riveted and welded connections, riveted and welded building frames, plate girders and trusses. Lecture, one hour; drawing room, six hours. *Prerequisite: Civ. Engr. 171a.* (3) I, II (Mory)

173b—STEEL STRUCTURES. Continuation of Civ. Engr. 173a with emphasis on floor systems, trusses, and plate girders for bridges. Drawing room, six hours. *Prerequisite: Civ. Engr. 173a.* (2) I, II (Leggett)

182—SANITATION. Municipal and rural sanitation presented from an engineering viewpoint. Also includes problems in heating, lighting, plumbing and ventilation. *Prerequisite: Bact. 57.* (2) I, II (Cheek)

202a—ADVANCED REINFORCED CONCRETE STRUCTURES. Theory and application of condensed forms of stress analysis and design as applied to continuous unsymmetrical building frames. Lecture, three hours. *Prerequisites: Civ. Engr. 171b and 110b.* (3) (Mory, Leggett)

202b—ADVANCED REINFORCED CONCRETE STRUCTURES. Theory and application of the column analogy method of stress analysis and design as applied to members and continuous structures with emphasis on arches. Lecture, three hours. *Prerequisites: Civ. Engr. 171b and 110b.* (3) (Mory)

202c—ADVANCED REINFORCED CONCRETE 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. Lecture, three hours. *Prerequisite: Civ. Engr. 202b.* (3) (Mory)

202d—ADVANCED REINFORCED CONCRETE STRUCTURES. Problems in the design and detailing of special structures, selected jointly by the student and instructor. Lecture, one hour; laboratory, four hours. *Prerequisite: Civ. Engr. 202c.* (3) (Mory)

221a, b—ADVANCED SOIL MECHANICS. Advanced study of the engineering properties of soils and the application of these theories to the design of engineering structures. Lecture, one hour; laboratory, four hours. *Prerequisite: Civ. Engr. 107.* (3 ea.) I, II (Gregg)

230a—ADVANCED HIGHWAY ENGINEERING. A study of highway administration, economics and finance, including sources and types of revenue, road costs, toll financing, classification of roads, benefits from improvement and program planning. Lecture, three hours. *Prerequisite: Civ. Engr. 130b or consent of instructor.* (3) (Gregg)

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. *Prerequisite: Civ. Engr. 130a or consent of instructor.* (3) (Pendley)

230c—ADVANCED HIGHWAY ENGINEERING. Highway design, construction and maintenance, including physical aspects of design, drainage, road types, pavement design, construction methods and supervision, and maintenance methods. Lecture, three hours. *Prerequisite: Civ. Engr. 232a.* (3) (Gregg)

230d—ADVANCED HIGHWAY ENGINEERING. Origin, production, classification, and significant properties of bituminous materials, bituminous paving mixes, paints, metal products and miscellaneous materials used in the highway industry. Tests and application of test data. Lecture, two hours; laboratory, two hours. *Prerequisite: Civ. Engr. 130b.* (3) (Gregg)

230e—ADVANCED HIGHWAY ENGINEERING. Production, classification and significant properties of Portland and natural cements, mineral aggregates, and concrete paving mixtures. Tests and application of test data. Lecture, two hours; laboratory, two hours. *Prerequisite: Civ. Engr. 130b.* (3) (Gregg)

242a-d—RAILROAD ENGINEERING. Advanced course in location, construction, maintenance, economical selection of lines, grade reduction, cost of operation, valuation, and structures and their maintenance. Class work, one hour; laboratory, four hours. (3 ea.) I, II (Shaver)

252a-d—SANITARY ENGINEERING. Continuation of Civ. Engr. 159 covering more detailed design of various sanitary constructions. (Additional courses in chemistry, bacteriology, and zoology should be taken in connection with this course.) Class work, one hour; laboratory, four hours. (3 ea.) I, II (Cheek)

262a-d—GEODETIC SURVEYING. Advanced course in geodetic calculations, development, and use of formulas used by the United States Coast and Geodetic Survey. Modern methods of field practice. Class work, one hour; laboratory, four hours. (3 ea.) I, II (Shaver)

272a—ADVANCED STEEL STRUCTURES. Theory and application of the Williot and Mohr diagrams, Maxwell's law of reciprocal relations, virtual work and influence lines for determining deflections, movements and camber in design of continuous steel trusses and plate girders. Lecture, three hours. *Prerequisites: Civ. Engr. 171b and 173b.* (3) (Mory)

272b—ADVANCED STEEL STRUCTURES. Preparation of design drawings of structures analyzed and proportioned in Civ. Engr. 202a and 272a. Laboratory, four hours. *Prerequisites: Civ. Engr. 202a and 272a.* (2) (Leggett)

272c—ADVANCED STEEL STRUCTURES. Theory and application of stress analysis and design methods as applied to single and multi-span gabled frames and thin shells. Lecture, three hours. *Prerequisites: Civ. Engr. 272a and 202b.* (3) (Leggett)

272d—ADVANCED STEEL STRUCTURES. Theory and application of stress analysis and design as applied to suspension bridges. Lecture, two hours; laboratory, two hours. *Prerequisite: Civ. Engr. 272a.* (3) (Mory)

282a-f—SPECIAL PROBLEMS IN CIVIL ENGINEERING. Individual work on some selected problem in one of the various fields of Civil Engineering. Laboratory, six hours. *Prerequisite: approval of Head of Department.* (3 ea.) (Staff)

283a-d—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. Two hours. (1 ea.) (Staff)

500-1, 2, 3—THESIS. (0) I, II, S (Staff)

ELECTRICAL ENGINEERING

101—FUNDAMENTALS OF ELECTRICAL MACHINERY. (For Civil, Metallurgical, and Mining Engineers.) A study of elementary direct current and alternating current circuits, machinery controls and illumination equipment. Two class hours; two hours laboratory. *Prerequisite: Phys. 3b.* (3) I, II (Staff)

103—ELECTRICAL LABORATORY FOR MINING ENGINEERS. A laboratory study of circuits and equipment used in the servicing and operation of industrial equipment. With special emphasis on mining applications. Three hours laboratory. *Concurrent with Elec. Engr. 101.* (1) II (Staff)

105a—ELECTRICAL ENGINEERING CIRCUITS AND MACHINERY. (For Mechanical Engineers.) Study of electrical circuits and machinery and their control as found in modernly equipped installations. Three class hours; three hours laboratory. *Prerequisites: Phys. 3b and Math. 20b.* (3) I (Krimm)

105b—ELECTRICAL ENGINEERING CIRCUITS AND MACHINERY. (For Mechanical Engineers.) Continuation of Elec. Engr. 105a. Three class hours; three hours laboratory. (3) II (Krimm)

107R—ELECTRICAL CONTROLS. Control of electric equipment. Types of contractors, relays, etc. Typical circuits with which they are tied together into units for automatic functioning. Recitation, two class hours. *Prerequisites: Elec. Engr. 116R, 116L, 105b or 101. Concurrent with Elec. Engr. 107L.* (2) I (Back)

107L—ELECTRIC CONTROLS LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 107R. Laboratory, three hours. *Concurrent with Elec. Engr. 107R.* (1) I (Back)

108R—INDUSTRIAL ELECTRONICS. Electronic devices for industrial use, and their applications in the control of rectifiers, motors and welders. High frequency heating, timing circuits, and oscillators; phototubes, etc. Recitation, two class hours. *Prerequisites: Elec. Engr. 116R, 116L, 161R, 161L. Concurrent with Elec. Engr. 108L.* (2) I, II (Jackson)

108L—INDUSTRIAL ELECTRONICS LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 108R. Laboratory, three hours. *Concurrent with Elec. Engr. 108R.* (1) I, II (Jackson)

111—ADVANCED ELECTRICAL LABORATORY. Laboratory, two hours. (1) I, II (Staff)

114R—ALTERNATING CURRENT CIRCUITS. A mathematical study of single phase and polyphase circuits under the influence of steady state sinusoidal and nonsinusoidal voltages. Recitation, three class hours. *Prerequisite (or to be taken concurrently): Elec. Engr. 21R, 21L, and Math. 20b. Concurrent with Elec. Engr. 114L.* (3) I, II (Back)

114L—ALTERNATING CURRENT CIRCUITS LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 114R. Laboratory, three hours. *Concurrent with Elec. Engr. 114R.* (1) I, II (Back)

115R—DIRECT CURRENT MACHINERY. A Study of D.C. Machinery, construction and design, and its operation and characteristics. Recitation, two class hours. *Prerequisites: Elec. Engr. 114R, 114L, Math. 20b. Concurrent with Elec. Engr. 115L.* (2) I, II (Barnett)

115L—DIRECT CURRENT MACHINERY LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 115R. Laboratory, three hours. *Concurrent with Elec. Engr. 115R.* (1) I, II (Barnett)

116R—ALTERNATING CURRENT MACHINERY. A study of A.C. machinery construction and its operation and characteristics. Recitation, three class hours. *Prerequisites: Elec. Engr. 114R, 114L, Math. 20b. Concurrent with Elec. Engr. 116R.* (1) I, II (Barnett)
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116L—ALTERNATING CURRENT MACHINERY LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 116R. Laboratory, three hours. *Concurrent with Elec. Engr. 116R.* (1) I, II (Barnett)

117—ADVANCED ALTERNATING CURRENT MACHINERY. Advanced analytical study of A.C. machinery characteristics. *Prerequisites: Elec. Engr. 116R, 116L.* (3) II (Staff)

118—ELECTRICAL POWER PLANT EQUIPMENT. A study of the electrical elements of a modern power plant and their operation and characteristics. *Prerequisites: Elec. Engr. 116R, 116L.* (3) I (Staff)

120—ELECTRIC CIRCUIT ANALYSIS. Mathematical and physical principles of engineering analysis. Analogies, duals. Steady state and transient solutions. Fourier and Laplace analyses. Dimensional analysis. Bessel and Hyperbolic functions, etc. Two class hours; two hours laboratory. *Prerequisites: Elec. Engr. 114R, 114L, and Math. 35.* (3) I, II (Jackson)

123—ELECTRICAL EQUIPMENT PROBLEMS. (For Electrical Engineers.) Individual problems related to engineering practice are assigned. The solutions involve economic as well as engineering considerations. Lecture, one hour; five hours laboratory. *Prerequisites: Elec. Engr. 116R, 116L, 120.* (2) I, II (Jackson)

124—ELECTRICAL DESIGN. Fundamental relations in the design of electrical machinery. Includes the calculations for the design of several pieces of electrical equipment. Lecture, one hour; five hours laboratory. *Prerequisites: Elec. Engr. 115R, 115L, 116R, 116L.* (2) I, II (Barnett)

135R—NETWORKS AND LINES. Fundamentals of network theory in communication and power circuits. Network theorems, transmission lines and wave filters. Recitation, three class hours. *Prerequisites: Elec. Engr. 114R, 114L, 120. Concurrent with Elec. Engr. 135L.* (3) I, II (Allison)

135L—NETWORKS AND LINES LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 135R. Laboratory, three hours. *Concurrent with Elec. Engr. 135R.* (1) I (Allison)

136R—ILLUMINATION ENGINEERING. Spectral nature of light sources; entities in illumination systems; measurements and standards; design of interior and outdoor lighting systems. Recitation, two class hours. *Prerequisites: Physics 3b, Math. 20b. Concurrent with Elec. Engr. 136L.* (2) II (Staff)

136L—ILLUMINATION ENGINEERING LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 136R. Laboratory, three hours. *Concurrent with Elec. Engr. 136R.* (1) II (Staff)

137—ELECTRIC POWER TRANSMISSION AND DISTRIBUTION. A study of the problems involved in the transmission of electric power with special emphasis on the elements of the transmission line. *Prerequisites: Elec. Engr. 120, 135R, 135L.* (3) I, II (Staff)

151a, b—SEMINAR. Semi-weekly meetings with staff for reports and discussion on research and modern trends and practices in Electrical Engineering. Two class hours. *Prerequisite: senior standing.* (1 ea.) I, II (Staff)

152a-c—INDEPENDENT PROBLEMS. (For Electrical Engineers.) A problem, approved by the Head of the Department, forms the background for study and research. Only for students the character of whose previous work justifies it. (1 ea.) I, II (Staff)

152d-f—INDEPENDENT PROBLEMS. (For Electrical Engineers.) A problem, approved by the Head of the Department, forms the background for study and research. Only for students the character of whose previous work justifies it. (2 ea.) I, II (Staff)

161R—VACUUM TUBE ELECTRONICS. High vacuum and gas tube characteristics. Electronic circuits, rectifiers and smoothing filters. Audio amplifiers, oscillators. Electronic instruments. Recitation, three class hours. *Prerequisites: Elec. Engr. 114R, 114L. Concurrent with Elec. Engr. 161L.* (3) I, II (Daily)

161L—VACUUM TUBE ELECTRONICS LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 161R. Laboratory, three hours. *Concurrent with Elec. Engr. 161R.* (1) I, II (Daily)

162R—RADIO CIRCUITS. Resonance at radio frequencies; coupled circuits and impedance transformation; radio frequency amplifiers. AM and FM transmitters and receivers. Recitation, three class hours. *Prerequisites: Elec. Engr. 161R, 161L. Concurrent with Elec. Engr. 162L.* (3) I, II (Kadaba)

162L—RADIO CIRCUITS LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 162R. Laboratory, three hours. *Concurrent with Elec. Engr. 162R.* (1) I, II (Kadaba)

164R—RADIO AND TELEVISION CIRCUITS. High frequency phenomena: coupled circuits, impedance transformation, lines, antenna feeding and matching, wide band amplifiers, pulse circuits. Recitation, three class hours. *Prerequisites: Elec. Engr. 162R, 162L, 135R, 135L. Concurrent with Elec. Engr. 164L.* (3) I, II (Allison, Kadaba)

164L—RADIO AND TELEVISION CIRCUITS LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 164R. Laboratory, three hours. *Concurrent with Elec. Engr. 164R.* (1) I, II (Allison, Kadaba)

165—FIELDS AND WAVES. Fundamental theory of current, potential, power, and electric and magnetic fields. Vector analysis, Maxwell's equations. Plane waves, power flow and the Poynting vector. Two class hours. *Prerequisite: Elec. Engr. 120.* (2) I, II (Romanowitz, Kadaba)

172R—AUTOMATIC CONTROL SYSTEMS. Closed loop industrial control systems and system elements. Analysis of modes of operation. Stability, adjustment. Recitation, experiment exercises relating to studies in Elec. Engr. 172R. Laboratory, three hours. *Concurrent with Elec. Engr. 172R.* (1) I, II (Jackson)

172L—AUTOMATIC CONTROL SYSTEMS LABORATORY. Laboratory practice and experiment exercises relating to studies in Elec. Engr. 172R. Laboratory, three hours. *Concurrent with Elec. Engr. 172R.* (1) I, II (Jackson)

206—ELECTRIC POWER TRANSMISSION. The theory underlying the calculation and operation of long distance transmission circuits. Special attention to relay control. (3) (Staff)

210—SYMMETRICAL COMPONENTS. A study of the symmetrical component method of analyzing unbalanced conditions on transmission lines and its use in solving relay applications. (3) (Staff)

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. *Prerequisites: Elec. Engr. 120, 135R, 135L.* (3) (Staff)

211b—LINEAR CIRCUIT ANALYSIS II. Continuation of Elec. Engr. 211a with an introduction to non-linear systems. (3) (Staff)

212—SERVOMECHANISMS. Synthesis of closed loop systems. Transient and steady state analysis of system transfer functions. Laplace transform and loci plot methods. *Prerequisites: Elec. Engr. 107R, 107L, 108R, 108L, 211a.* (3) (Smith)

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221—ELECTRON BEHAVIOR IN HIGH VACUUM AND GAS TUBES. Potential distribution, thermionic emission and electron flow; energy of electrons in meals; Maxwellian distribution equation and curves; random motions of electrons and ions. *Prerequisites: Elec. Engr. 108R, 108L, 120.* (3) (Romanowitz, Kadaba)

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. *Prerequisite: Elec. Engr. 221.* (3) (Romanowitz, Kadaba)

223—LINES AND WAVE GUIDES. Open wire and coaxial lines, reflections, standing waves; circle diagram; stub matching; impedance transformation, wave guides. *Prerequisites: Elec. Engr. 135R, 135L, 120.* (3) (Kadaba)

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. *Prerequisites: Elec. Engr. 164R, 164L, 165.* (3) (Allison)

227—ELECTROMAGNETIC FIELDS. Advanced studies in electric and magnetic fields, using vector methods and Maxwell's equations; wave equations, radiation and propagation of energy. *Prerequisites: Elec. Engr. 165.* (3) (Kadaba)

230a-f—SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING. Open to graduate students who have the ability to carry on research. Individual work in one of the various fields of Electrical Engineering. Laboratory, six hours a week. (3 ea.) (Staff)

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. Two class hours. (1 ea.) (Staff)

500-1, 2, 3—THESIS.

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MECHANICAL ENGINEERING

100a—MACHINE DESIGN. Design of machine and structural elements. Lecture and recitation, three hours. *Prerequisites: Engr. Draw. 18 and Mech. Engr. 15b.* *Prerequisite (or to be taken concurrently): Appl. Mech. 100.* (3) I, S (Carter, Gard)

100b—MACHINE DESIGN. Continuation of Mech. Engr. 100a. Drawing room, nine hours. *Prerequisite: Mech. Engr. 100a.* (3) I, II, S (Carter, Gard)

104a—ENGINEERING THERMODYNAMICS. Fundamental principles of thermodynamics. Lecture and recitation, three hours. *Prerequisites: Phys. 3b. and Math. 20b.* (3) I, S (Penrod)

104b—ENGINEERING THERMODYNAMICS. Continuation of Mech. Engr. 104a. Lecture and recitation, three hours. *Prerequisite: Mech. Engr. 104a.* (3) II, S (Penrod, Marshall)

105—POWER PLANT ENGINEERING. Study of the characteristics of steam and internal combustion engineering generating power stations. Lecture and recitation, three hours. *Prerequisites: Mech. Engr. 104b, 112.* (3) II, S (Stewart)

107—FLUID MECHANICS. Fundamental principles of fluid flow. Lecture and recitation, three hours. *Prerequisite: Mech. Engr. 104a.* (3) II (Penrod, Baker, Lange)

108—INTERNAL COMBUSTION ENGINES. A study of internal combustion engine cycles and the characteristics and performance of actual engines, valve gears, and materials of construction. Lecture and recitation, three hours. *Prerequisite: Mech. Engr. 105b or 134.* (3) II (Carter, Lange, Stewart)

109—REFRIGERATION. A course which deals with compression and absorption refrigeration machines and installations. Lecture and recitation, three hours. *Prerequisite: Mech. Engr. 104b or 134.* (3) I, S (Penrod, Walton)

112—MECHANICAL LABORATORY. Fundamentals of mechanical engineering laboratory practice. Lecture and recitation, one hour; laboratory, three hours. *Prerequisite: Mech. Engr. 104a, Engl. 1b.* (2) II, S (Staff)

113a—MECHANICAL LABORATORY. Performance tests on heating, ventilating, and power plant equipment. Lecture and recitation, one hour; laboratory, three hours. *Prerequisites: Mech. Engr. 104b, 107.* (2) I (Staff)

113b—MECHANICAL LABORATORY. Continuation of Mech. Engr. 113a. Lecture and recitation, one hour; laboratory, three hours. *Prerequisite: Mech. Engr. 113a.* (2) II (Staff)

114a—AIR CONDITIONING, HEATING, AND VENTILATING. Theory of air conditioning and the mechanical equipment of buildings. Lecture and recitation, three hours. *Prerequisite (or to be taken concurrently): Mech. Engr. 109.* (3) I (Walton)

114b—AIR CONDITIONING, HEATING, AND VENTILATING DESIGN. Continuation of Mech. Engr. 114a and the complete design and layout of a year-round air-conditioning system. Lecture, one hour; drawing room, six hours. *Prerequisite: Mech. Engr. 114a.* (3) II (Walton)

116—ELEMENTARY HEATING, VENTILATING, AND AIR CONDITIONING. Fundamental principles of air conditioning. Lecture and recitation, three hours. *Prerequisite: Phys. 1a or its equivalent.* (3) II (Baker, Walton)

122a—SEMINAR. Studies of current engineering literature, preparation and presentation of bibliographies and reports through the use of the Engineering Index and Industrial Arts Index. Two hours a week. *Prerequisite: senior classification.* (1) I (Staff)

- 122b—SEMINAR. Continuation of Mech. Engr. 122a. Two hours a week. *Prerequisite: senior classification.* (1) II (Staff)
- 129—ELEMENTS OF HEAT TRANSFER. Fundamental principles of heat transfer. Lecture and recitation, four hours. *Prerequisite: Mech. Engr. 104b.* (4) I, S (Penrod, Baker, Walton)
- 130—APPLIED AERODYNAMICS. Fundamental principles of fluid mechanics applied to aerodynamics. Lecture and recitation, three hours. *Prerequisites: Mech. Engr. 104b, 107.* (3) I (Lange, Marshall)
- 131a—AIRPLANE DESIGN. Covering fundamental principles of airplane design. Lecture and recitation, three hours. *Prerequisite (or to be taken concurrently): Mech. Engr. 130.* (3) (Lange, Marshall)
- 131b—AIRPLANE DESIGN. Continuation of Mech. Engr. 131a. Lecture and recitation, one hour; drafting room, six hours. *Prerequisite: Mech. Engr. 131a.* (3) (Lange, Marshall)
- 133—TOOL DESIGN. An introduction to Tool Engineering which embodies the fundamental principles of designing jigs, fixtures, cams, gauges, punches, dies, and automatic machine tools. Lecture, one hour; drawing room, six hours. *Prerequisite: Mech. Engr. 100b.* (3) I (Carter, Gard)
- 134—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. *Prerequisites: Phys. 3b and Math. 20b.* (3) I (Staff)
- 135—EXPERIMENTAL AERODYNAMICS. A complete wind tunnel analysis of a scale made to obtain lift, drag, pitching moment, and side force data. Lecture, one hour; laboratory, four hours. *Prerequisite: Mech. Engr. 130.* (3) II (Lange, Marshall)
- 136—INTERNAL COMBUSTION ENGINE LABORATORY. A study of magnetos, distributors, fuel ignition, timing, carburetors, oil systems, and performance tests on engines. Aeronautical Laboratory, three hours. *Prerequisites (or to be taken concurrently): Mech. Engr. 108, 113a.* (1) I, II (Marshall, Stewart)
- 137—MOTION AND TIME STUDY. Principles and uses of motion economy and fundamentals of time study. Lecture and recitation, three hours. *Prerequisite: Mech. Engr. 15b.* (3) I (Gard)
- 138—PRODUCTION ENGINEERING. Scheduling, routing, material control, quality control, and problems in engineering economy. Lecture and recitation, three hours. *Prerequisite: Mech. Engr. 137.* (3) I (Gard)
- 139—PLANT LAYOUT. Selection of processes and machines, material handling systems, and plant requirements. Lecture, two hours; drawing room, three hours. *Prerequisite: Mech. Engr. 138.* (3) II (Gard)
- 141a—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, three hours. *Prerequisite: Phys. 3b.* (3) I (Baker, Knight)
- 141b—MECHANICAL AND ELECTRICAL EQUIPMENT FOR BUILDINGS. Continuation of Mech. Engr. 141a. Lecture and recitation, three hours. *Prerequisite: Mech. Engr. 141a.* (3) II (Baker, Knight)
- 202a-d—POWER PLANT ENGINEERING. Advanced work in the design, selection, layout, and operation of heat-power plant equipment. (3 ea.) (Penrod, Walton)
- 203a—HEATING, VENTILATING, AND AIR CONDITIONING. Theoretical analysis of complex refrigeration cycles and treatment of advanced refrigeration topics; intermittent heating; advanced psychrometrics and air conditioning techniques. (3) (Baker)
- 203b—HEATING, VENTILATING AND AIR CONDITIONING. Analysis of panel heating and cooling systems; theoretical development of exact radiation equations involving multiple reflections; configuration factor analysis; exact and simplified design techniques. (3) (Baker)
- 203c, d—HEATING, VENTILATING AND AIR CONDITIONING. 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. (3 ea.) (Baker)
- 204a-d—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. (3 ea.) (Gard, Carter)
- 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. *Prerequisite: approval of Head of Department.* (3 ea.) (Staff)
- 211a—ADVANCED ENGINEERING THERMODYNAMICS. Critical treatment of the laws of thermodynamics, temperature scales; application of theory to compressors and internal combustion engines; frequent reference to research papers. Lecture four hours. *Prerequisite: Mech. Engr. 104b or consent of instructor.* (4) I, II (Penrod)
- 211b—ADVANCED ENGINEERING THERMODYNAMICS. Continuation of Mech. Engr. 211a. *Prerequisite: Mech. Engr. 211a.* (4) II (Penrod)

212a—Mechanics treat
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212a—ADVANCED FLUID MECHANICS. Fundamentals of hydro- and aero-mechanics treated by the use of vector and tensor calculus. Lecture, four hours. *Prerequisite:* Mech. Engr. 107 or consent of instructor. (4) I (Penrod, Lange)

212b—ADVANCED FLUID MECHANICS. Continuation of Mech. Engr. 212a. *Prerequisite:* Mech. Engr. 212a. (4) II (Penrod, Lange)

213a—ADVANCED HEAT TRANSFER. Application of mathematics to heat transfer, transfer of heat in heat exchangers and furnaces, heat transmission and pressure drop, discussion of research papers. Lecture, four hours. *Prerequisite:* Mech. Engr. 107, 129 or equivalent. (4) I (Baker, Penrod)

213b—ADVANCED HEAT TRANSFER. Continuation of Mech. Engr. 213a. *Prerequisite:* Mech. Engr. 213a. (4) II (Penrod, Baker)

214a, b—SPECIAL PROBLEMS IN AERONAUTICAL ENGINEERING. Advanced course in aircraft power plant engineering dealing with special problems in reciprocating engines, gas turbines, and jet propulsion. Aeronautical Laboratory, nine hours. *Prerequisite:* approval of Head of Department. (3 ea.) I, II (Marshall, Lange)

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. (1 ea.) (Penrod, Carter, Baker)

216—STEAM TURBINES. Steam turbine cycles; flow of steam through nozzles and blades; internal losses; reheat factor; regenerative feed heating; turbine performance at varying loads; mixed-pressure turbines; construction of nozzles and diaphragms. *Prerequisite:* approval of Head of Department. (4) (Penrod)

217—GAS TURBINES AND JET PROPULSION. Momentum, energy, and thermodynamics of gas flow; performance calculations; centrifugal, axial-flow, and Lysholm compressors; gas turbine cycles and characteristics; combustion chamber; aircraft, stationary, marine, and locomotive power plants; rockets. *Prerequisite:* approval of Head of Department. (4) (Penrod, Carter)

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. *Prerequisite:* Mech. Engr. 100b. (3) (Carter)

500-1, 2, 3—THESIS.

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METALLURGICAL ENGINEERING

Two graduate degrees in Metallurgical Engineering are awarded: the Master of Science in Metallurgical Engineering and the Doctor of Engineering.

132—METALLURGICAL CALCULATIONS. Calculations involved in the practical application of metallurgical principles both general and specific. Recitation and problems, three hours. *Prerequisites:* Chem. 22; and Met. Engr. 33. (3) I (Crouse)

140—THE SCIENCE OF METALS. First course in physical metallurgy; correlation of structures of metals and alloys to their physical properties together with the effects of mechanical work and heat. Lecture and recitation, three hours. *Prerequisites:* Phys. 3b; Chem. 22; and Met. Engr. 33. (3) I, II (Crouse, Swift)

142—FERROUS METALLOGRAPHY AND HEAT TREATMENT. Correlation of compositions, heat-treatments, microstructures, and properties of ferrous metals and alloys. Engineering, tool, heat-resistant, and corrosion-resistant ferrous alloys, and cast irons included. Lecture, two hours; laboratory, three hours. *Prerequisites:* Met. Engr. 140. (3) I (Staff)

143a—PHYSICS OF METALS. Radiography and x-ray metallography; structural metallurgical topics; elastic, plastic properties; diffusion; solubility of gases; introduction to electron and band theory of solids. Lecture and recitation, three hours. *Prerequisites:* Phys. 123b; Chem. 147b; and Met. Engr. 140. (3) I (Clifton)

143b—PHYSICS OF METALS. This is a continuation of Met. Engr. 143a. Lecture and recitation, two hours; laboratory, three hours. *Prerequisite:* Met. Engr. 143a. (3) II (Clifton)

144—NON-FERROUS METALLOGRAPHY AND HEAT TREATMENT. Correlation of compositions, heat-treatments, microstructures and properties of non-ferrous metals and alloys. Commercially pure metals; and solid solution, cold-working, age-hardenable, and martensitic-type alloys are considered. Lecture, two hours; laboratory, three hours. *Prerequisites:* Met. Engr. 140. (3) II (Staff)

164—ELEMENTS OF LOW TEMPERATURE CARBONIZATION. Principles involved in the low temperature treatment of coals and other carbonaceous materials, including hydrogenation. Lecture and recitation, three hours; assigned reference reading. *Prerequisites:* Phys. 123b; and Chem. 147b. (3) I, II (Crouse)

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. *Prerequisite:* Phys. 3b. (3) II (Spokes)

175a, b—SEMINAR. General discussions of metallurgical subjects; preparation and delivery of papers and reports; extemporaneous speaking, and the briefing of technical books and articles in current literature. Two hours. *Prerequisite:* six semesters in metallurgical engineering. (1 ea.) I, II (Staff)

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. *Prerequisites: Met. Eng. 140 or permission of instructor.* (3) I, II (Crouse, Swift)

207—ADVANCED PRODUCTION METALLURGY. Principles and practices used in the production of alloys; with special stress upon any particular group of alloys that the student may choose. Reference reading and laboratory work are emphasized. Lecture, two hours; laboratory, eight hours. (3) I, II (Crouse, Swift)

209—ADVANCED ORE DRESSING. Ore dressing plant design and original research in concentration problems. Lecture and recitation, two hours; laboratory, eight hours. (6) I, II (Spokes)

210—TECHNOLOGY OF LOW TEMPERATURE CARBONIZATION. Principles and practices employed in low temperature carbonization of carbonaceous materials such as oil shales, bituminous and cannel coals. Lecture and recitation, two hours; laboratory, eight hours. *Prerequisite: permission of Head of Department.* (6) I, II (Crouse)

213—X-RAY METALLOGRAPHY. Crystallography; x-ray theory. Laue, rotation-crystal, powder x-ray diffraction methods; special cameras; structure-factor equations; reciprocal lattice; stereographic, gnomonic projections; poles figures; stress-strain analysis, phase diagrams; electron diffraction. Lecture, three hours; laboratory, three hours. *Prerequisite: Phys. 119.* (4) I, II (Clifton)

214—THEORETICAL STRUCTURAL METALLURGY. Interatomic forces of crystal bonding; free electron zone theory; equilibrium 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 (Clifton, Swift)

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)

216—THE PHYSICAL CHEMISTRY OF STEEL MAKING. 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 are emphasized. Lecture, three hours. (3) I, II (Clifton, Swift)

217—THE MICROSCOPY OF SLAGS AND REFRACTORIES. Identification of phases in slags. Emphasis is placed on the interpretation of micro-structural features as indicators of high temperature reaction tendencies among silicate and oxide systems. Lecture and recitation, one hour; laboratory, six hours. (3) I, II (Crouse, Swift)

218—DIFFUSION 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 (Staff)

220—CRYSTAL PLASTICITY. Fundamentals of plastic deformation in metals. Topics will include crystallography, slip, twinning, strain hardening, recovery, cold working, cold-worked and recrystallization textures. Heyns stresses, creep and similar subject matter. Lecture and recitation, three hours. (3) I, II (Staff)

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. *Prerequisite: Chem. 244.* (3) I, II (Clifton)

222—CORROSION. Corrosion mechanisms, including the electrochemical theory, fundamentals of oxidation and tarnish, passivity and effects of crystal orientation on corrosion. Corrosion of various engineering materials in various environments and testing. Lecture, two hours; laboratory, three hours. (3) I, II (Swift)

223—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, two hours. (3) I, II (Swift)

224—MATERIALS ENGINEERING. Various factors in specification and testing of materials. Materials for lightweight construction, mechanical and electrical applications, and severe service conditions are treated. Material failures, trouble shooting and testing are discussed. Lecture, two hours; laboratory, three hours. (3) I, II, S (Swift)

240a-f—SPECIAL PROBLEMS, LITERATURE AND LABORATORY. Literature research and planning of research programs; shop problems and technical writing, including a term paper, are required. Laboratory, six hours. Consultation and lecture by appointment. (3 ea.) I, II (Staff)

275a-h—SEMINAR. Review of current literature in the field of metallurgical engineering and presentation of papers thereon. Presentation of talks on departmental research. Group and panel discussions. Required of all graduate students. Two hours. (1 ea.) I, II (Staff)

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MINING ENGINEERING

- 126—ELEMENTS OF MINING. Fundamental mining operations, prospecting, and mine development. Lecture and recitation, three hours. *Prerequisites: Chem. 2b, Phys. 3a, Geol. 12a.* (3) I (Spokes, Roll)
- 130—MINERAL INDUSTRIES ADMINISTRATION. The engineering aspects of mine administration and management, including safety engineering. Lecture and recitation, three hours. (3) I (Spokes)
- 132—MINE RESCUE TRAINING AND FIRST AID. Required of mining engineers. Fundamental principles of mine rescue training and first aid. Given on University campus by Kentucky Department of Mines and Minerals, U. S. Bureau of Mines, or both in collaboration. (0) II
- 133a, b—COAL PREPARATION. Principles and practice of coal preparation and associated operation. Lecture and recitation, three hours. *Prerequisite: Met. Engr. 166.* (3 ea.) a, I; b, II (Spokes)
- 136—MINE VENTILATION. The principles and methods of mine ventilating and air conditioning; the control of dangerous impurities. Lecture and recitation, two hours. *Prerequisite: Min. Engr. 126.* (3) II (Spokes, Roll)
- 137—MINE PLANT AND MACHINERY. Theory and practice of mine haulage, hoisting, drainage, pumping, and compressed air as power. Lecture and recitation, three hours. *Prerequisite: Min. Engr. 126.* (3) I (Spokes)
- 139—VALUATION OF MINERAL PROPERTIES. Methods of appraising the value of deposits of ores, mineral fuels, and non-metallics. Lecture and recitation, three hours. (3) II (Roll, Spokes)
- 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. *Prerequisite: Min. Engr. 126.* (3) I (Roll, Spokes)
- 175a, b—SEMINAR. The preparation and delivery of papers and reports on mining subjects, extemporaneous speaking, and the briefing of technical books and articles in the current literature. Two hours. *Prerequisite: six semesters in Mining Engineering.* (1 ea.) I, II (Staff)
- 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 (Spokes)
- 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. (2) I, II (Spokes)
- 209—ADVANCED MINE ENGINEERING. Procedure and methods of collecting and recording data for the systematic development and exploitation of a mining property. Lecture and recitation, three hours; drawing and mapping, eight hours. (7) I, II (Spokes)
- 220a-f—SPECIAL PROBLEMS IN MINING ENGINEERING. Open to graduate students who have the ability to carry on research. Each course consists of individual work in one of the various fields of Mining Engineering. Laboratory, six hours. (3 ea.) I, II, S (Spokes, Roll)
- 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 ea.) (Staff)
- 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. Calculations involving formulas, batches of materials, and the drying and firing of ceramic ware. Lecture and recitation, three hours. (3) I, II (Swift)
- 223—FUELS AND THEIR COMBUSTION. Available fuels in the solid, liquid, and gaseous states. Emphasis will be on the utilization of fuels in the mineral industries. Technology of fuels. Physics and chemistry of combustion. Combustion calculations. Lecture and recitation, three hours. (3) I, II (Crouse)
- 224—PREPARATION AND USES OF INDUSTRIAL MINERALS. Sources, processing, marketing, utilization, and economics of nonmetallic minerals, and product specifications. Clay, limestone, asbestos, refractories, etc., will be studied. Lecture and recitation, three hours. (3) I, II (Swift)
- 500-1, 2, 3—THESIS. (0) I, II, S (Staff)

VI. 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.).

101a, b—CONTRACTS I, II. Anderson's 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)

102a, b—TORTS I, II. Seavy, Keeton and Thurston's Cases. Intentional torts and defenses, negligence, causation, duties of occupants of land and manufacturers and vendors of chattels.
(3, 2) I, II (Oberst)

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) I (Matthews)

105—AGENCY. Mechem's Cases on Agency. Study of traditional agency materials.
(2) I (Ham)

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)

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)

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)

123—NEGOTIABLE INSTRUMENTS. Britton's Cases on Bills and Notes. (4th edition.) A general study of the law of bills and notes following the Uniform Negotiable Instruments Law, including: operative facts of negotiability; transfer; holders in due course; defenses; liability of primary and secondary parties.
(3) I (Ham)

141—PARTNERSHIP. Steffen's Cases on Agency (2d ed.). Nature of partnership, characteristics of partnership property, dissolution, distinction between partnership and other forms of unincorporated business associations.
(1) S (Ham)

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 (Ham)

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)

150—PUBLIC UTILITIES. Robinson's Cases (2d edition). Nature and scope of public utility concept—historical and modern; methods of determining rate base; reasonable rates; duty to serve—extent and limitations.
(2) S (Moreland)

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 (Oberst, McEwen)

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)

163—WILLS AND DECEDENTS' ESTATES. Leach, cases and text. Descent and distribution, the making and revocation of wills, probate and administration.
(2) II (Whiteside, Gilliam)

164—CONFLICT OF LAWS. Cheatham, Dowling and Goodrich's cases (3rd edition). Nature of the subject, penal laws, procedure, judgments, domicile, capacity, form, particular subjects, litigation, family law, inheritance, foreign administrators.
(3) II (McEwen, Moreland)

165a, b—TRUSTS AND FUTURE INTERESTS I, II. Scott's Cases (4th ed.) and Simes' Cases (2d ed.). Uses and Statute of Uses; trusts as to creation elements; transfer of beneficiary's interest; administration, termination and modification; charitable trusts; resulting and constructive trusts; powers. Types of future interests; construction problems; limitations to classes; rule against perpetuities; illegal restraints and conditions.
(3, 2) I, II (Matthews, Dukeminier)

- 166—SALES. Vold's Cases (2nd edition). Time of transfer of title; future goods, fungible goods, seller's lien, stoppage in transitu, conditional sales, documents of title, trust receipts; remedies of seller, buyer; express, implied warranties. (2) I (Ham)
- 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. (2) II (Oberst)
- 174—CREDIT TRANSACTIONS. Hanna's Cases on Security (2d ed., re-edited). Mortgages; creation, assignment, priority, foreclosure, redemption. Pledges, suretyship rights, suretyship defenses, Statute of Frauds. (3) II (Dukeminier)
- 176—TRADE REGULATION. Oppenheim's Cases. Unfair competition in promoting sales, obstruction of access to markets, price practices and price policies, combination and monopoly, anti-trust laws. (3) S (Oberst)
- 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)
- 180—LABOR LAW. Smith's Cases and Materials (2nd 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. (2) II (Staff)
- 186—LOCAL GOVERNMENT LAW. Fordham's Local Government Law. Legislative control over municipal corporations; municipal powers in general; licenses and franchises; appropriation of municipal funds; municipal contracts, indebtedness, torts, property, special assessments. (2) II (Staff)
- 187—CORPORATIONS. Dodd and Baker's Cases (2nd edition). Formation; entity concept; structure of management; problems of control; scope of corporate activities; powers, duties and responsibilities of directors; stockholders' derivative suits; stock; dividend; organic changes. (4) I (Ham)
- 189—INCOME TAXATION. Griswold's Cases on Federal Taxation (4th edition). Problems in federal and state income taxation. (3) II (Whiteside)
- 190—ESTATE, INHERITANCE AND GIFT TAXATION. Problems in state and federal estate, inheritance and gift taxation, with some attention to estate planning. (2) S (Whiteside and Dukeminier)
- 191a, b—EQUITY I, II. Chafee, Simpson and Maloney's Cases (3rd edition). The traditional equity materials. (2, 2) I, II (Moreland)
- 195—INTERNATIONAL LEGISLATION (SEMINAR). A course for second and third year law students on the development and codification of international law. History of codification; promotion of codification under League of Nations and United Nations; international law and war criminal trials; genocide pact; Universal Declaration and Covenant of Human Rights and other similar topics. (2) II (Gilliam)
- 197a-h—SEMINARS IN SELECTED LEGAL PROBLEMS. Under this title various seminars are offered in the second semester only. The range of seminar topics includes Anglo-American Legal History, Land Development and Planning, Legislation, Fiduciary Administration, Estate Planning, etc. (2) II (Staff)

VII. PHARMACY

Major programs leading to advanced degrees are not at present offered in the College of Pharmacy.

101a—ADVANCED ORGANIC PHARMACEUTICAL CHEMISTRY. A study of the classification, source, properties, synthesis and uses of organic medicinal chemicals used as therapeutic agents. Lecture, one hour; laboratory, four hours. *Prerequisites: Phar. Chem. 31a, b.* (3) I (Glasser)

101b—ADVANCED ORGANIC PHARMACEUTICAL CHEMISTRY. A continuation of 101a. Lecture, one hour; laboratory, four hours. *Prerequisites: Phar. Chem. 31a, b.* (3) II (Glasser)

102—BIOCHEMISTRY. Chemistry of carbohydrates, lipids, proteins, enzymes, and vitamins in relation to physiological processes. Special reference is made to compounds used in pharmacy. Included is practice in the use of the polarimeter, refractometer, colorimeter, Westphal balance, etc. Lecture, three hours; laboratory, three hours. *Prerequisites: Phar. Chem. 31a, b.* (4) I (Glasser)

103—DRUG ASSAY. Modern methods of analysis of medicinal 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. *Prerequisites: Chemistry 33 and 102.* (4) I (Glasser)

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 incompatibilities. Lecture, three hours. *Prerequisite: Chemistry 102.* (3) II (Glasser)

111a—DISPENSING PHARMACY. The application of fundamental pharmaceutical principles and techniques to the compounding of the various types of preparations encountered on prescriptions. Practical methods for insuring qualitative and quantitative accuracy are stressed. Lecture, three hours; laboratory, four hours. *Prerequisite: Pharmacy 27.* (5) I (Littlejohn)

111b—DISPENSING PHARMACY. Methods of detecting and handling common types of prescription incompatibilities. Film studies of projected handwritten prescriptions selected from current drug store files. Methods of prescription pricing. Lecture, three hours; laboratory, four hours. *Prerequisite: Pharmacy 111a.* (5) II (Littlejohn)

122a—MODERN THERAPEUTIC AGENTS. A study of the official drugs with special attention to chemical drugs. Emphasis is given to synonyms, proprietaries of like composition, uses, dosage and common compounding incompatibilities. Lecture, three hours. *Prerequisite: Pharmacy 24b.* (3) I (Rehberg)

122b—MODERN THERAPEUTIC AGENTS. A comprehensive comparative study of the newer drugs used in pharmacy. The uses, chemistry and proprietary forms of administration are considered. Lecture, three hours. *Prerequisite: Pharmacy 122.* (3) II (Rehberg)

130—MANUFACTURING PHARMACY. Methods of larger scale manufacture of compressed tablets, solutions, mixtures, ointments and creams, and suppositories. The use and care of equipment involved. Field trips to medium-sized pharmaceutical manufacturing concerns. Lecture, two hours; lab, three hours. Admission: By special permission of department head. (3) I, II (Rehberg)

138a—PHARMACOLOGY AND TOXICOLOGY. A presentation of the pharmacodynamic actions, modes of administration, toxic manifestations of drugs, and relationship of pharmacodynamic action to therapeutic use. Lecture, four hours; laboratory, two hours. (5) I (Walton)

138b—PHARMACOLOGY AND TOXICOLOGY. A continuation of 138a. Presenting to the student emergency treatment in cases of acute poisoning and mechanical injury. Standard First Aid Methods are demonstrated. Acute and chronic poisoning by noxious agents and application of remedial measures are discussed. Lecture, four hours; laboratory, two hours. (5) II (Walton)

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