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GENERAL LIBRARY

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GRADUATE SCHOOL

ANNOUNCEMENT 1936-37



Columbia, Missouri

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FEBRUARY 1, 1936

GRADUATE SCHOOL CALENDAR FOR 1936-37

Summer Session

1936

- June 8.....Monday, registration.
June 9.....Tuesday, 7 a. m. class work begins.
July 4.....Saturday, Independence Day, holiday.
July 13.....Monday, final date for submitting applications for advanced degrees.
July 20.....Monday, final date for submitting dissertations for advanced degrees.
July 26.....Sunday, 11 a. m., baccalaureate address.
July 31.....Friday, 4 p. m., summer session closes.
July 31.....Friday, 8 p. m., commencement exercises.

First Semester

- September 14.....Monday, registration.
September 15.....Tuesday 8 a. m., class work begins.
September 15.....Tuesday, 10 a. m., opening convocation.
October 19.....Monday, final date for submitting applications for advanced degrees.
November 2.....Monday, final date for preliminary examination. June commencement.
November 11.....Wednesday, 11 a. m., Armistice Day exercises.
November 25.....Wednesday, 4 p. m., Thanksgiving Day holidays begin.
November 30.....Monday, 8 a. m., Thanksgiving holidays close.
December 2.....Wednesday, final date for preliminary examination. August commencement.
December 18.....Friday, 4 p. m., Christmas holidays begin.

1937

- January 4.....Monday, 8 a. m., Christmas holidays close.
January 4.....Monday, final date for submitting dissertations for advanced degrees.
January 23.....Saturday, to }
January 30.....Saturday } mid-year examinations.
January 30.....Saturday, 4 p. m., first semester closes.

Second Semester

- February 1.....Monday, registration.
February 2.....Tuesday, 8 a. m., class work begins.
March 1.....Monday, final date for submitting applications for fellowships and scholarships for 1937-38.
March 25.....Thursday, 12 noon, Easter holidays begin.
March 29.....Monday, 8 a. m., Easter holidays close.
May 17.....Monday, final date for submitting dissertations for advanced degrees.
May 29.....Saturday, to }
June 5.....Saturday } final examinations.
June 6.....Sunday, 11 a. m., baccalaureate address.
June 9.....Wednesday, 10 a. m., commencement exercises.

GRADUATE SCHOOL ANNOUNCEMENTS

ADMISSION

Graduates of the colleges and universities comprising the Missouri College Union and of other reputable colleges and universities are admitted to the Graduate School. Graduates of Missouri State Teachers Colleges, whose first regular enrollment for college work in a teachers college was subsequent to September 1, 1916, and who have completed the 120-hour curriculum, will be admitted to the Graduate School. The list of universities and colleges approved by the Association of American Universities (see Twenty-sixth Annual Conference, 1924, pp. 35-39, and subsequent issues) will be used as a guide in the case of graduates of institutions formerly not admitted.

Admission to this school, however, shall not be understood as implying admission to candidacy for advanced degrees, which is subject to the regulations indicated below.

Students are admitted to the Graduate School by the Registrar of the University, to whom applications for admission and official transcript of records, including statement of degree or degrees, should be sent before the opening of the session.

FEES AND EXPENSES

LIBRARY, HOSPITAL, AND INCIDENTAL FEE: Graduate students in the regular and summer session, except those specially exempt by rules of the Curators (see below, page 4), are required to pay a library, hospital, and incidental fee of \$3.50 per credit hour.

Graduate students taking courses in the School of Law are required to pay an extra charge of fifty cents per credit hour for that course; in the School of Medicine, an extra charge of seventy-five cents per credit hour. Students registered for ten credit hours or more are entitled to free medical attention and hospital care.

Students taking work away from the University and not in residence in Columbia, and whose work is not organized in the Extension Division, pay a fee of \$2.00 per credit hour. Such students have no hospital privileges.

ACTIVITY FEE: Every student is required to purchase each semester for \$5.75 a student activity ticket which entitles the student to admission to all intercollegiate athletic contests, Fine Arts concerts, some dramatic and forensic events, special lectures, a subscription to the weekly student paper, and a copy of the student annual.

FEE FOR LATE REGISTRATION: Every student who files his study card after the close of the last day of registration must pay a fee of \$5 for late registration in addition to fees already provided for.

FEES FOR EXAMINATION: Candidates for an advanced degree, who have completed in a previous semester or term all requirements but the final examination and the submission to the Graduate Faculty of a thesis (if required) and who are not regularly enrolled in the Graduate School, must enroll in the Graduate School before the examination may be given or the thesis read. Students shall enroll for "examination" for no hours credit and pay an incidental fee of \$5.00. A similar regulation applies to candidates not regularly enrolled in the Graduate School who desire to take the preliminary examination for the degree, Doctor of Philosophy.

FEE FOR DIPLOMA, CERTIFICATE, AND HOOD: A diploma fee of \$5 must be paid for each degree or life certificate taken in the University, and a fee of \$2 each for other

certificates. Those receiving the Ph.D. degree are furnished hoods. The fee for each hood is about \$15.

CHANGES IN FEES: The University reserves the right to make at any time changes in any or all fees without advance notice.

LIVING EXPENSES: The estimated cost of room rent for students living in Read Hall, the dormitory for women, varies, according to the room, from \$40 to \$50 a semester. Room rent in private houses varies. The average is about \$50 a semester. The average cost of board is about \$75 a semester. The expense of the average male student per semester is about \$250; for a woman this item will usually be somewhat higher. No provision is made in this estimate for clothing and railway fares.

For further details regarding fees see the General University Catalog.

FELLOWSHIPS, SCHOLARSHIPS, PRIZES, LOAN FUNDS

UNIVERSITY FELLOWSHIPS AND SCHOLARSHIPS: The University offers annually a limited number of University Fellowships yielding each a stipend of \$600 a year. These fellowships will be awarded, according as the applicants, irrespective of department, have successfully completed at least one year of graduate study and have demonstrated their ability to render service in the form of research. The University offers also a limited number of Scholarships bearing stipends of \$300 annually, open to graduate students of high promise in scholarship, irrespective of the lines of work they may desire to pursue. It is expected that scholars will be well qualified to do graduate work in the subjects which they elect and that they will devote themselves mainly to work in these subjects. University fellows and scholars are allowed to engage in outside work only with the consent of the Dean of the Graduate Faculty and the professor of the major subject that they elect. The Executive Board, upon the recommendation of the dean and professor, may deprive any student of his fellowship, whenever it may appear that he is not devoting himself as he should to his work as fellow or scholar. Applications must be filed not later than March 1, in order to receive consideration in the award for the following academic year. Applications received after this date and not later than June 1 will be considered in filling any vacancies that may occur in the fellowships or scholarships. Application blanks may be obtained from the Registrar of the University and when filled out should be sent to the Dean of the Graduate Faculty, Columbia, Missouri.

GREGORY FELLOWSHIPS AND SCHOLARSHIPS: By the terms of the will of the late Charles R. Gregory of St. Louis, Missouri, the residue of his estate, amounting to approximately \$225,000, after providing for numerous bequests to charitable institutions, was left to the University of Missouri at Columbia to establish "The William Alexander Gregory Educational Fund." This must be invested by the Board of Curators "in a safe and prudent manner, the income from which shall be used in assisting white students of either sex in obtaining an education in any of the courses in said institution."

The Board of Curators has seen fit to provide that not more than \$3,000 annually from this income may be used for the establishment and maintenance of fellowships and scholarships in the Graduate School to be known as the "Gregory Fellowships and Scholarships." These are awarded on the same conditions as the University Fellowships and Scholarships.

PEABODY SCHOLARSHIP IN EDUCATION: In June, 1912, the trustees of the Peabody Education Fund gave the University the sum of \$6,000 on condition that it be held and used as an endowment of a Peabody Graduate Scholarship in education. This scholarship is awarded on the same conditions as apply to University Scholarships.

CURATORS' SCHOLARSHIPS FOR HONOR GRADUATES OF MISSOURI COLLEGES: The Board of Curators, in an attempt to encourage high scholarship, offers annually to the honor graduate, or the student attaining the highest scholastic rank in the graduating class, of each year of the following fully accredited Missouri colleges and schools a scholarship amounting to exemption for the first two semesters from the Library, Hospital, and Incidental fee:

Missouri College Union. Scholarships are available to those taking the degree of A.B. or B.S. in the following colleges: Central College, Culver-Stockton College, Drury College, Lindenwood College, Missouri Valley College, Park College, St. Louis University, Tarkio College, Washington University, Westminster College, William Jewell College.

Teachers Colleges. Scholarships are available to those taking the degree of A. B. or B. S. in the following colleges: Central State Teachers College, Warrensburg; Northeast State Teachers College, Kirksville; Northwest State Teachers College, Maryville; Southeast State Teachers College, Cape Girardeau; Southwest State Teachers College, Springfield; Harris Teachers College, St. Louis.

To obtain one of these scholarships, the student must enroll in the University for the session immediately following graduation from the school in which the scholarship was earned. In the event that the first-rank graduate fails to accept the scholarship, it may become available for the graduate who stands second; or, eventually for the one who stands third, but no lower. Certification of the student's attainment is to be made by the proper official of the institution to the Secretary of the Board of Curators on forms furnished by the latter.

AGRICULTURAL RESEARCH FELLOWSHIPS AND SCHOLARSHIPS: The University offers annually a limited number of research fellowships in the Agricultural Experiment Station, each of the value of \$600, and scholarships, each of the value of \$300. It is the purpose of these fellowships and scholarships to foster and encourage original investigation and to give opportunity to students who desire to become efficient investigators in the field of agricultural science. They are awarded on the same conditions as the University Fellowships and Scholarships. All candidates for these fellowships and scholarships must fulfill the requirements for admission to the Graduate School of the University. (See page 3).

These fellowships and scholarships are available in the department of agricultural chemistry, agricultural economics, animal husbandry, dairy husbandry, entomology, farm crops, horticulture, botany, rural sociology, soils, and veterinary science. They will be awarded to the candidates who are best prepared and are of the highest promise in scholarship. Application blanks for these fellowships may be obtained from the Director of the Agricultural Experiment Station, Columbia, Missouri. Applications must be filed not later than March 1, in order to receive consideration in the award for the next academic year. Applications received after this date will be considered in filling any vacancies that may occur in these fellowships or scholarships.

VOLKER SCHOLARSHIP IN SOCIAL SERVICE: William Volker of Kansas City, has established in the department of sociology, in order to encourage training in social welfare work, a graduate scholarship of the annual value of \$300. The scholarship will be awarded on the same conditions as apply to the University Scholarships.

ST. LOUIS ALUMNI GRADUATE SCHOLARSHIP. A scholarship of the value of \$300 has been provided by the St. Louis Alumni Loan and Scholarship Fund. This scholarship is awarded on the same conditions as apply to University Scholarships.

THE BAIRD CLASSICAL SCHOLARSHIP. Through the generosity of the Honorable Charles Baird, of Kansas City,¹ Chairman of the Board of Visitors of the University, a scholarship of \$100 is offered for the year 1936-7 for the encouragement of scholarly attainment in Greek and Latin literature.

This scholarship may be held by either a graduate or an undergraduate student.

JOHN W. JEWELL SCHOLARSHIP (GRADUATE): A scholarship in journalism amounting to \$50 a year is awarded each year to the student who, having completed his undergraduate work in journalism, is deemed worthiest—scholarship, character, need of financial assistance, and general fitness for newspaper work being taken into consideration. Funds for this and for four undergraduate John W. Jewell Scholarships were given by the widow and the father of the late John W. Jewell, a former student in the School of Journalism.

TEACHING FELLOWSHIPS AND GRADUATE ASSISTANTS: A limited number of Teaching Fellowships and Graduate Assistantships, which entitle the holder to a stipend up to six hundred dollars for the two semesters according to the service rendered, are available in the several departments including Agricultural Economics, Agricultural Engineering, Anatomy, Animal Husbandry, Astronomy, Botany, Chemistry, Dairy Husbandry, Geology, Home Economics, Horticulture, Mathematics, Physics, Soils, Zoology, etc. Assistantships in Comparative Physiology in connection with the Laboratory for Interior Fisheries Investigations of the Bureau of Fisheries are also available. Teaching Fellows and Graduate Assistants may complete a full year of residence by registering for three-fourths of a full program during the two semesters and devoting their entire time to graduate study during the summer session.

Applications for Teaching Fellowships or Graduate Assistantships may be filed with the Dean of the Graduate School or sent directly to the chairman of the department concerned.

SCHOLARSHIPS IN ZOOLOGY: Three scholarships of the annual value of \$100 for aid for study at the Woods Hole Biological Laboratory or some similar purpose are open to graduate student in the Department of Zoology. These are the Jonas Viles Jr. Scholarship, the Clarence Clinton Crouch Scholarship and the Winterton Conway Curtis Scholarship.

SUMMER SESSION SCHOLARSHIPS FOR MEMBERS OF FACULTIES OF MISSOURI COLLEGES: In order to make available to teachers in Missouri Colleges the resources of the University for graduate instruction, the Board of Curators has created five summer session scholarships for each college faculty in Missouri. These scholarships bear exemption from the library, hospital, and incidental fees.

PRIZES: The following prizes offered by the English Department are open to graduate students:

The Mahan Poetry Prizes of \$100, \$25, and \$10; contests closing in November.

The Mahan Debate Prize of \$25.00, closing in December.

The Mahan University Essay Prizes of \$50 and \$15; contest closing in January.

The Dramatic Prize of \$50 for One-Act Plays, awarded by the Dramatic Arts Club and the Missouri Workshop; contest closing in March.

The Stephens Medal for Orations, closing in April.

The Mahan Story Prizes of \$100, \$25, and \$10; contest closing in May.

The McAnally Medal for English Semester Essays.

For detailed regulations and conditions of these literary contests, see the General Catalog of the University of Missouri.

LOAN FUNDS: Under certain conditions, graduate students may avail themselves of financial aid from the various funds that have been established from time to time for this purpose by benefactors and friends of the University. Applications, together with full information and recommendations, should be addressed to the Secretary of the University.

SOCIETIES, PUBLICATIONS, LIBRARIES, LABORATORIES

LITERARY AND SCIENTIFIC SOCIETIES: A large number of literary and scientific societies are maintained in the University, with practically each department and each special field of interest represented. Some of these are conducted by members of the faculty and are open to advanced students. Others are conducted by students, in some cases with the participation of members of the faculty.

HONORARY SOCIETIES: There are a number of honorary societies in the University, organized for the purpose of raising scholastic and cultural standards in their respective lines. In addition to the general literary society, Phi Beta Kappa, the scientific society, Sigma Xi, the social science society, Alpha Pi Zeta, the national mathematical society, Phi Mu Epsilon, the national musical fraternity, Phi Mu Alpha, and general honor societies, there are similar organizations in the School of Law, Medicine, Journalism, Education, Business and Public Administration, the Graduate School, the Colleges of Arts and Science, Agriculture and Engineering, and in several of the departments.

PUBLICATIONS: The "University of Missouri Studies", several series in "The University of Missouri Bulletin," and the "Publication of the Agricultural Experiment Station" are maintained as a means of publishing the results of original research in the University by instructors and graduate students. (See p. 83).

UNIVERSITY LIBRARIES, LABORATORIES, AND MUSEUMS

LIBRARIES: The University libraries comprise the general library and many departmental libraries. They contain 333,126 bound volumes and many pamphlets. Students have access also to the library of the State Historical Society of 100,000 titles and 90,000 duplicates. The distinguished scholar and author, Dr. William Benjamin Smith, Professor in the University of Missouri from 1885 to 1893 (Tulane University, 1893-1906; emeritus, 1906-1934), has generously presented to the University his private library, consisting of over 3,000 carefully selected volumes, many of them rare and semi-rare books of great value, and containing especially rich collections of works on mathematics, physics, philosophy, religion, and Old and New Testament criticism. The Irion library, a professional library in Education, has recently been added to the library facilities.

LABORATORIES: Facilities for research in the sciences are provided in the following laboratories: agricultural engineering, animal husbandry, anatomy, astronomy, bacteriology, botany, chemistry, agricultural chemistry, dairy husbandry, engineering (civil, electrical, chemical, sanitary, and mechanical), entomology, experimental psychology, educational psychology, farm crops, geography, geology, mineralogy, home economics, horticulture, pathology, pharmacology, physics, physiology, physiological chemistry, soils, veterinary science, and zoology.

MUSEUMS: There are also museums of art, classical archaeology, ethnology, geology and other collections.

REGISTRATION

Directions for registration will be placed in each student's hands by the Registrar. Two days (see calendar, p. 2) are set apart for registration. On the first of these the student should consult his major adviser, or the representative of that department in which he wishes to major, and have his course of study outlined and ready to present to the dean on that or the following day.

PART-TIME REGISTRATION BY STUDENTS WITHIN REACH OF COLUMBIA BY MOTOR AND RAIL

Teachers, ministers, professional men, and others who are within easy reach of Columbia by motor or rail may register for graduate seminars, individual conferences, and courses which are given only once or twice a week and which, if due request is made, may be scheduled at a time convenient to the members of the class.

GRADUATE STUDENTS NOT CANDIDATES FOR A DEGREE

Graduate students who are not candidates for a higher degree are not required to select a major adviser or field of specialization, but may, with the approval of the Dean of the Graduate School, select their work for the special purpose for which they are in attendance at the University from the courses for which they have the requisite preparation. Should such students subsequently desire to become candidates for a degree, that part only of the work already done will be accepted which, in the judgment of the adviser or advisory committee, properly belongs in the field of specialization and the student will be required to complete whatever work is necessary for fulfilling the requirements for the degree.

REGULATIONS GOVERNING THE DEGREE OF MASTER OF ARTS

1. GENERAL STATEMENT

The degree of Master of Arts is offered to students who have spent in residence at least two semesters or four summer sessions (with the exception noted below) exclusively devoted to advanced courses of study and who have submitted an acceptable dissertation, when required by the department of the candidate's major subject, and passed a final examination.

2. ACCEPTANCE OF CANDIDATE

After admission to the Graduate School, a student wishing to become a candidate for this degree must fill out, in consultation with his major adviser, (and minor adviser if a minor is offered), upon a blank form provided for the purpose, a full statement of all the work he proposes to offer for the degree, and must present it to the Dean of the Graduate Faculty not later than one month after his or her registration, as indicated in the Graduate School Calendar (p. 2).

In making such application, the student must indicate his major field of work, (and minor field if a minor is offered), the subject of the dissertation, when one is required, the undergraduate prerequisites completed and uncompleted for graduate work in the special field, the course of study selected by him with the advice of his major adviser (and minor adviser if a minor is offered), secure the signature of his major adviser (and minor adviser if a minor is offered) to the blank form indicated above, before presenting it to the Graduate office for approval. He may, however, defer submitting the subject of the dissertation for not more than two weeks after filing the application.

A student who fails to file application for his degree in due time may not be recommended for the degree at the appropriate commencement.

3. REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS

a. *Residence*; Two semesters of sixteen weeks each, or four summer sessions of eight weeks each, devoted to advanced courses of study are required for the degree of Master of Arts. The minimum residence at the University is three summer terms or one semester and a summer term. Not more than a total of 8 hours toward the Master of Arts degree may be earned off the University campus, by non-resident research, by correspondence in extension center courses or in another university having a recognized Graduate School (see below under 4). No work shall be counted as residence unless the student is in actual attendance at the University for the number of hours per week for which such credit is given.

b. *Course of Study*; Over and above the prerequisites for graduate work in the special field thirty-two hours selected from courses receiving graduate credit, as listed in this announcement, must be completed. Not less than 16 hours must be in courses numbered 200 or above. For courses not listed in this announcement the office of the Dean of the Graduate School should be consulted. Courses numbered below 100 do not receive credit toward an advanced degree.

The course of study for the degree of Master of Arts may be chosen from one or more departments provided it constitutes a unified program approved by the major adviser and the Dean of the Graduate School. A minor need not be offered in fulfillment of the requirements for the degree of Master of Arts. If a minor is offered it must be not less than ten hours, must be approved by the professor of the minor subject and shall be included in the final examination.

c. *Dissertation*; The dissertation, when required, must demonstrate the student's capacity for research and independent thought and must be submitted to the Graduate Faculty on or before final date set in the Graduate School Calendar (p. 2). The student should consult the chairman of the department in which he wishes to major in regard to the requirements for the dissertation and the Dean of the Graduate Faculty for information regarding the form in which the dissertation must be submitted.

Credit for the dissertation is counted in terms of hours in making up the total of thirty-two hours required for the degree; the number of hours credit that may be allowed for the dissertation varies with different departments.

For the Master of Arts and Master of Science in Engineering with designation of the field, a dissertation is required by the following departments:

Agricultural Chemistry	Horticulture
Anatomy	Journalism
Astronomy	Mechanical Engineering
Biochemistry	Medical Bacteriology and Preventive Medicine
Botany	Music
Chemistry	Pathology
Classical Languages and Archaeology	Philosophy
Electrical Engineering	Physical Education
English	Physiology and Pharmacology
Entomology	Political Science
French and Italian	Poultry Husbandry
Geology	Psychology
Geography	Rural Sociology
Germanic Languages	Sociology
History	Soils
Home Economics	

A dissertation is not required, or is optional, in the following departments:

Accounting and Statistics	Education
Agricultural Economics	Field Crops
Animal Husbandry	Mathematics
Art	Physics
Civil Engineering	Spanish
Chemical Engineering	Veterinary Science
Dairy Husbandry	Zoology
Economics and Finance	

d. *Final Examination*; Each candidate for the degree of Master of Arts is required to pass a final examination evincing a mastery of the fundamental principles of the work included in the course of study offered for the degree.

e. *Time limit*; The work included in a program for the degree Master of Arts must be completed within the period of eight years of the date of the final examination for the degree. Work taken previous to this time will be considered invalidated by the passage of time. This regulation becomes effective September 1, 1937.

4. CORRESPONDENCE AND EXTENSION CENTER COURSES

A total of eight hours or the equivalent of one summer session may be earned through the University of Missouri Extension Division, by correspondence courses or by extension center courses conducted by members of the Graduate Faculty. The correspondence courses and extension center courses must have been approved for graduate credit and must be approved also for inclusion in the course of study for the master's degree by the major professor and the Dean of the Graduate School. After June 1, 1933 graduate work by correspondence to be applied toward a Master of Arts degree may be taken only after the completion of at least one summer of residence in the Graduate School at the University of Missouri. For further information in regard to correspondence and extension center courses address the Director of University Extension, University of Missouri.

The Graduate School will not accept from any other institution credit earned through correspondence or extension.

5. NON-RESIDENT RESEARCH

When the facilities or materials necessitate the work being done away from the University, a student, upon the recommendation of the major adviser and the approval of the Administrative Committee of the Graduate School, may regularly enroll for research work to be done away from the University. This will be known as non-resident research and must be indicated as "non-resident" on the course card and on the Registrar's records. To enroll for non-resident research a student must have been in residence in the Graduate School at least one full summer term or one semester of part time. Candidates for the Master of Arts degree may not register for non-resident research for more than 4 hours per semester. The total credit toward the Master of Arts degree for work done away from the University is limited to 8 hours. (See under residence). The results of non-resident research must ordinarily form part of a dissertation duly presented to the Graduate Faculty in partial fulfillment of the requirements for an advanced degree.

6. ADVANCED STANDING FOR THE MASTER OF ARTS DEGREE

(a) *From other institutions*

Not more than eight of the thirty-two hours required may be transferred from another institution and such credit will be accepted only in case the other institution has a recognized graduate school. Of such credit transferred only that approved

by the major adviser and the Dean of the Graduate School may be included in the program (see course of study) offered toward the degree of Master of Arts.

(b) *From the University of Missouri*

Seniors, who at the beginning of any semester have a graduation requirement for the bachelor's degree of fifteen hours or less, may be permitted, with the approval of the appropriate deans, to register simultaneously in the Graduate School for courses sufficient to make a full program. Students who graduated with excess undergraduate credits before 1923 will *not* receive credit for the same hereafter. Students who graduated between 1923 and 1925 received credit as heretofore; but each year, in order, one of the years between 1923 and 1925 has been eliminated from this category until February 1932 this privilege was abolished altogether.

Similar credits may be allowed a student for excess undergraduate work from another institution having a graduate school, to the extent of one-half of one semester (namely, eight hours), if such advanced standing would be granted by the graduate school of that institution. If the institution in question has not a graduate school that may be recognized as such, no advanced standing will be allowed.

The student will be held responsible in the master's examination for all credit in advanced standing presented in candidacy for the degree.

7. REQUIREMENT FOR THE DEGREE IN EXCEPTIONAL CASES

Attention is called to the fact that graduate work cannot be subject to rigid regulation, and the Graduate Faculty reserves the right to deal with exceptional cases on individual merit.

8. RECOMMENDATIONS FOR THE DEGREE

With the approval of the professors concerned, such candidates as have fully met all requirements may, at the close of the fall or winter term, or any summer session, be recommended by the Graduate Faculty for the degree of Master of Arts.

REGULATIONS GOVERNING THE DEGREE OF MASTER OF SCIENCE WITH DESIGNATION IN ENGINEERING

The general regulations in effect for the degree of Master of Science with designation of the field of specialization in engineering are the same as those for the degree of Master of Arts.

Admission to candidacy is open to applicants with the degree of Bachelor of Science in Engineering, or the substantial equivalent of the required undergraduate courses in the field of specialization. Programs adapted to the needs of other college graduates with adequate preparation in mathematics and science may be arranged. Special consideration will be given to the graduate interests of teachers of engineering and science.

REGULATIONS GOVERNING THE DEGREE OF MASTER OF EDUCATION

1. GENERAL STATEMENT

The degree Master of Education is offered to students who have pursued advanced courses of study for two semesters of sixteen weeks each or four summer sessions of eight weeks each.

2. ACCEPTANCE OF CANDIDATES

The candidate for the degree Master of Education must have completed not less than 15 hours of work in undergraduate courses in education in an approved institution. After admission to the Graduate School a student wishing to become a candidate for this degree must select a major adviser in the field of Education in which

he wishes to specialize (for list of major advisers see page 34 herein.) In consultation with his major adviser he must fill out, upon a blank form provided for the purpose, a full statement of all the work he proposes to offer for the degree and present it in quadruplicate to the Dean of the School of Education not later than one month after enrollment. A student who fails to file application for his degree in due time may not be recommended for the degree at the appropriate commencement.

3. REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION

a. *Residence:* Two semesters of sixteen weeks each, or four summer sessions of eight weeks each, devoted to advanced courses of study are required for the degree of Master of Education. This requirement may be met in part by correspondence work, extension center work, field work under the direction of a resident University staff member, or by credit earned in the graduate school of another institution of recognized standing. A maximum total of 8 hours of work taken off the campus may be credited toward the degree. Only candidates who have completed 16 hours of work on the campus will be eligible to pursue field work.

b. *Course of Study:* Over and above the prerequisites, a program of studies comprising at least 32 semester hours of work approved for graduate credit, sixteen of which must be in courses numbered 200 or above, must be completed. The program must include not less than 16 hours of graduate courses in education. The program may consist entirely of courses in education or may be made up in part of courses from other departments selected to fit the professional needs of the candidate.

c. *Dissertation:* A dissertation is not required but the major adviser may require written reports of field work or special investigations.

d. *Final Examinations:* A final examination, comprehensive in character and in the professional field in which the candidate takes work is required.

REGULATIONS GOVERNING THE DEGREE OF DOCTOR OF PHILOSOPHY

1. GENERAL STATEMENT

The degree of Doctor of Philosophy is offered to students who have pursued advanced courses of study without serious interruption for a period of at least six semesters, who have submitted an acceptable dissertation, passed all prescribed examinations and satisfactorily met all other requirements described below.

It should be emphasized that the requirements for this degree are not computed in terms of time and courses but that the degree is conferred only upon such students as have reached, after long study, a high attainment in some special branch of learning and have given the clearest evidence of their ability to carry on independent, original research by reason of having made an actual contribution to knowledge of a character approved by competent judges.

2. ACCEPTANCE OF CANDIDATES

In order to be accepted by the Graduate Faculty as a candidate for the degree of Doctor of Philosophy, the student must give evidence that he has completed an undergraduate course of study such as is offered by colleges of good standing and that he has received a baccalaureate degree equivalent to the baccalaureate degree of the University of Missouri.

He must also declare his candidacy by filling out, not later than the beginning of

his second year of graduate work,* a blank form provided for the purpose, secure thereto the signature of the adviser under whose direction he desires to do his research work, and present it to the Dean of the Graduate School for his approval

3. REQUIREMENTS FOR THE DEGREE

(a) *Residence.*—The candidate must pursue advanced courses of study without serious interruption for a period of six semesters. If any of the years of advanced work have been passed away from this University the faculty reserves the right to decide in each case whether these years may be properly regarded as spent in university studies under suitable guidance and favorable conditions. Private study or study pursued at a distance from libraries and laboratories will not be considered as equivalent to university work. In any case, the student must spend the two semesters immediately preceding his final examination in residence at the University of Missouri, unless specifically authorized by the Graduate Faculty to do otherwise.

(b) *Subjects of Study.*—The subjects of study may be chosen from one or more departments, as may be determined by the advisory committee; but shall constitute a definite plan of training for research or scholarly investigation in some particular field.

(c) *Dissertation.*—The dissertation, embodying the results of original investigation must be written upon a subject approved by the adviser and must be submitted in typewritten form four weeks before the commencement at which the degree is sought. It then becomes the property of the University. A brief biographical sketch of the writer must be appended to the dissertation. The student should consult the Dean of the Graduate Faculty for information regarding the form in which the dissertation must be presented.

Upon receiving the dissertation a committee is appointed whose duty it is to report upon it in writing to the Graduate Faculty.

The candidate is required to print the dissertation with such revision as the faculty may allow. Before his degree is conferred, the candidate is required to deposit 100 printed copies of his dissertation in the University Library. Or, in case the dissertation has not been printed before the conferring of the degree, the candidate may (1) deposit with the Secretary of the University a statement from a responsible publishing agency certifying to the fact that a contract has been entered into for the printing of the dissertation, and that the required number of copies will be furnished within a reasonable time; or (2) the candidate may deposit with the Secretary of the University a financial guarantee sufficient to print the required number of copies for the University. With the special permission of the Dean of the Graduate Faculty, the publication of the substantial contribution to knowledge may be accepted in lieu of the publication of the entire dissertation.

In the publication of a thesis in whole or in part suitable acknowledgment must be included indicating the publication to be a thesis or portion of a thesis submitted to the Graduate Faculty of the University of Missouri in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

(d) *Examinations.*—Upon the request of the major adviser a committee, consisting of the members of the advisory committee and such others as the dean may

*Students who have done graduate work elsewhere may, with the consent of the adviser and the dean, be admitted to candidacy at a later stage in their study. When such approval is given the dean shall appoint, in consultation with the adviser, an advisory committee to confer as to the future work of the candidate.

select, shall be appointed to take charge of all examinations and to report upon the same to the dean in writing.

At least one year before the final examination, the candidate is required to pass a preliminary examination conducted by the examining committee.*

The final examination may be either written or oral or both; and, if oral, may be conducted in the presence of the faculty.

(e) *Languages*.—Before being admitted to the preliminary examination the candidate must give satisfactory evidence of ability to translate French and German readily at sight. In especial cases with the approval of the Administrative Committee of the Graduate School students may be allowed to substitute other languages. In the case of a candidate for the doctorate majoring in French or German some other language, modern or ancient, shall be substituted for the language of the major.

(f) *Conferring of Degrees*.—Upon the satisfactory completion of all requirements the candidate may be recommended by the Graduate Faculty for the degree of Doctor of Philosophy.

WORK FOR THE DEGREE DOCTOR OF PHILOSOPHY AT ROLLA

Candidates for the degree, Doctor of Philosophy in the fields of Chemistry, Metallurgy, and Geology may meet requirements for the degree by residence at the University of Missouri School of Mines and Metallurgy at Rolla. Such candidates must register with the Graduate School of the University of Missouri at Columbia and are subject to all the regulations of the Graduate School. Candidates in Chemistry and Geology, taking work at Rolla, must spend not less than one year in residence at Columbia.

REGULATIONS GOVERNING THE DEGREE OF DOCTOR OF EDUCATION

1. GENERAL STATEMENT

The degree of Doctor of Education is offered to students who have pursued advanced courses of study without serious interruption for a period of at least six semesters.

2. ACCEPTANCE OF CANDIDATES

Candidates for the degree, Doctor of Education, must have attained the degree Master of Arts with a major in education or the Master of Education, or the quantitative and qualitative equivalent of one of these degrees from a college or university of recognized standing. He must declare his candidacy by filling out, not later than one month after his registration for the second year of graduate work, a blank form provided for the purpose, secure thereto the signature of the adviser under whom he wishes to do his graduate work, and present it to the Dean of the Graduate School.

3. REQUIREMENTS FOR THE DEGREE DOCTOR OF EDUCATION

a. *Residence*: Three years of work above the undergraduate degree is required as a minimum for the degree Doctor of Education. With the approval of the major adviser and the Dean of the Graduate School a maximum of two years of graduate work completed in other institutions with recognized graduate schools may be accepted toward the requirement. In any event the candidate must be enrolled in residence on the campus of the University of Missouri for a minimum of one year.

*This examination may, with the consent of the dean, be met at the beginning of the last year of residence.

b. *Subjects of Study:* The program of study is determined by the major adviser in cooperation with a consulting committee appointed by the Dean of the Graduate School and shall constitute a well organized plan of professional specialization in some one of the major fields of education.

c. *Dissertation:* A dissertation is required, for which not less than 8 nor more than 12 hours of credit may be granted. The dissertation shall embody the results of an investigation which may be carried on under supervision in practical school situations and may, with the consent and advice of his major adviser and consulting committee, consist of two or three lesser educational projects. The candidate must deposit not fewer than three typewritten copies of his dissertation on or before a date set by the Faculty of the School of Education. After the dissertation has been submitted it is reviewed by the consulting committee. The dissertation shall be the property of the University of Missouri. The candidate is not required to publish this dissertation.

d. *Apprentice Training:* If a candidate majors in some aspects of educational administration or supervision or special field of teaching and has not had acceptable experience in this field, the major adviser may require as part of his program of studies one semester of apprentice work under proper supervision in a school system approved for such work by the Faculty of Education. The supervision of apprentice work shall be under the immediate direction of the candidate's major adviser, in which case not more than 12 hours credit (the equivalent of one semester) may be granted for such work. Only students who have completed a minimum of 12 hours beyond the A. M., M. Ed., or the equivalent thereof shall be eligible for apprentice training.

e. *Examinations:* A matriculation examination, which may be oral or written or both as determined by the major adviser, must be taken not earlier than the second year of graduate work, nor later than November 1 preceding the June in which the candidate plans to complete the requirements for the degree, or the preceding December 1 if the requirements are to be completed in August. The examination is a comprehensive one including the candidate's major fields of interest for the degree and is conducted by the major adviser and consulting committee. If the results of the examination are such as to give evidence that the candidate can pursue further graduate study profitably, he will be advised to do so.

A final oral examination on the work included in the dissertation is also required. This is conducted by the major adviser and consulting committee.

f. **REQUIRED RESEARCH TECHNIQUES:** The candidate is required to give satisfactory evidence of sufficient knowledge of statistics and educational research techniques as to enable him to understand and utilize research reports in the field of education. Acquaintance with foreign languages will not be required except as may be determined by the candidate's major adviser.

COURSES OF INSTRUCTION

Courses preceded by a number with letter f attached, thus: 104f, 106f, are given in the fall semester. Those preceded by a number with the letter w attached, thus: 104w, 106w, are given in the winter semester. Those preceded by a number with the letter s attached, thus: 175s, are given in the summer session. The number of hours credit given for a course for each term is indicated by the arabic numerals in parentheses following the statement of the course. Courses numbered 200 and above are strictly graduate in character.

The amount of work that can be offered during the summer depends upon the demand and is subject to change. The special *Bulletin of the Summer Session* gives later information. Students desiring upperclass and graduate courses would do well to inquire in advance of their coming regarding the work available in the department or departments in which they wish to work during the summer session.

ACCOUNTING AND STATISTICS

Prerequisites for graduate study: The student must have the equivalent of an undergraduate major in closely related courses in this and associated departments.

107s, f and w. **ELEMENTARY STATISTICS.** The elementary principles of statistics as applied in the scientific study and interpretation of business, economic, social and political problems and data. Emphasis is placed primarily on a critical appreciation of the general processes involved rather than a detailed study of technique. Students in other divisions who are interested primarily in sampling, frequency distribution analysis, testing the homogeneity of experimental data, tests of significance or reliability of computed values, etc., may register for partial credit after consultation with the instructor. (3) MR. HARTKEMEIER.

108w. **BUSINESS STATISTICS.** Prerequisite, 107. A study of the statistical work of a large number of existing business organizations. The student learns how statistical methods are used in actual practice, what they are intended to accomplish, and how successful they are. Modern methods of recording and analyzing internal and external statistical data by the use of International Business Machines equipment are illustrated and considered in detail. (3) MR. HARTKEMEIER.

109f. **CORRELATION.** The measurement of relationship between variables, the correlation of time series, and the relation between correlation and causation. Detailed instruction in technique and machine computation. Laboratory instruction in the use of punched card sorting and tabulating equipment. (3) MR. HARTKEMEIER.

117f and w. **INTERMEDIATE ACCOUNTING.** Prerequisite, course 17. An intensive study of the evaluation and treatment of assets and liabilities, including consideration of related principles of profits determination. Also a study of special problems such as depreciation, branch house accounting, statement of affairs, fiduciary accounts and consolidated statements. (4) MR. SCOTT.

120s and w. **PROBLEMS IN ACCOUNTING PRACTICE.** Prerequisite, 117. Solution and discussion of problems taken principally from C. P. A. and other examinations, and a brief study covering the planning and installation of accounting systems. (3) MR. BAUER.

121f. **INDUSTRIAL ACCOUNTING.** Prerequisite, course 117. A study of industrial accounting technique and its place in the development of accounts. (2) MR. SCOTT.

123w. **CONSOLIDATED STATEMENTS.** Prerequisite, course 117. A study of the problems raised by the necessity of adjusting accounts to the current trend towards consolidation in business organization. (2) MR. SCOTT.

127w. **ADVANCED STATISTICS.** Prerequisite, 107. Curve fitting, sampling, probability, and the analysis of variance and covariance. The theory of non-linear, partial, and multiple correlation. Complex problems are solved by extensive use of the punched card tabulating equipment. (3) MR. HARTKEMEIER.

128f. **MANAGERIAL ACCOUNTS AND STATISTICS.** Prerequisite, courses 107 and 117. A study of the use of accounts and statistics for the purpose of the direction of business policy. (3) MR. SCOTT.

133w. MUNICIPAL AND INSTITUTIONAL ACCOUNTING. Prerequisite, 117. Accounting and budgetary control as related to the financial problems of governmental and institutional organizations. (2) MR. BAUER.

134f. AUDITING. Prerequisite, 117. Principles and procedures. A summary review of accounting principles in their relation to the work of the public accountant. (3) MR. BAUER.

138w. MERCANTILE ORGANIZATION AND CREDITS. Prerequisite, 17. The administration of the relations of business enterprise with outside parties—current creditors, customers, etc.—with especial emphasis on retail selling methods. (3) MR. BAUER.

195s, f and w. SPECIAL PROBLEMS. (1-3).

197f. CONTROVERSIAL ACCOUNTING PROBLEMS. Prerequisite, 117 and consent of instructor. A study of conflicting views of accountants on numerous specific problems. Such conflicts typically arise out of a divergence between accounting theory and rules of thumb which develop directly out of practice. (2) MR. BAUER.

217s. THEORY OF ACCOUNTING STATEMENTS. Prerequisite, 117. A study of the problems arising out of the preparation of summary accounting statements. Students will be required to cover a variety of assignments in accounting literature as the basis for class discussion and individual reports. (3) MR. BAUER.

220f. BUSINESS CYCLES, FORECASTING, AND STABILIZATION. Prerequisite, 107. If the student has not taken 109, this course must be taken at the same time as 220. The theory, history, and statistics of business cycles and the problems of their prediction and control. Their relation to speculative and investment transactions. (Given alternate years.) (3-5) MR. HARTKEMEIER.

225w. ADVANCED ACCOUNTING THEORY. A study of the functions of accounts; their development; their place in the current business regime; and their relation to the process of economic development. (3-5) MR. SCOTT.

228f. STATISTICAL THEORY AND PRACTICE. The place of quantitative method in the social sciences. A careful examination of the implications of statistical methods used by research workers. (Given alternate years.) (3-5) MR. HARTKEMEIER.

231s, f and w. SPECIAL STUDIES. (1-3).

290s, f and w. RESEARCH. (Credit to be arranged.)

AGRICULTURAL CHEMISTRY

Graduate work in Agricultural Chemistry should be preceded by a minimum of twenty-four hours credit in chemistry, physics, or biology. This minimum must include at least 16 hours of chemistry. In special cases additional requirements may be imposed.

MINOR IN AGRICULTURAL CHEMISTRY

The following course may be counted toward a minor in Agricultural Chemistry; it may not be counted for a major:

101w. GENERAL AGRICULTURAL CHEMISTRY. Prerequisite, chemistry 15. A chemical study of the materials recognized as pertaining to agriculture. (5) MR. HOGAN.

MAJOR IN AGRICULTURAL CHEMISTRY

The following courses may be counted toward a major in Agricultural Chemistry:

110s, 111f, and 112w. AGRICULTURAL ANALYSIS. Prerequisite, chemistry 25. Quantitative analysis of agricultural products. (3-5) MR. RICHARDSON.

201f and 202w. SEMINAR. (1) MR. HOGAN.

204f. **PHYSIOLOGICAL CHEMISTRY OF THE DOMESTIC ANIMAL.** Prerequisite, 5 hours of organic chemistry. Offered in alternate years; not given in the year 1936-37. Three lectures. (3) MR. HOGAN.

205f. **PLANT CHEMISTRY.** Prerequisite, 3 hours of physical chemistry. Offered in alternate years; not given in the year 1936-37. Three lectures, two laboratory periods. (3-5) MR. VINSON.

206w. **DAIRY CHEMISTRY.** Prerequisite, 5 hours of organic chemistry. Offered in alternate years; given in the year 1936-37. (4) MR. _____.

207f. **COLLOID CHEMISTRY.** Prerequisite, 3 hours of physical chemistry. Three lectures, two laboratory periods, a special problem. (3-6) MR. JENNY.

208s, 209f, and 210w. **SPECIAL INVESTIGATIONS.** (2-6) MR. HOGAN; MR. BRODY; MR. JENNY; MR. VINSON.

211s, 212f, and 213w. **RESEARCH.** (2-8) MR. HOGAN; MR. BRODY; MR. JENNY; MR. VINSON.

AGRICULTURAL ECONOMICS

Prerequisite for graduate study in Agricultural Economics: For a major, a Bachelor's degree with at least 16 semester hours credit or their equivalent in Agricultural Economics or in General Economics and Agricultural Economics. Students may use toward a minor any of the courses listed for which they already have the necessary prerequisites.

101f. **PRINCIPLES OF MARKETING AND CO-OPERATION.** A survey of the marketing system as a whole; the various types of middlemen and their functions, the general weaknesses of the system, and suggested remedies; the possibilities and limitations of co-operative marketing, factors determining success or failure. (3) MR. HAAG.

107w. **FARM FINANCE.** Prerequisite, course 1f. A study of the financing of farm credit needs based upon a brief survey of the financial structure, money and banking. Particular attention will be given to those institutions that are sources of agricultural credit, i. e., the Federal Reserve System, Federal Land Bank, Intermediate Credit Bank, etc. (3) MR. HAMMAR.

108s. **ADVANCED PRODUCTION ECONOMICS.** Prerequisite, course 1f. A cross section of the production organization of modern society with special reference to the position of agriculture in this organization. Topics considered will include specialization and comparative advantage, the economic law of diminishing returns, the size of the business unit, maladjustments in production, etc. (3) MR. HAMMAR. Offered only in alternate years; not offered in 1936.

110w. **GENERAL FARM MANAGEMENT.** Prerequisite, course 1f or its equivalent and four semesters' work completed in a standard agricultural course or the consent of the instructor. A study of the elementary principles of farm management and the methods developed for analyzing a farm business, judging its efficiency by these principles and the working out of corrections for weaknesses, found in the farming system. (3) MR. JOHNSON.

121w. **ECONOMIC HISTORY OF AGRICULTURE.** Prerequisite, courses 1f and 10w. A general historical survey of the economic development of American agriculture. (2) MR. JOHNSON.

125f. **AGRICULTURAL STATISTICS.** This course includes a study of the collection, analysis, and presentation of agricultural statistics and is designed to furnish a knowledge of statistical methods sufficient for all ordinary requirements in agricultural work. (3) MR. FRAME.

127f. AGRICULTURAL PRICES. Prerequisite, course 1f. A study of the various factors that affect the prices of farm products, and the use of current market information in planning what to produce and where and when to sell. (3) MR. HAAG.

130f and w. SPECIAL PROBLEMS. Prerequisite, the introductory course in the phase of agricultural economics in which the special problem falls. Special studies and readings by individual students wishing further work in some phase of agricultural economics but who find it impossible to take additional regular course work in this particular phase. Credit to be arranged. MEMBERS OF THE STAFF.

132w. COMMODITY PRICES AND MARKETING. Prerequisites, courses 101f and 127f or consent of instructor. Marketing and price problems of livestock, grains, fruits and vegetables, poultry and dairy products, cotton. Application of principles to practical problems encountered in the field. (3) MR. HAAG.

133w. MARKET ANALYSIS. Prerequisite, courses 25, 101, 127 and 132. A study of the factors affecting the efficiency of individual marketing agencies or business firms handling agricultural products. Analysis of consumer preferences and demand for agricultural products. Analysis of the markets for food and textile products of individual firms. Administrative problems of financing and operations of firms handling agricultural products. (2) MR. HAAG.

150w. LAND ECONOMICS. Prerequisite, course 1f. A critical examination of the system of land utilization in the United States. The course is developed about the topics of conservation, land classification, land utilization, land valuation, tenancy and the agricultural ladder, land taxation, and the land policies of the United States. (2) MR. HAMMAR.

190f. LAND RENTING AND MORTGAGE PROBLEMS. Prerequisites, 25f, 110w, and 125f. The economic and farm management aspects of the problems connected with tenant operated farms; adjusting rates to allow for changing costs and changing price level; farm management principles involved in drawing the lease agreements etc. (2) MR. JOHNSON.

200s, f, and w. SEMINAR. Special lectures and reports on economic problems in agriculture. (1).

201w. ADVANCED AGRICULTURAL PRICE ANALYSIS. Prerequisites, courses 125, 127, and 132 or permission of instructor. Technical methods of analyzing the prices of agricultural products and the solution of specific price problems by students. (2) MR. HAAG.

205w. CURRENT ECONOMIC PROBLEMS OF AGRICULTURE. Prerequisite, 16 hours of agricultural economics or their equivalent. Analysis of the more important current economic problems of the farmer, together with proposed remedies. (3) MR. JOHNSON.

207f AGRICULTURAL POLICY. Prerequisite, 16 hours of agricultural economics or their equivalent. A topical study of the farmer in his public relations with special reference to public finance, land utilization, and agricultural production. (2) MR. HAMMAR.

210w. ADVANCED FARM MANAGEMENT. Prerequisite, course 110w. A study of the application of farm management principles on individual farms. Detailed analyses will be made on from 25 to 40 farms. Whenever possible, personal visits to the farm will be made. (3) MR. JOHNSON.

225w. ADVANCED AGRICULTURAL STATISTICS. Prerequisite, 125f or its equivalent. A study of the Poisson, Binomial and Normal distributions, tests of significance, and analysis of variance. Suited to all agricultural research, but especially adapted to students in the biological sciences. (3) MR. FRAME.

240s, f, and w. RESEARCH IN AGRICULTURAL ECONOMICS. (Credit to be arranged.) Teacher selected by student.

AGRICULTURAL ENGINEERING

103w. FARM BUILDINGS. The place of buildings in the business of farming. Arrangement of buildings on the farmstead and planning of barns, hog houses, poultry houses, granaries, etc., for economy, convenience, sanitation and appearance. Building materials their adaptability and use. Rafter cutting, farm concrete and masonry work. Blue print reading and cost estimation. Modernizing the farm home. Water supply and sewage disposal. (3) MR. WOOLEY.

104w. FARM BUILDING DESIGN. Prerequisite, course 103 or registration therein. A laboratory course in design and testing. (2) MR. WOOLEY.

112w. FARM POWER AND MACHINERY II. A continuation of course 111. Advanced work on gas engines and tractors. Harvesting and threshing machinery; feed grinders; ensilage cutters. Farm lighting plants; electric service from power lines; electric motors for farm work. (3) MR. JONES.

121f. DRAINAGE AND EROSION CONTROL. A study of the place of terraces, drains and dams in the modern farming program. Field practice in laying out and constructing terraces, ditches, tile drains, barriers and soil saving dams. Elementary drainage law, district organization, etc. (3) MR. WOOLEY.

122f. IRRIGATION AND DRAINAGE. Prerequisite, agricultural engineering 121 or its equivalent. Water rights. Irrigation by pumping. Methods of applying water to the land. Irrigation of different crops. The measurement of water. The drainage of irrigated land. The course covers irrigation and drainage from the farmer's point of view. (2) MR. WOOLEY.

150f and w. SPECIAL PROBLEMS IN AGRICULTURAL ENGINEERING. Primarily for advanced undergraduates. Problems assigned or elected by the student subject to approval. (1-5) MR. WOOLEY; MR. JONES.

200f and w. SEMINAR. Studies of recent investigations in agricultural engineering and related fields; discussion of current literature; preparation and presentation of papers. (1) MR. WOOLEY; MR. JONES.

201s. ADVANCED FARM MECHANICS. Prerequisite: B. S. in agriculture, with a minimum of 9 hours in agricultural engineering, including 3 hours of farm power and machinery and 3 hours of farm shop work or elementary farm mechanics. Advanced study of principles and theories as applied to mechanical work on the farm, with laboratory practice contributing to a development of a knowledge of mechanics. The course is designed with special reference to the needs of teachers of vocational agriculture. To be given last half of Summer Session only. (2) MR. JONES.

285f and w. SPECIAL INVESTIGATIONS IN AGRICULTURAL ENGINEERING. Research on minor problems not leading to a thesis (Credit to be arranged.) MR. WOOLEY; MR. JONES.

299f and w. RESEARCH IN AGRICULTURAL ENGINEERING. Original research in farm power and machinery, farm buildings, drainage, or erosion control. Thesis required. (Credit to be arranged.) MR. WOOLEY; MR. JONES.

ANATOMY

Prerequisite for graduate work: The first year of the regular medical curriculum or its equivalent or an Arts degree with a zoology major.

101f. ELEMENTARY ANATOMY. A course designed to outline a few of the fundamentals of both gross and microscopic anatomy. No actual dissection is undertaken, but dissections made by medical students are studied. (Prerequisite five hours of general zoology). (3) MR. CROUCH

102f. EMBRYOLOGY. A study of the development of the individual based upon man and the higher mammals. Open only to medical and graduate students. (3) MR. WELLS; MR. BARKS

103f. HISTOLOGY. A study of the microscopic structure of the fundamental tissues of the human body. (2) MR. WELLS; MR. BARKS.

104w. HISTOLOGY. A continuation of course 103f. A study of the microscopic structure of the organs of the human body. (4) MR. WELLS; MR. BARKS.

105f. HUMAN DISSECTION. A Study of the gross structure of the human body, dissection progressing in the following order: Thorax, superior extremities, neck and head. (7) MR. OVERHOLSER; MR. CROUCH; MR. THOMPSON.

106w. HUMAN DISSECTION. A continuation of course 105f. Dissection of the abdomen, pelvis, perineum and lower extremities. (7) MR. OVERHOLSER; MR. THOMPSON.

107f. TOPOGRAPHIC AND APPLIED ANATOMY. A course devoted to the practical consideration of the principal structures stressed in clinical surgery supplemented with a study of cross sections of the human body (105f and 106w are prerequisite). (3) MR. CROUCH.

108w. NEURO-ANATOMY. The gross and microscopic structure of the central nervous system and the sense organs are studied. (4) MR. CROUCH; MR. THOMPSON.

200f and w. SEMINAR. The presentation and discussion of original investigation and current literature. Open to students in courses numbered above 200. (1).

201f and 202w. SPECIAL STUDIES IN ANATOMY. The intensive study of regions or systems as preparation for specialization in medicine. This may include developmental and microscopic as well as gross anatomy. (102 to 106 are prerequisite). (Hours to be arranged). MR. OVERHOLSER; MR. CROUCH; MR. WELLS.

290f and w. RESEARCH. The facilities of the department are available to students qualified to undertake investigation in anatomy. (4 to 8).

ANIMAL HUSBANDRY

Students expecting to do major graduate work in Animal Husbandry should have included in their undergraduate work a total of eighteen (18) semester credits in the following specified subjects or their equivalents: Animal husbandry; elementary zoology; economics; organic chemistry; animal nutrition; animal breeding; veterinary science.

A dissertation will be required for the master's degree, unless the department in any individual case permits the candidate to substitute other work.

100s and f. PRINCIPLES OF ANIMAL NUTRITION. Prerequisite, organic chemistry 15. The laws of animal nutrition; adaptation of facts of physiological chemistry to feeding of domestic animals. (3) MR. HOGAN; MR. WEAVER.

101w. ANIMAL BREEDING. Prerequisite, general zoology 1. Principles and practices involved in the improvement of domestic animals; physiology of reproduction, growth, and development; master breeders, variation, heredity, close breeding, cross breeding, grading, prepotency, pedigree selection and allied subjects in their relation to live stock improvement. (3) MR. TROWBRIDGE; MR. MCKENZIE; MR. COMFORT.

102f. ADVANCED LIVE STOCK JUDGING. Prerequisite, course 3, live stock judging. A continuation of the comparative judging work given in course 3; includes excursions to live stock shows and noted breeding farms. (3) MR. MOFFETT.

103w. LIVE STOCK PRODUCTION. Prerequisites, courses 1 and 100. Systems of beef, pork, sheep, horse and mule production, including breeding, feeding and management of commercial and pure bred live stock. (5) MR. WEAVER; MR. MOFFETT.

107f. **LIVE STOCK MANAGEMENT.** Prerequisite 103w. The operation of live stock farms. Special studies concerning the various classes of live stock and their products. (1-2) MR. TROWBRIDGE; MR. WEAVER.

111f and w. **SPECIAL PROBLEMS.** Topics assigned or chosen subject to approval. Each student may, under supervision, undertake a project outlining objectives, planning and keeping records, caring for livestock and summarizing results in a written report. (1-3) MEMBERS OF DEPARTMENTAL STAFF.

125s. **LIVE STOCK JUDGING AND MANAGEMENT.** Prerequisite, course 1, types and market classes of livestock, and 100, principles of animal nutrition, or equivalents. Adapted to high school teachers of vocational and general agriculture. Basic and current live stock types and methods of production. (Last half of term only). (2) MR. TROWBRIDGE; MR. WEAVER.

200f and w. **SEMINAR.** Critical consideration of research and particular subjects. Review of current literature. (1) MR. TROWBRIDGE; MR. MCKENZIE.

204w. **ANIMAL NUTRITION.** Prerequisite, course 100. A study of the more important contributions to the knowledge of animal nutrition; designed for students specializing in some phase of animal industry. Alternates with agricultural chemistry 204f, physiological chemistry of the domestic animal; given in the year 1936-1937. (2) MR. HOGAN.

206f. **ANIMAL BREEDING INVESTIGATIONS.** Prerequisite, courses 101w and veterinary science, 1f. Study of specimens and original investigations; current literature on anatomy and physiology of reproduction. (2) MR. MCKENZIE.

207w. **LIVE STOCK FEEDING INVESTIGATIONS.** Prerequisite, course 103w. A study of the more important investigations in feeding cattle, hogs, sheep, horses, and mules. (2) MR. TROWBRIDGE; MR. WEAVER.

290s, 291f, 292w. **RESEARCH.** Investigation in live stock production, animal breeding, nutrition, or physiology of reproduction. The results are to be presented in a carefully organized written report or thesis. MR. MUMFORD; MR. TROWBRIDGE; MR. HOGAN; MR. WEAVER; MR. MCKENZIE.

ARCHAEOLOGY (CLASSICAL)

See under CLASSICAL LANGUAGES AND ARCHAEOLOGY.

ART—HISTORY OF

112f. **HISTORY OF ITALIAN RENAISSANCE PAINTING.** A study of Italian painting from the late XIII to the late XVI century, stressing the general characteristics of the Renaissance period, the individual qualities of local schools, and the evolution of style. Illustrated lectures and individual investigation. (3) MR. WELLER.

113w. **HISTORY OF THE NORTHERN RENAISSANCE.** A study of the art of Flanders, Germany, and Holland from the XV to the XVII century, emphasizing the relationship of art with race, history, and philosophy. Illustrated lectures and individual investigation. (3) MR. WELLER.

116w. **HISTORY OF ITALIAN RENAISSANCE SCULPTURE.** The evolution of Italian sculpture from Niccolò Pisano to Bernini, with emphasis upon the relationship of sculpture with the contemporary architecture and painting. Illustrated lectures and collateral reading. (2) MR. WELLER.

118w. **HISTORY OF PRINTS.** The technique and stylistic evolution of woodcut, engraving, etching, lithograph, mezzotint, etc., from late mediaeval to contemporary times, bringing out the influence of time and place upon art forms. Illustrated lectures and collateral reading. (2) MR. WELLER.

119f. MEDIAEVAL SCULPTURE. The study of Early Christian, Byzantine, Pre-Romanesque, Romanesque, and Gothic Sculpture in Italy, Germany, Spain, England, and France, with frequent citation of the contemporary minor arts, and reference to contemporary philosophy, literature, and symbolism. (2) MR. WELLER.

120w. LEONARDO AND MICHELANGELO. A study of the architecture, sculpture, painting, and literary productions of these two men, with special emphasis upon their place in the evolution of Italian art and thought. Illustrated lectures and collateral reading. (2) MR. WELLER.

200f and w. HISTORY OF ART SEMINAR. Hours and work to be arranged. The seminar may involve individual research related to one of the lecture courses. MR. WELLER.

For the courses in Greek Art see CLASSICAL LANGUAGES AND ARCHAEOLOGY.

ART—THEORY AND PRACTICE OF

Students desirous of entering the Graduate School of the University to pursue their art studies should present the equivalent of the various courses listed below:

In drawing and painting: eight hours credit Painting (177), eight hours credit Drawing (198), and five hours credit in Composition.

In design: six hours credit Design (190), and four hours Painting (177).

In Applied Art: Artcraft (50, 60, 101, 103, 106, 107, 108, 109), Handwork (120, 121), four hours credit Painting (177), Composition II (59), eight hours credit Design (70) and six hours credit History of Art.

For details of these courses see University Catalog.

MINOR IN ART

The following courses may be counted toward a minor in art: they may not be counted for a major:

102f and w. ARTCRAFT IV. Individual work in the crafts. (2) MISS DOBBS.

190f and w. DESIGN. Project in decorative design for a total credit of eight hours MR. HANSEN.

177f and w. PAINTING. Studies in oil from head and figure with accessories for a total credit of four hours. MR. ADAMS.

179f and w. COMPOSITION III. Designing of mural decorations. Two to six hours credit each semester. MR. HUDSON.

198f and w. DRAWING. Advanced life class. Four hours credit. MR. HUDSON.

MAJOR IN ART

The following courses may be counted toward either a major or minor in Art: 190f and w. DESIGN. Advanced project in design and work in technique of a chosen craft, for a total of eleven hours credit. ARTS STAFF.

177f and w. PAINTING. Advanced painting of head and figure with accessories, for a total credit of eight hours. MR. HUDSON.

179f and w. COMPOSITION III. Complete evolution of picture in professional manner. Credit from four to six hours by examination. MR. HUDSON.

200f and w. SEMINAR. To be arranged. ARTS STAFF.

220f and w. GRADUATE COLLABORATION. Advanced designing in collaboration with students of the other arts. (4) ARTS STAFF.

230f and w. SPECIAL PROBLEMS. Original work in student's chosen field. (4) ARTS STAFF.

240f and w. HISTORIC RESEARCH. (2) ARTS STAFF.

250f and w. ADVANCED COMPOSITION. Projects in the designing of easel pictures and mural decorations. Credit to be arranged. MR. HUDSON.

ASTRONOMY

The minimum requirement for graduate work in the Department of Astronomy is a working knowledge of differential and integral calculus, one year of college physics, and course 1, or its equivalent, in astronomy.

104f. PRACTICAL ASTRONOMY. Prerequisite, differential calculus. Determination of azimuth, time, longitude and latitude, chiefly with the engineers' transit and the sextant. Laboratory course. (3).

105w. ADVANCED PRACTICAL ASTRONOMY. Prerequisite, course 104. Precise observations with the instruments of the Observatory. Laboratory course. (2).

110w. HISTORY OF ASTRONOMY. Prerequisite, course 1. (3).

120w. ASTROPHYSICS. Prerequisite, course 1, calculus and college physics. (3).

125f. NUMERICAL ANALYSIS. Prerequisite, integral calculus. (3).

150f. CELESTIAL MECHANICS I. Prerequisite, integral calculus and college physics. (3).

206w. THEORY OF ORBIT DETERMINATION. Prerequisite, course 150. (3).

210w. CELESTIAL MECHANICS II. Prerequisite, course 150. (3).

BIOCHEMISTRY

Two beginning courses, 101w for 3 hours and 106f for 6 hours are offered. The two together give 8 hours.

101w. ELEMENTARY PHYSIOLOGICAL CHEMISTRY. An outline of vertebrate physiological chemistry, with principal reference to the conditions in man, about 25 lectures and 25 laboratory periods are given. Prerequisite, organic chemistry, 3 hours. Not open for medical credit. (3) MR. GULICK.

106f. PHYSIOLOGICAL CHEMISTRY. Prerequisite, organic chemistry, course 110f, or equivalent. (6) MR. GULICK; MR. CALVIN.

108w. TOXICOLOGY. The chemical identification of toxic substances. (2) MR. GULICK.

200f and w. BIOCHEMISTRY SEMINAR. Roundtable reviews of research topics and literature, led by the staff and graduate students. (1) MR. GULICK.

203f and 204w. ADVANCED PHYSIOLOGICAL CHEMISTRY. A course extending and supplementing Course 106f. The prosecution of a short experimental problem required. (3-4) MR. GULICK.

205w. THE BLOOD. A chemical, physiological and clinical study. Prerequisite 106f or equivalent. (3-4) MR. CALVIN.

208w. BIOCHEMICAL PREPARATIONS. The isolation and purification of biochemically important materials. Prerequisite, 106f or equivalent. (2-4) MR. CALVIN.

215f and 216w. BIOCHEMICAL PROBLEMS. Assigned problems in elementary research. (2-10) MR. GULICK; MR. CALVIN.

290f and w. RESEARCH. Investigations of unsolved problems under the guidance of the staff. MR. GULICK; MR. CALVIN.

BOTANY

The minimum prerequisite for graduate work in the Department of Botany is 24 hours credit in botany or allied subjects—bacteriology, chemistry, horticulture, field crops, zoology, etc. When the credit in the allied subjects is more than 5 hours, personal conference with the student will be necessary.

100s and w. PLANT PHYSIOLOGY. Lectures and laboratory work on the physiology of the common cultivated plants. (5) MR. ROBBINS.

101s and w. TAXONOMY AND ECOLOGY. Laboratory and field work on taxonomy of plants, with special reference to the local flora; and readings and lectures on plant associations, with an introduction to ecology. The laboratory and field work may be taken without the lectures (3 or 5). MR. RICKETT.

102s and f. PLANT PATHOLOGY. A study of special groups of fruit, vegetable, and cereal diseases, with reference to symptoms, life histories, parasites, and methods of control. (3) MR. MANEVAL.

104s and f. PLANT HISTOLOGY. Methods used in the preparation and preservation of class material and in fixing, sectioning, and staining sections for microscopical study. (3) MR. NAYLOR.

105f. PLANT MORPHOLOGY. A comparative study of the structure of selected plants of different groups. Ordinarily the angiosperms are emphasized. Prerequisites Course 1 and 101 (3) MR. RICKETT.

106s and f. HEREDITY AND GENETICS. Theories and facts of heredity, with applications to plant breeding, evolution, and eugenics. (5).

107w. MYCOLOGY. A systematic study of the fungi, with especial reference to those causing plant disease. (3) MR. MANEVAL.

111f, 112w, and 113s. SPECIAL PROBLEMS. On consultation with the teachers concerned, properly prepared students may study special problems in the various fields of botany. (Credit to be arranged.) MR. ROBBINS; MR. MANEVAL; MR. RICKETT; MR. TUCKER; MR. NAYLOR.

200f and w. SEMINAR. Special subjects of botanical work will be discussed, including the results of investigations carried out in the department. A reading knowledge of French and German is essential. (1 or 2) MR. ROBBINS; MR. RICKETT; MR. MANEVAL; MR. TUCKER; MR. NAYLOR.

201w. ADVANCED PLANT PATHOLOGY. A general course in phytopathological technique. The topics considered will be preparation and reaction of culture media, isolation, cultivation, and physiological study of plant pathogens, inoculation of host plants, and relation of host to pathogene. (3) MR. TUCKER.

202f and w. ADVANCED PLANT PHYSIOLOGY. Prerequisite, course 100w or equivalent. Lectures and laboratory work on problems in plant physiology. (2-5) MR. ROBBINS.

203f, 204w, 205s. SPECIAL TOPICS. Study of subjects in botany not included in the courses regularly offered. Designed especially for graduate students whose major interest or whose research work demands additional directed training. (3-5) MR. ROBBINS; MR. MANEVAL; MR. RICKETT; MR. TUCKER; MR. NAYLOR.

290f, 291w, and 292s. RESEARCH. Students who have had adequate preparation will be assigned some special problem for investigation. A reading knowledge of French and German is essential. (Credit and hours to be arranged.) MR. ROBBINS; MR. MANEVAL; MR. RICKETT; MR. TUCKER; MR. NAYLOR.

CHEMICAL ENGINEERING

Courses required for the undergraduate major in chemical engineering can not count toward the degree of Master of Science in Chemical Engineering. Those contemplating graduate study in chemical engineering are requested to confer with the chairman of the department.

150f and w. SPECIAL PROBLEMS. Prerequisite, senior standing. Directed study of problems in the field of chemical engineering. (2-4) MR. LORAH.

200f and w. SEMINAR. Prerequisite, graduate standing. Reviews of recent investigations and projects of major importance in the field of chemical engineering. (1). DEPARTMENT STAFF.

252f. **ADVANCED CHEMICAL ENGINEERING.** Prerequisite, course 162. A study of the more advanced theories as applied to the unit processes, and the design of equipment for such operations. These studies will include the latest available material. (3) MR. LORAH.

261w. **PROCESS DEVELOPMENT AND PLANT DESIGN.** Prerequisite, graduate standing. Lectures and individual study of the chemical, engineering, and economic factors involved in selecting, designing and installing representative types of chemical manufacturing processes. (3) MR. LORAH.

285f and w. **SPECIAL STUDIES.** Prerequisite, graduate standing. Experimental investigation of problems in the field of chemical engineering or applied chemistry. (2-5) DEPARTMENT STAFF.

299f and w. **RESEARCH.** Prerequisite, graduate standing. Independent investigation of some problem or design in the field of chemical engineering or applied chemistry to be presented in the form of a thesis. (Minimum 4 hours). DEPARTMENT STAFF.

CHEMISTRY

Graduate work in chemistry is based upon an undergraduate major including courses 110, 112, 121, and 131. Graduate students majoring in chemistry who enroll in any of these courses can not count toward the Master of Arts credit thus earned.

The department strongly urges students planning to major in chemistry to acquire a reading knowledge of French and German.

110s, f, and w. **ORGANIC CHEMISTRY.** Prerequisite, ten hours work in chemistry; medical students will be admitted to this course with eight hours chemistry. (5) MR. CALVERT; MISS NIGHTINGALE. (MR. DUNLAP, ROLLA).

112s, f, and w. **ORGANIC CHEMISTRY.** Continuation of the subject matter of course 110. Required of students specializing in chemistry. (3) MR. CALVERT; MISS NIGHTINGALE. (MR. DUNLAP, ROLLA).

113s, f, and w. **ORGANIC SYNTHESIS.** A laboratory course in synthetic organic chemistry. May be taken with course 112. (3-5) MR. CALVERT; MISS NIGHTINGALE.

121s, f, and w. **QUANTITATIVE CHEMICAL ANALYSIS.** Prerequisite, course 27. The general principles. (5) MR. BRECKENRIDGE.

122s, f, and w. **QUANTITATIVE CHEMICAL ANALYSIS.** Prerequisite, course 121. The analysis of commercial materials and products. (3-5) MR. BRECKENRIDGE.

124f and w. **QUANTITATIVE ORGANIC ANALYSIS.** Must be preceded or accompanied by course 121. Quantitative analysis of pure organic compounds. (3-5) MR. FRENCH; MISS NIGHTINGALE.

130s and w. **PHYSICAL CHEMISTRY.** Prerequisite, college course in physics, 3 hours quantitative analysis, 3 hours of organic chemistry. Recommended to students majoring in biological sciences, home economics, and students specializing in agriculture. (3) MR. STEARN. (MR. MONROE, ROLLA.)

131s and f. **PHYSICAL CHEMISTRY.** Prerequisite, course 110 and 121; college course in physics; preceded or accompanied by mathematics 100. (5) MR. STEARN. (MR. MONROE, ROLLA.)

133w. **ELECTRO-CHEMISTRY.** Prerequisite, course 131 or consent of instructor. Generally offered alternate years. Given in 1936-37. (4) MR. STEARN.

FOR COURSES IN CHEMICAL ENGINEERING AND APPLIED CHEMISTRY, SEE UNDER ENGINEERING, PAGE 25.

Courses above 200 must be preceded by a major in chemistry or accompanied by courses required to complete the major.

200f and w. SEMINAR. Meetings at which subjects of chemical interest are discussed by students of sufficient attainment and members of the teaching staff. A reading knowledge of French and German is desirable. (1-2).

205f. PLANT CHEMISTRY. See Agricultural Chemistry. MR. VINSON.

207f. COLLOID CHEMISTRY. See Agricultural Chemistry.

211f. ADVANCED ORGANIC CHEMISTRY. Lectures on selected topics, principally stereochemistry and its applications, carbohydrates, nitrogen compounds, etc. (4) MR. CALVERT. (MR. DUNLAP, Rolla.)

212w. ADVANCED ORGANIC CHEMISTRY. Lectures on selected topics, supplemented by readings and reports. In the selection of topics, the special needs of the students will be considered. (4) MR. CALVERT. (MR. DUNLAP, Rolla.)

213s and w. RECENT THEORIES IN ORGANIC CHEMISTRY. Prerequisite, a major in chemistry. (2) MR. FRENCH.

225f. QUALITATIVE ORGANIC CHEMISTRY. Must be preceded by course 112. (4) MR. FRENCH.

227w. ADVANCED ANALYTICAL CHEMISTRY. Prerequisite, course 121. Chiefly laboratory work. The work of the course is varied to meet the needs of the individual (Credit to be arranged). MR. BRECKENRIDGE. MR. SCHRENK, (MR. KERSHNER, Rolla.)

231f and w. PHYSICO-CHEMICAL CALCULATIONS. Prerequisite, 131. (2-5) MR. STEARN.

232f and w. ADVANCED PHYSICAL CHEMISTRY. Prerequisite, course 131. From semester to semester various aspects of the field will be considered. Credit up to 9 hours, though work for only 3 hours per semester will be given. There is no set sequence in the rotation of the subjects covered. The general field has been divided into the following courses.

(a) THERMODYNAMICS. The formal application of thermodynamic theory to the solution of chemical problems.

(b) CHEMICAL KINETICS. Application of the results of statistical mechanics to the problem of reaction velocities in homogeneous reactions. Activation, collision diameters and steric factors are considered from a classical point of view; and the more recent treatment of the activated complex, with properties derived from quantum mechanics, is given.

(c) QUANTUM MECHANICS APPLIED TO CHEMISTRY. An introduction to the fundamental ideas of wave mechanics with special emphasis on the Heitler-London-Slater-Pauling-Eyring method for chemical bond energies.

(d) ELECTROSTATIC VALENCE THEORY. The application of electrostatic theory to the problems of chemical bonding, complex ion formation, crystal structure, and chemical stability.

(e) THEORY OF SOLUTIONS. Based on the interionic attraction theory of Debye-Hückel-Onsager-Bjerrum-Fuoss. MR. STEARN. (MR. MONROE, Rolla.)

235w. RADIOACTIVITY AND STRUCTURE OF MATTER. Study of the radio elements, and their radiations, atomic disintegration, atomic structure, artificial radioactivity, applications of radioactivity to problems in chemistry, geology, and physics. Generally offered alternate years. Not given 1936-37. (3) With laboratory MR. SCHLUNDT.

271f and 272w. RESEARCH. Arrangements for research should be made by consultation with the professor or instructor with whom the research is elected.

The University of Missouri Section of the American Chemical Society meets monthly. Students may attend these meetings.

CIVIL ENGINEERING

Those contemplating graduate study in civil engineering are requested to confer with the chairman of the department.

104f. HIGHER SURVEYING. Prerequisite, course 2 and engineering drawing 1. Mining, hydrographic, and topographic surveying; determination of azimuth and plane triangulation. Control of surveys. (4).

106w. CITY PLANNING. Prerequisite, course 104. Planning city layouts and additions from topographic maps. (2).

112f and w. BUSINESS RELATIONS. Prerequisite, senior standing. The Engineer's business relations as developed in connection with the design, construction, operation, and management of projects. Construction and contracting. (3) MR. RUBEY.

113w. ECONOMY OF RAILWAY OPERATIONS. Prerequisite, course 111. Treated from the engineering point of view. (2-3) MR. RUBEY.

134w. ROAD MATERIALS. Properties of materials used in highway construction; laboratory tests of road material. (3) MR. LARUE.

141f. WATER POWER. Prerequisite, 140. Hydrology; steam measurement, weirs, current meters, storage reservoirs and dams; water-wheels; the problems of a water-power development. (3) MR. RODHOUSE.

143w. HYDRAULIC ENGINEERING. Prerequisite, 140. A general course in hydraulic engineering, including the application of the principles of hydraulics to typical problems in the general field of hydraulic design and construction; problems common to water supply, water power development, sanitary, drainage, and irrigation works. (3) MR. RODHOUSE.

150f or w. SPECIAL PROBLEMS. Directed investigation of problems in the field of civil engineering. (2-4). STAFF.

155w. HIGHWAY ENGINEERING. Prerequisite, course 151. Management, improvement, and maintenance of roads; plans and estimates for road improvement; construction and maintenance of street pavements. (2) MR. LARUE.

157w. SANITARY DESIGN. Prerequisite, course 140. Design of sewerage systems and works for water and sewage treatment. (2).

200f and w. SEMINAR. Reviews of recent investigations and projects of major importance in the field of civil engineering. (1) STAFF.

201w. GEODETIC SURVEYING. Prerequisite, course 104. Elements of geodesy, with practice in the use of precise instruments. (2)

214w. RAILWAY ENGINEERING AND MANAGEMENT. To be preceded or accompanied by course 113. Treated from the point of view of the executive trained in engineering. (2-3) MR. RUBEY.

215w. CONSTRUCTION AND CONTRACTING. Prerequisite, course 112 or equivalent. Consideration of the larger and more complex projects. (2-3) MR. RUBEY.

222f. BRIDGE DESIGN. Prerequisite, course 121. Design of stringer bridges, plate girders, and steel railroad truss bridge, with working drawings and estimates. (3) MR. MOORMAN.

223w. HIGHER STRUCTURES. Prerequisite, course 222. Swing bridges; arches; suspension and cantilever bridges; deflection of trusses. (3) MR. MOORMAN.

226w. CONCRETE STRUCTURES. Prerequisite, course 125. Theory of reinforced concrete structures with problems in design. (3) MR. MOORMAN.

227f. THEORY OF STRUCTURES. Prerequisite, 223. Statically indeterminate structures; secondary stresses. Credit to be arranged. MR. MOORMAN.

241f. ADVANCED HYDRAULIC ENGINEERING. Prerequisite, course 141 or 143. Problems in design and construction relating to reservoirs, dams, conduits, waterways and general hydraulic engineering. (3) MR. RODHOUSE.

243f. IRRIGATION AND DRAINAGE. Prerequisite, 140. Irrigation engineering, institutions, and practice; canals, ditches, reservoirs; land drainage. (2) MR. RODHOUSE.

256f. HIGHWAY DESIGN. Prerequisite, courses 125 and 151. Design of highway structures culverts, warts, small bridges; plans and estimates for highway improvements. (2) MR. LARUE.

257f or w. SANITARY ENGINEERING. Investigations and special problems in sanitary engineering. (Credit to be arranged.)

285f and w. SPECIAL STUDIES. Independent study of some problem in the field of civil engineering. (2-5). STAFF.

299f and w. RESEARCH. An independent investigation of some problem or design in the field of civil engineering, to be presented in the form of a thesis. (Minimum of 4). STAFF.

CLASSICAL LANGUAGES AND ARCHAEOLOGY

CLASSICAL ARCHAEOLOGY

136f. GREEK ART TO THE AGE OF PERICLES. The history of Greek Sculpture and the development of Greek Architecture and its plastic decoration. (3) MR. GRAHAM.

137w. GREEK ART FROM THE AGE OF PERICLES TO ROMAN TIMES. Continuing course 136. (3) MR. GRAHAM.

138f. MYCENAEAN ART OR ART OF PRIMITIVE GREECE. A detailed study of the discoveries at Troy, Mycenae, Cnossus and other Mycenaean sites. (1) MR. GRAHAM.

140w. ROMAN LIFE. A study of the extant remains, particularly those of Rome, Pompeii, and Herculaneum. Lectures and readings. Illustrated by use of plans, maps, and lantern slides. (2) MR. GRAHAM; MR. GWATKIN.

145f. GREEK LIFE. Study of the manners and customs of the ancient Greeks. Lectures, assigned readings, and reports. Illustrated by maps, charts, photographs, and stereopticon views. (2) MR. GWATKIN; MR. GRAHAM.

MUSEUM OF ART: The Museum occupies the third floor of the west wing of Jesse Hall. It is supplied with models of temples representing the three orders of Greek architecture and with plaster casts of representative specimens of Greek and Roman sculpture. These are arranged chronologically, and on the walls are hung framed photographs of other works of classic art.

For Renaissance and modern painting, as well as for ancient art and topography the Museum possesses also a large number of photographs, photogravures, and colored reproductions of masterpieces of art, and an extensive collection of lantern slides.

GREEK

105f. GREEK DRAMA. (3) MR. MILLER.

107w. GREEK PHILOSOPHY. Reading of Plato. (3) MR. GWATKIN.

111f. THE GREEK HISTORIANS. Reading of Herodotus and Thucydides. (3) MR. GWATKIN.

147f. THE GREEK ORATORS. (3) MR. HARRELL.

215w. LYRIC POETRY. Selections from the lyric poets of Greece from the earliest to Hellenistic times. Open only to graduate students and exceptionally prepared seniors. (3) MR. HARRELL.

220f and w. HOMER: THE ILIAD AND THE ODYSSEY. (2-3) MR. GWATKIN.

222. SEMINAR. Conducted in accordance with the needs of the graduate students in classics.

LATIN

Prerequisite for graduate work: The student who elects Latin as his major must have made the equivalent of a Latin major in his undergraduate work. The student who elects Latin as a minor should have made the equivalent of a Latin minor, or more, of which at least ten hours credit should have been made in upperclass courses. A reading knowledge of French or German is required.

The following courses may be counted for either major or minor:

- 106w. LATIN PROSE COMPOSITION. Advanced course. Prerequisite, course 104.
 (1) MR. GWATKIN.
 109w. HORACE: SATIRES AND EPISTLES. (3) MR. GWATKIN.
 110f. HORACE: ODES AND EPODES. (3) MR. GWATKIN.
 114f. CICERO'S LETTERS. Prerequisite, courses 109 and 110. (3) MR. GRAHAM.
 115f and 116w. RAPID READING. Prerequisite, courses 110 and 111 or equivalent. Readings from representative authors. (2) MR. MILLER.
 117f. CATULLUS: SELECTED POEMS. Prerequisite, courses 109 and 110. (3) MR. MILLER.
 119w. VERGIL'S AENEID: VI-XII. Prerequisite, courses 109 and 110. (3) MR. MILLER.
 120w. LATIN COMEDY. Prerequisite, courses 109 and 110. (3) MR. GWATKIN.
 121w. JUVENAL'S SATIRES. Prerequisite, courses 110 and 111. Not given in 1936-37. (3) MR. GWATKIN.
 125w. LUCRETIUS. Prerequisite, courses 109 and 110. Not given in 1936-37. (3) MR. MILLER.
 200f and w. SEMINAR. (3) MR. GWATKIN.
 205w. EPIGRAPHY. Latin inscriptions and the light they throw on Roman civilization. (2) MR. GWATKIN.
 210f and 211w. HISTORY OF LATIN LITERATURE: a. From the beginning to the Augustan Age; b. The Augustan Age to the Period of Decline. Studied through selections from the authors of various periods. (3-4) MR. HARRELL.
 230f and w. RESEARCH AND THESIS WORK. (1-3) MR. GWATKIN; MR. HARRELL; MR. MILLER; MR. GRAHAM.

SANSKRIT

220f. BEGINNING SANSKRIT. Elements of the language. Translation of Sanskrit into English and English into Sanskrit. Thorough drill in forms. Whitney's *Sanskrit Grammar*; Lanman's *Sanskrit Reader*. (3) MR. ALMSTEDT.

221w. CONTINUATION OF 220f. (3) MR. ALMSTEDT.

DAIRY HUSBANDRY

Prerequisites for graduate work: A B. S. degree in Agriculture or if some other baccalaureate degree is offered the candidate must have included in his undergraduate work or shall be required to take, a total of twenty-six (26) college credit hours in the following specified subjects or their equivalent: Chemistry, Physics, Zoology, Bacteriology, Economics and in addition such technical agricultural subjects as the Department may deem essential for graduate study in the branch of Dairy Husbandry in which the student intends to major.

Dissertation or paper suitable for publication in a scientific journal or as a Research Bulletin of the Experiment Station is required of all candidates for advanced degrees.

100w. DAIRY PRODUCTION. A study of the problems of the milk producer and dairy cattle breeder, with special attention to feeding and management practices, herd improvement, disease control, dairy farm equipment. (Prerequisite, Animal Nutrition.) (3) MR. RAGSDALE.

101f. DAIRY BACTERIOLOGY. An applied course teaching the relationship of microorganisms to milk, and the relation of milk and its products to public health. (Prerequisite—General Bacteriology.) (3) MR. GARRISON.

102w. MARKET MILK. This course deals with the problems of the market milk producer, milk plant operator, milk distributor and milk inspector. (Prerequisite—General Bacteriology.) (3) MR. GARRISON.

103w. DAIRY MANUFACTURES. Advanced problems and factors concerned in the manufacture of butter, ice cream, cheeses, condensed milk, milk powder, dairy by-products and refrigeration methods. (Prerequisite—Dairy Products; also Dairy Bacteriology is recommended.) (3) MR. REID.

104w. BACTERIOLOGY OF DAIRY PRODUCTS. A study is made of the bacteriology of starters and fermented milk drinks, the control of microorganisms important in the manufacture of butter and cheeses, and the relationship of bacteria to ice cream, condensed milk, powdered milk and dairy by-products. (Prerequisite—Dairy Products and Dairy Bacteriology). (2) MR. GARRISON.

105w. DAIRY PLANT MANAGEMENT. The organization, operation and management of market milk plants, creameries, cheese factors, ice cream plants, condenseries milk powder and dairy by-products plants. (Prerequisite—Market Milk or Dairy Manufactures should precede or accompany this course.) (2) MR. REID.

106f. ADVANCED DAIRY CATTLE JUDGING. A continuation of the comparative judging work given in course 3, including excursions to the farms of leading breeders and shows. (Prerequisite—Dairy Cattle Judging 3 or its equivalent.) (1) MR. HERMAN.

107f. ADVANCED DAIRY PRODUCTS JUDGING. A continuation of the comparative judging work given in course 4 including excursions to dairy products plants, markets and shows. (Prerequisite—Dairy Products Judging 4 or its equivalent.) (1) MR. REID.

108w. DAIRY CATTLE BREEDING. A study of selection, inbreeding, outbreeding, assortative mating, breed families and experiences of leading breeders with reference to herd improvement. (Prerequisite—an elementary course in Genetics or Animal Breeding.) (2) MR. HERMAN.

110f and w. SPECIAL PROBLEMS. For advanced and well trained undergraduates who wish to make further studies in some phase of dairy husbandry. (Credit to be arranged.) MEMBERS OF THE DEPARTMENTAL STAFF.

200f and w. SEMINAR. Students and members of the staff present for critical consideration and discussion reviews of correct literature, subjects of special importance and interest and results of their own research. (1) MR. RAGSDALE AND DEPARTMENTAL STAFF.

210f. MILK SECRETION. The comparative anatomy of the mammary gland with special reference to the dairy cow. (2) MR. TURNER.

220w. MILK SECRETION. The physiology and biochemistry of milk secretion. (2) MR. TURNER.

230w. GROWTH AND DEVELOPMENT. Deals with growth, senescence and related nutritional problems. Selection of specific problems for study may vary with the preparation and interests of students. (Prerequisite: One or more courses in Nutrition or Bio-Chemistry.) (3) MR. BRODY.

240f and w. **SPECIAL STUDIES.** Leading scientific journals and experiment station publications in a chosen field of the dairy industry are studied to acquaint the student with research methods, current research problems, and the results of scientific research. A minor research problem may be included. (Credit to be arranged.) MR. RAGSDALE; MR. REID; MR. BRODY; MR. TURNER; MR. HERMAN; MR. GARRISON.

250f and w. **RESEARCH.** The various phases of dairy husbandry included under dairy production and dairy manufactures offer many attractive problems for graduate research. Students are usually permitted to assist in special investigations associated with one of the regular research projects of the Agricultural Experiment Station. (Credit to be arranged.) MR. RAGSDALE; MR. REID; MR. BRODY; MR. TURNER; MR. HERMAN; MR. GARRISON.

ECONOMICS AND FINANCE

Prerequisite for graduate work: The completion of an undergraduate major in economics is prerequisite to candidacy for an advanced degree in this field of study. Candidates for the degree of Doctor of Philosophy are required ordinarily to complete, during their term of study, one year of satisfactory work in some other University.

105f and w. **MONEY, CREDIT AND BANKING.** A study of modern currency and banking systems with especial emphasis upon their place in our present financial organization of economic activities. (5) MR. WOOD.

106f and w. **TRANSPORTATION AND PUBLIC UTILITIES.** The economic and legal principles that relate to the management, development, and regulation of railways and other public utilities. (3) MR. CURTIS.

110f. **THE LABOR MARKET.** An intensive study of such topics as wages, unemployment, hours, and industrial accidents in their economic and governmental aspects. MR. BAUDER.

111w. **TRADE UNIONISM.** The organization, aims, and tactics of trade unions and employers' associations studied from the point of view of labor and of public policy. (3) MR. BAUDER.

115w. **PUBLIC REVENUES.** A study of the finances and financial methods of governments, with especial reference to taxation and to tariff policy. Prerequisite, two courses in the department or consent of the instructor. (3) MR. BROWN.

118w. **CORPORATION FINANCE.** Method and policy in the financing of business enterprises; organization and financial management of corporations. (3) MR. BOPP.

119f. **ECONOMIC CONTROL.** Economic and legal aspects of control in the economic system. Recent developments. Public policy. Prerequisite, senior standing. (3) MR. CURTIS.

122f and w. **INVESTMENT.** Principles of investment; investment markets; services to the investor; types of investments and their evaluation. Prerequisite, junior standing. (3) MR. BOPP.

124f. **FOREIGN EXCHANGE.** A study of the demand for, and the supply of, the means of international payments with especial reference to the instruments employed. Prerequisite, course 105. (2) MR. BOPP.

130f. **BANKING SYSTEMS.** The organization, operation, and economic character of such credit institutions as trust companies, farm loan systems, foreign banking systems, etc. Prerequisite, course 105. (3) MR. BOPP.

136w. **PERSONNEL MANAGEMENT.** Personnel relations in industry; the development of labor policy; employment methods, labor turnover, safety programs, health, employee training, and welfare activities. (3) MR. BAUDER.

137f. **PRINCIPLES OF BUSINESS MANAGEMENT.** The principles of administration as applied to business enterprises, with especial reference to industrial management. (3) MR. BAUDER.

140f. **HISTORY OF COMMERCE AND INDUSTRY.** Evolution of the forms of economic organization in relation to changes in industrial processes and in political and social institutions. (3) MR. BAUDER.

141w. **AMERICAN INDUSTRIAL EVOLUTION.** The development of industrial organization in the United States, chiefly in terms of technological and market change. (3) MR. BAUDER.

150f and w. **BUSINESS LAW A.** A study of normal business relations in their legal aspects. Cases on contracts and related branches of the law. Prerequisite, upperclass standing. (3) MR. CURTIS.

151w. **BUSINESS LAW B.** Legal questions arising in connection with the sale and custody of goods and the use of negotiable instruments in loans and payments. Security. Prerequisite, course 150. (3) MR. CURTIS.

211f. **ADVANCED ECONOMIC THEORY.** A critical examination of the writings of leading modern economists, to the end of constructing a correct theory of value and distribution. (5) MR. BROWN.

219w. **ECONOMIC REORGANIZATION.** The literature of economic reform and recent revolutionary changes in Europe and elsewhere. (2) MR. BAUDER.

221w. **INTERNATIONAL FINANCE.** A comprehensive study of the balance of international payments with particular emphasis upon the political aspects of international finance. (2) MR. BOPP.

227w. **CLASSICAL ECONOMIC THEORY.** Selections from the writings of Smith, Malthus, Ricardo, Mill, and Senior, and from the writings of contemporary critics of the classical school. (3-5) MR. WOOD.

230f. **ADVANCED MONETARY THEORY.** A study of monetary and credit theories, combined with a statistical study of the current banking and credit situation in the United States. (3-5) MR. WOOD.

240s, f and w. **SPECIAL STUDIES.** Graduate students may select topics for study and investigation from the fields suggested by the undergraduate courses listed above such as taxation, monopoly, etc. (Credit to be arranged.) MR. BAUDER; MR. BOPP; MR. BROWN; MR. CURTIS; MR. WOOD.

290s, f and w. **RESEARCH.** Research in connection with the thesis offered for the degree of Master of Arts or Doctor of Philosophy. (Credit to be arranged.) MR. BAUDER; MR. BOPP; MR. BROWN; MR. CURTIS; MR. WOOD.

EDUCATION

The graduate work in Education is organized to lead to the following graduate degrees: Master of Arts and Doctor of Philosophy; Master of Education and Doctor of Education.

GENERAL INFORMATION

Prerequisites: To be admitted to candidacy for the degree Master of Arts with a major in Education, students must have completed at least fifteen semester hours of professional education courses including courses in educational psychology, history and principles of education, school administration, and methods of teaching.

To be admitted to candidacy for the degree Master of Education, students must have completed not less than fifteen semester hours of work in undergraduate courses in Education in an approved institution.

CHOICE OF MAJOR ADVISER

Graduate students in education should first of all decide on the particular line of school work for which they wish to prepare. They should then consult the faculty adviser in the field of their major interest and in consultation with him make out a complete program of studies for the desired degree. Some of the fields of specialization follow, along with the names of the appropriate advisers in the Department of Education:

<i>Graduate Specialty</i>	<i>Faculty Adviser</i>	<i>Room No.</i>
Educational Psychology	Mr. Irion	101 Jesse Hall
	Mr. Saupe	408 Jesse Hall
History and Philosophy of Education	Mr. Coursault	104 Jesse Hall
City, County, and State School Administration	Mr. Capps	104 Jesse Hall
	Mr. Carpenter	304 Jesse Hall
Educational Tests and Measurements	Mr. Capps	104 Jesse Hall
Secondary Education	Mr. Rufi	323 Jesse Hall
	Mr. Watkins	Univ. H. S.
Teaching of English	Mr. Moffett	209 Jesse Hall
Teaching of Social Studies	Mr. Ellis	316 Jesse Hall
Educational Guidance	Mr. Germane	7 Jesse Hall
Elementary Education	Mr. Phillips	Elem. School
Industrial Education	Mr. Selvidge	111A Eng.
Agricultural Education	Mr. Dickinson	122 Waters
Home Economics Education	Miss Irons	8 Gwynn Hall
Physical Education (Teacher Training)	Mr. Hindman	102 Rothwell Gym.

COURSES RECOMMENDED FOR ALL GRADUATE STUDENTS IN EDUCATION

For many lines of graduate work in education, advisers insist on students having during the first semester the following courses if they have not been taken as undergraduate work:

C170 EDUCATIONAL STATISTICS

D207 TESTS AND MEASUREMENTS FOR SECONDARY SCHOOLS

or

E205 TESTS AND MEASUREMENTS FOR ELEMENTARY SCHOOLS

General background courses commonly recommended for all graduate students in education who have not had the equivalent as undergraduate work are:

A205f PSYCHOLOGY OF EDUCATION

B271f PHILOSOPHY OF EDUCATION

C209f STATE AND NATIONAL SCHOOL ADMINISTRATION

DISSERTATION OPTIONAL FOR THE DEGREE OF MASTER OF ARTS
AND NOT REQUIRED FOR THE DEGREE MASTER OF EDUCATION

A dissertation is optional for students majoring in education for the degree of Master of Arts. However, a student may offer, subject to the approval of his major adviser, an acceptable dissertation counting four to eight hours credit in the total of thirty-two hours required for this degree.

A thesis is not required for the degree Master of Education.

SUGGESTED GRADUATE PROGRAMS OF STUDY FOR THE DEGREE
MASTER OF ARTS

Thirty-two semester hours of work are required for the degree Master of Arts. At least half of this must be in courses numbered 200 and above. While the advisers

take into consideration the individual needs and desires of the students as well as the previous training which the student has had, it may be suggestive to list certain sample graduate programs for students majoring in Education:

SUGGESTED GRADUATE PROGRAM FOR STUDENTS MAJORING IN EDUCATIONAL PSYCHOLOGY*

First Year Graduate Work

A176	Psychology of Elementary School Subjects.....	3 hours
A202	Intelligence Testing.....	3 hours
A205	Psychology of Education.....	3 hours
B271	Philosophy of Education.....	3 hours
C170	Educational Statistics.....	3 hours
C210	City School Administration.....	3 hours
E205	Tests and Measurements in Elementary Schools.....	3 hours
106 or 111	Genetics.....	2 hours
125	Social Psychology.....	3 hours
	Elect with consent of adviser.....	6 hours

32 hours

Second Graduate Year

A206	Mental Hygiene.....	3 hours
A208	Psychology of High School Subjects.....	3 hours
A200	Seminar in Educational Psychology.....	4 hours
A250	Special Investigations in Educational Psychology.....	6 hours
C201	Methods of Educational Research.....	2 hours
122	Abnormal Psychology.....	3 hours
197	The Psychology of Learning.....	3 hours
	Elect with consent of adviser.....	8 hours

32 hours

Third Graduate Year

A200	Seminar in Educational Psychology.....	4 hours
A207	Differential Psychology.....	3 hours
A290	Research in Educational Psychology.....	8 hours
198	Systematic Psychology.....	3 hours
209	Psychological Textbooks.....	3 hours
	Elect with consent of adviser.....	4 hours

25 hours

*Since most candidates specializing in Educational Psychology find it profitable to do so only if they carry on the work to the completion of the requirements for the degree of Doctor of Philosophy, a full three year program has been outlined. The first year marks the program for the degree Master of Arts.

SUGGESTED PROGRAM OF STUDIES FOR THE DEGREE MASTER OF ARTS WITH A MAJOR IN SCHOOL ADMINISTRATION

All students are required to complete the following courses:

C200	Seminar in Educational Administration.....	1 -3
C209	State and National School Administration.....	2½-3
C210	City School Administration.....	2½-3

In consultation with his major adviser a student will usually select three of the following courses:

C170	Educational Statistics.....	2½-3
C211	Administration of Pupil Personnel.....	2½-3
C212	School Building Problems.....	2½-3
C240	School Finance.....	2½-3

In consultation with his adviser a student usually selects at least one course from each of the following fields:

Philosophy and Psychology of Education

Elementary Education—supervision, curriculum, or measurement courses

Secondary Education—administration, supervision, curriculum, or measurement courses

Other requirements:

1. The general prerequisite for graduate work with a major in Education, namely, that the student must present at least fifteen hours of acceptable undergraduate work in Education, applies to all majors in School Administration.

2. A student should present at least one undergraduate major in a subject-matter field. Furthermore, it is very desirable that he carry course work in some subject-matter field on the graduate level during his work for the degree Master of Arts.

3. Courses in Education other than those listed above, or in subject-matter fields, may be selected by the student in consultation with his adviser.

SUGGESTED GRADUATE PROGRAM FOR HIGH SCHOOL PRINCIPALS LEADING TO THE DEGREE MASTER OF ARTS

(Starred courses are required)

*A205	Psychology of Education.....	2½-3 hours
*B271	Philosophy of Education.....	2½-3 hours
*C209	State and National School Administration.....	2½-3 hours
*D201	Extra-Curricular Activities.....	2½-3 hours
*D206	High School Administration.....	2½-3 hours
*D215	High School Supervision (or D205).....	2½-3 hours
*D230	The Junior High School.....	2 hours
*D245	The High School Curriculum.....	2½-3 hours
		22-26 hours

ADDITIONAL COURSES TO MAKE UP THE REQUIREMENT OF THIRTY-TWO HOURS ARE TO BE SELECTED FROM THE COURSES LISTED BELOW

A208	Psychology of High School Subjects.....	2½-3 hours
B275	College Teaching.....	2½-3 hours
C170	Educational Statistics.....	2½-3 hours
C210	City School Administration.....	3 hours
C211	Administration of Pupil Personnel.....	3 hours
C212	School Building Problems.....	3 hours
C240	School Finance.....	3 hours
C273	Junior College Administration.....	3 hours
D200	Seminar in Secondary Education.....	Arr.
D207	Tests and Measurements for Secondary Schools.....	3 hours
D221	Educational Guidance.....	2½-3 hours

D240	Improvement of High School Teaching.....	2 hours
D246	Curriculum Construction for Secondary Schools.....	2½-3 hours
E184	Projects in Moral Education.....	2 hours

Students who have carried considerable undergraduate work in education are encouraged to include from eight to twelve hours of graduate work in subject-matter fields in their programs for the Master of Arts degree.

SUGGESTED GRADUATE PROGRAM FOR STUDENTS MAJORING IN EDUCATION,
DIVISION OF HIGH SCHOOL TEACHING,
LEADING TO THE DEGREE MASTER OF ARTS

A205	Psychology of Education.....	3 hours
A208	Psychology of High School Subjects.....	2½-3 hours
B271	Philosophy of Education.....	2½-3 hours
D207	Tests and Measurements for Secondary Schools.....	3 hours
D240	Improvement of High School Teaching.....	2 hours
D245	High School Curriculum.....	2½-3 hours
D250	Special Investigations in Secondary Education.....	1 -3 hours
		17½-20 hours

ADDITIONAL COURSES WHICH MAY BE ACCEPTED OR SUBSTITUTED FOR ONE OF THE
ABOVE WITH THE CONSENT OF THE ADVISER TO MAKE A TOTAL OF
THIRTY-TWO HOURS

A207	Differential Psychology.....	3 hours
B190	Comparative Education.....	2 hours
C170	Educational Statistics.....	2½-3 hours
C201	Methods of Educational Research.....	2 hours
D181	Problems in High School Music Teaching.....	2 hours
D201	Extra-Curricular Activities.....	2½-3 hours
D210	English Methods.....	2 -3 hours
D212	Problems in the Teaching of General Science.....	2 hours
D215	High School Supervision.....	3 hours
D220	Problems in the Teaching of Social Studies.....	3 hours
D221	Educational Guidance.....	2½-3 hours
D230	Junior High School.....	2 hours
D246	Curriculum Construction for Secondary Schools.....	2½-3 hours

GRADUATE COURSES OTHER THAN EDUCATION

Each candidate for a degree with a major in Education who expects to do high school teaching or high school supervision should carry from twelve to fourteen hours of graduate work in the subject-matter field of major interest. Graduate advisers in these subject-matter fields should be consulted concerning such courses.

Students desiring a major in Education for high school teaching must have had at least twenty hours of undergraduate work in Education from an acceptable institution. They must have had sufficient undergraduate training in some subject-matter field to be acceptable candidates for graduate courses in that field. Such subject-matter training must meet with the approval of the department in which the work is taken.

SUGGESTED GRADUATE PROGRAM FOR EDUCATIONAL GUIDANCE
LEADING TO THE DEGREE MASTER OF ARTS

This program is recommended for all those who plan to do work in student advisement and educational guidance or to specialize as counselors in secondary schools and in higher educational institutions.

(Starred Courses are Required)

*A205	Psychology of Education.....	2½-3 hours
*A202	Intelligence Testing.....	2 -3 hours
*A206	Mental Hygiene.....	2½-3 hours
*B271	Philosophy of Education.....	2½-3 hours
*C170	Educational Statistics.....	2½-3 hours
*D201	Extra-Curricular Activities.....	2½-3 hours
*D221	Educational Guidance.....	2½-3 hours
*F194	Principles of Trade and Industrial Teaching.....	2 -3 hours
*122	Abnormal Psychology.....	3 hours
*191	Psychiatric Social Work.....	2 hours
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		24-29 hours

SUGGESTED ELECTIVE COURSES TO MAKE UP THE REQUIREMENT OF THIRTY-TWO
HOURS

A208	Psychology of High School Subjects.....	2 -3 hours
C211	Administration of Pupil Personnel.....	2½-3 hours
D206	High School Administration.....	2½-3 hours
D220	Problems in the Teaching of Social Studies.....	3 hours
D240	Improvement of High School Teaching.....	2 hours
D250	Special Investigations in Secondary Education.....	1 -3 hours
E139	Technique of Handling the Problem Child.....	2 -3 hours
E184	Projects in Moral Education.....	2 -3 hours
F221	Vocational Guidance.....	2 hours

Students who have considerable undergraduate credit in Education are urged to minor in sociology, or at least to elect 8 to 12 hours of graduate work in such courses as: 110, Social Pathology; 111, Criminology; 114, The Family; and 118, Social Case Work.

SUGGESTED GRADUATE PROGRAM FOR ELEMENTARY SCHOOL PRINCIPALS
LEADING TO THE DEGREE MASTER OF ARTS

A176	Psychology of Elementary School Subjects.....	2-3 hours
A202	Intelligence Testing.....	1-3 hours
A205	The Psychology of Education.....	3 hours
C170	Educational Statistics.....	2½-3 hours
C210	City School Administration.....	2½-3 hours
E200	Seminar in Elementary Education.....	2 hours
E204	Elementary School Supervision.....	3 hours
E205	Tests and Measurements for Elementary Schools.....	3 hours
E206	Curriculum Construction.....	3 hours
E208	The Work of the Elementary School Principal.....	2 hours
E250	Special Investigations in Elementary Education.....	3 hours
Electives.....		5-1 hours
		<hr/>
		32 hours

SUGGESTED GRADUATE PROGRAM FOR SUPERVISORS IN ELEMENTARY SCHOOLS
LEADING TO THE DEGREE MASTER OF ARTS

A176	Psychology of Elementary School Subjects.....	2-3 hours
A202	Intelligence Testing.....	1-3 hours
A205	The Psychology of Education.....	3 hours
C170	Educational Statistics.....	2½-3 hours
E200	Seminar in Elementary Education.....	2 hours
C209	State and National School Administration.....	2½-3 hours
E204	Elementary School Supervision.....	3 hours
E205	Tests and Measurements for Elementary Schools.....	3 hours
E206	Curriculum Construction.....	3 hours
E250	Special Investigations in Elementary Education.....	3 hours
	Electives.....	7-3 hours
		32 hours

SUGGESTED ELECTIVES

A206	Mental Hygiene.....	2½-3 hours
B271	Philosophy of Education.....	2½-3 hours
E125	Primary Materials and Methods in Reading.....	3 hours
E139	The Technique of Handling the Problem Child.....	3 hours
E165	Problems in the Teaching of Reading.....	3 hours
E166	Problems of Teaching Literature in the Grades.....	3 hours

SUGGESTED COURSES FOR COLLEGE TEACHERS

Advanced graduate students planning to take up college teaching and desiring professional training courses as part of their preparation are advised to consider the following courses:

B275 COLLEGE TEACHING.

C273 JUNIOR COLLEGE ADMINISTRATION.

Other courses which may be of special value and which may be taken provided the student meets the prerequisites, are:

A207 DIFFERENTIAL PSYCHOLOGY.

B271 PHILOSOPHY OF EDUCATION.

Students planning to teach Education courses in junior colleges should have special preparation in Education with an emphasis on Elementary Education.

PROGRAM FOR THE DEGREE MASTER OF EDUCATION

The requirements for the degree Master of Education are described in an earlier part of this bulletin under the topic of Regulations Governing the Various Graduate Degrees.

Besides carrying the courses recommended for all graduate students in Education, the candidate should work out a definite program of studies with the adviser whom he selects from the published list of advisers. This program should be worked out in conference between the candidate and the major adviser. In general, an attempt is made to plan a program which will fit the individual needs of the candidate and for that reason courses other than those recommended for all students are not listed in a definite program of studies.

PROGRAM FOR THE DEGREE DOCTOR OF EDUCATION

The requirements for the degree Doctor of Education are published in another part of this bulletin under the topic describing the general regulations governing advanced graduate degrees.

A candidate for the degree Doctor of Education should select an adviser in accordance with the published list of advisers and should have a consulting committee appointed by the Dean of the Graduate School through his major adviser. The major adviser will confer with the candidate relative to his program and will then with the assistance of the consulting committee work out a program of studies leading toward the degree. The degree Doctor of Education is especially intended to meet the professional needs of the candidate. The program of studies will be worked out with this objective in view.

(A) EDUCATIONAL PSYCHOLOGY

A176f. PSYCHOLOGY OF ELEMENTARY SCHOOL SUBJECTS. The applications of educational psychology to the teaching of elementary school subjects. Prerequisite A102. (3) MR. GERMANE.

A200f and w. SEMINAR IN EDUCATIONAL PSYCHOLOGY. (1-3) MR. IRION; MR. SAUPE.

A202f and w. INTELLIGENCE TESTING. Group intelligence testing including a critical study of various tests and practice in their administration. The course will also include a study of individual mental testing and the uses to be made of results in the classification and treatment of pupils. (3) MR. SAUPE.

Sec. I Individual Intelligence Testing. (1)

Sec. II Group Intelligence Testing. (2).

A205f. THE PSYCHOLOGY OF EDUCATION. An advanced course covering the entire field of educational psychology. For graduate students only. (2½-3) MR. IRION; MR. SAUPE.

A206w. MENTAL HYGIENE. The psychology of personal adjustment. A review of the studies and researches in the field of psychology of improved self-management. Prerequisite A205 or its equivalent. (2½-3) MR. GERMANE.

A207. DIFFERENTIAL PSYCHOLOGY. Prerequisite, 20 semester hours of professional work in Education, including at least two courses in educational psychology. Presented primarily from the research point of view. Offered only upon special demand by advanced graduate students. (3) MR. IRION.

A208w. PSYCHOLOGY OF HIGH SCHOOL SUBJECTS. Deals with the applications of educational psychology to the mastery of high school subjects. Prerequisite A205 or its equivalent. (2½-3) MR. IRION.

A250f and w. SPECIAL INVESTIGATIONS IN EDUCATIONAL PSYCHOLOGY. (Credit to be arranged.) MR. IRION; MR. SAUPE.

A290f and w. RESEARCH IN EDUCATIONAL PSYCHOLOGY. (Credit to be arranged.) MR. IRION; MR. SAUPE.

(B) HISTORY AND PHILOSOPHY OF EDUCATION

B190w. COMPARATIVE EDUCATION. A course designed to introduce the student into the field of comparative education. The educational theories and practices of various European countries in contrast with American theory and practice will be studied. (2).

B200f and w. SEMINAR IN THE HISTORY AND PHILOSOPHY OF EDUCATION. (1-3) MR. COURSAULT.

B250f and w. SPECIAL INVESTIGATIONS IN THE HISTORY AND PHILOSOPHY OF EDUCATION. (Credit to be arranged.) MR. COURSAULT.

B271f. PHILOSOPHY OF EDUCATION. A study of the fundamentals of education in the light of modern science and philosophy. (2½-3) MR. COURSAULT.

B275w. COLLEGE TEACHING. Primarily for graduate students who expect to teach in junior or senior colleges, or in teachers colleges. Important practical matters in college teaching will be considered. Each student will be expected to prepare a syllabus for the teaching of one college course. (3) MR. COURSAULT.

B290f and w. RESEARCH IN THE HISTORY AND PHILOSOPHY OF EDUCATION. (Credit to be arranged.) MR. COURSAULT.

(C) EDUCATIONAL ADMINISTRATION

C170f and w. EDUCATIONAL STATISTICS. Statistical methods for teachers, supervisors, superintendents and beginning graduate students. (2½-3) MR. CAPPS.

C200f and w. SEMINAR IN EDUCATIONAL ADMINISTRATION. (1-3) MR. CAPPS; MR. CARPENTER.

C201f. METHODS OF EDUCATIONAL RESEARCH. Prerequisite, course C170 or equivalent. Principles and techniques involved in attacking problems in Education. Methods of collecting and systematizing data, preparation of manuscripts for theses, dissertations and printed reports. (2) MR. CAPPS.

C209f. STATE AND NATIONAL SCHOOL ADMINISTRATION. A fundamental course in the principles and practices of national, state, and county educational administration. (2½-3) MR. CARPENTER.

C210w. CITY SCHOOL ADMINISTRATION. The principles and problems growing out of the relationships between the local board of education, the employed personnel, and the community. (2½-3) MR. CARPENTER.

C211f. ADMINISTRATION OF PUPIL PERSONNEL. Problems of pupil-progress in the public school system. Prerequisite E120 or D140 or equivalent. (2) MR. CARPENTER.

C212w. SCHOOL BUILDING PROBLEMS. The responsibility of the school administrator for the construction, operation, and maintenance of school buildings. (2½-3) MR. CARPENTER.

C235w. ADVANCED EDUCATIONAL STATISTICS. Prerequisite, courses C170 and E205 or D207, or their equivalent. Advanced problems in partial correlation, reliability, index numbers, and test and scale construction. (2½-3) MR. CAPPS.

C240f. SCHOOL FINANCE. Fundamental principles and techniques of public school finance. (2½-3).

C241w. PROBLEMS IN SCHOOL FINANCE. Advanced problems in public school finance. (2½-3)

C246w. SCHOOL SURVEYS. The technique of the school survey and its use as an instrument of self-appraisal. (3) MR. CARPENTER.

C250f and w. SPECIAL INVESTIGATIONS IN EDUCATIONAL ADMINISTRATION. (Credit to be arranged.) MR. CAPPS; MR. CARPENTER.

C273f. JUNIOR COLLEGE ADMINISTRATION. The organization and administration of the junior college. (3) MR. CARPENTER.

C290f and w. RESEARCH IN EDUCATIONAL ADMINISTRATION. (Credit to be arranged.) MR. CAPPS; MR. CARPENTER.

(D) SECONDARY EDUCATION

D170w. TESTS AND MEASUREMENTS IN PHYSICAL EDUCATION. Theory and practice of measuring aptitude and achievement in physical education activities, with particular reference to the determination of standards. Prerequisites: Physical

Education 152w and Education D110; a course in statistics is desirable but not required. (3) MR. HINDMAN.

D181w. PROBLEMS IN HIGH SCHOOL MUSIC TEACHING. Analysis of material for high school music organizations and studies in the presentation of this material. Prerequisite, completion of the curriculum in Public School Music for freshman and sophomore years or its equivalent and A102 and D110. (2) MR. SLEEPER.

D195f. METHODS AND TECHNIQUES OF COUNSELING. A course for deans, principals, advisers and sponsors of high school and college students. Prerequisite A102 or its equivalent. (2½-3) MR. GERMANE.

D197f. SPECIAL PROBLEMS IN STUDENT COUNSELING. A course for deans, personnel directors, principals, and part-time advisers of high school and college students. Prerequisite A205 or its equivalent. (2½-3) MR. GERMANE.

D200f and w. SEMINAR IN SECONDARY EDUCATION. (1-3) MR. ELLIS; MR. GERMANE; MR. RUFFI; MR. WATKINS.

D201s. EXTRA-CURRICULAR ACTIVITIES. The organization and administration of extra-curricular activities in junior and senior high schools, for high school principals, advisers of girls, and for high school teachers preparing for the management of extra-curricular activities. (2½-3).

D206f. HIGH SCHOOL ADMINISTRATION. Deals with the problems of administration from the point of view of the high school principal. Prerequisite, D140 or its equivalent. (3) MR. RUFFI.

D207f. TESTS AND MEASUREMENTS FOR SECONDARY SCHOOLS. Study of the uses and the construction of educational tests and measurements for purposes of classification of students and for improvement of instruction in various subject-matter fields in secondary schools. (3) MR. CAPPS.

D210w. ENGLISH METHODS. An investigation of the aims, means and methods in English instruction in the school. (2-3) MR. MOFFETT.

D212w. PROBLEMS IN THE TEACHING OF GENERAL SCIENCE. For teachers and supervisors of science. Problems of organization, content, and teaching. Includes a summary of investigations on teaching of science. (2) MR. WATKINS.

D215w. HIGH SCHOOL SUPERVISION. Methods of improving instruction in junior and senior high schools. (3) MR. RUFFI.

D219f and w. SPECIAL INVESTIGATIONS IN HIGH SCHOOL MUSIC TEACHING. Research in material and methods having to do with music projects in the junior and senior high school. A written report is required. Prerequisite, completion of Public School Music major in the School of Education or its equivalent. (2-5) MR. SLEEPER.

D220f. PROBLEMS IN THE TEACHING OF SOCIAL STUDIES. Recent developments in objectives, method, and curriculum in junior and senior high school social studies. Designed for high school teachers and supervisors, and open to graduate students with at least a minor in one of the social studies. (3) MR. ELLIS.

D221f. EDUCATIONAL GUIDANCE. A survey of recent literature pertinent to such problems of guidance as objectives, and the materials and techniques for the realization of these objectives. (2½-3) MR. GERMANE.

D230w. THE JUNIOR HIGH SCHOOL. A survey of the progress of the junior high school, including a study of the more important problems of organization and administration. (2) MR. RUFFI.

D240f. THE IMPROVEMENT OF HIGH SCHOOL TEACHING. For high school teachers and supervisors who have had considerable training in education and experience in teaching. Deals with recent developments in high school teaching, descriptions and evaluations of improved procedures. (2) MR. WATKINS.

D245w. THE HIGH SCHOOL CURRICULUM. For high school principals and teachers, and for superintendents interested in the improved adaptation of secondary school curricula. Deals with present trends in curricular change, reasons for the existence of present curricula, methods of curricular investigation, and the adaptation of curricula to community needs. (2½-3) MR. WATKINS.

D246s. CURRICULUM CONSTRUCTION FOR SECONDARY SCHOOLS. The course is intended to meet the needs of those school people who have definite problems calling for the construction of curricula to meet definite situations, or the needs of those attempting to construct high school courses. Practice in actual construction of courses and curricula is provided. Prerequisite, Education D245, High School Curriculum. In cases of individuals furnishing evidence of other adequate previous training, the prerequisite may be waived by the instructor. (3) MR. WATKINS.

D250f and w. SPECIAL INVESTIGATIONS IN SECONDARY EDUCATION. (Credit to be arranged.) MR. ELLIS; MR. GERMANE; MR. RUFU; MR. WATKINS.

D290f and w. RESEARCH IN SECONDARY EDUCATION. (Credit to be arranged.) MR. GERMANE; MR. RUFU; MR. WATKINS.

(E) ELEMENTARY EDUCATION

E108s. PRIMARY MATERIALS AND METHODS. A critical study is made of the principles, techniques and materials which are used to organize the curriculum of the first three grades for a modern elementary school. One major feature of the study involves the consideration of the curriculum from the point of view of the activities of children. A limited amount of attention is devoted to extra-curricular activities. Prerequisites, A102 Educational Psychology and E121 Technique of Teaching in Elementary Schools. (3).

E125s. PRIMARY MATERIALS AND METHODS IN READING. A study of the materials used in the first three grades of modern elementary schools, and the methods which should underlie the presentation of these materials in the instruction of children. Prerequisites, A102 Educational Psychology and E121 Technique of Teaching in Elementary Schools. (3).

E139s. THE TECHNIQUE OF HANDLING THE PROBLEM CHILD. A study of the different types of problem children along with the methods of treatment to be used by the classroom teacher in connection with each type. Prerequisite, A102 Educational Psychology. (3).

E163s. INDIVIDUALIZED INSTRUCTION. Theory and technique of Dalton Laboratory plan, Winnetka plan, and others, with discussion of observation of demonstration class in University Elementary School. (3).

E165w. PROBLEMS IN THE TEACHING OF READING. Fundamental problems in the teaching of silent reading. For teachers, supervisors, and superintendents. Selection of material and methods for grades I to IX. (3) MR. GERMANE.

E166w. PROBLEMS OF TEACHING LITERATURE IN THE GRADES. The study will include both the content and the methods of teaching literature to children in the six grades of the elementary school. The major emphasis will be placed upon content. The course includes a critical study for the selection of rhymes, fairy tales, folk lore, poems, stories of adventure, fables, and some creative writing. To obtain graduate credit considerable experience will be required in creative writing of the various types of children's literature and an undergraduate major in English. General prerequisites, A102 Educational Psychology and E121 Technique of Teaching in Elementary Schools. (2-3).

E170f. ELEMENTARY SCHOOL CURRICULUM. A study of the modern elementary school curriculum from the point of view of objectives, methods and materials with

suggestions regarding its practical reorganization. Prerequisites A102 and E121. (2) MR. PHILLIPS.

E175f. RURAL SCHOOL SUPERVISION. A course intended primarily for county school superintendents. A critical examination of some of the important problems of rural school supervision will be included. (2) MR. PHILLIPS.

E180w. MUSIC SUPERVISION. A comparative study of modern methods of teaching music in grades I to VI, teaching of Sight-Singing and Appreciation. Prerequisite, completion of the curriculum in Public School Music for freshman and sophomore years or its equivalent and E129 and A102 in the School of Education. (2) MR. SLEEPER.

E184w. PROJECTS IN MORAL EDUCATION. In this course two of the vital points in character education will be stressed, namely: (1) What are the psychological and environmental factors in the home, school, and community that affect human conduct? (2) What are the social situations in the home, school, and community that offer greatest opportunity for a united training in the making of desirable and wholesome social adjustments? (3) MR. GERMANE.

E195w. PROBLEMS IN COUNTY SCHOOL SUPERVISION. (Maximum credit 8 hours. Credit to be arranged.) MR. PHILLIPS.

E200f and w. SEMINAR IN ELEMENTARY EDUCATION. (1-3) MR. PHILLIPS.

E204f. ELEMENTARY SCHOOL SUPERVISION. A study of the modern technique of improving the work of the classroom teacher in the elementary schools. (3) MR. PHILLIPS.

E205w. TESTS AND MEASUREMENTS FOR ELEMENTARY SCHOOLS. Study of the uses and the construction of educational tests and measurements for the elementary schools from the points of view of the teacher, the supervisor and the administrator. (3) MR. CAPPS.

E206w. CURRICULUM CONSTRUCTION IN ELEMENTARY SCHOOL. (2-3) MR. PHILLIPS.

E208s. THE WORK OF THE ELEMENTARY SCHOOL PRINCIPAL. A course designed to deal with the special techniques needed by an elementary school principal. (2-3)

E218f and w. SPECIAL PROBLEMS IN ELEMENTARY SCHOOL MUSIC TEACHING. Research in material and methods having to do with music projects in the elementary school. A written report is required. Prerequisite, completion of Public School Music major in the School of Education or its equivalent. (2-5) MR. SLEEPER.

E250f and w. SPECIAL INVESTIGATIONS IN ELEMENTARY EDUCATION. (Credit to be arranged.) MR. PHILLIPS.

E290f and w. RESEARCH IN ELEMENTARY EDUCATION. (Credit to be arranged.) MR. PHILLIPS.

(F) VOCATIONAL AND INDUSTRIAL EDUCATION

Agricultural Education

F120w. COMMUNITY EDUCATIONAL ACTIVITIES IN VOCATIONAL AGRICULTURE. A study of the work of the teacher of agriculture in his extension activities. Particular attention is given to the problems of Evening and Part-Time Schools. (2) MR. DIPPOLD; MR. DICKINSON.

F195f and w. SPECIAL PROBLEMS IN AGRICULTURAL EDUCATION. Individual study. (Credit to be arranged.) MR. DICKINSON; MR. DIPPOLD.

F240f and w. PROBLEMS IN AGRICULTURAL EDUCATION. Group study on current and advanced problems in the teaching and administration of Agricultural Education. (2-4) MR. DICKINSON; MR. DIPPOLD.

Home Economics Education

F230f and w. SUPERVISION OF PRACTICE TEACHING OF VOCATIONAL HOME ECONOMICS. A course for those who are preparing to become supervisors of student teaching in Home Economics in institutions of college rank which train teachers for Vocational Home Economics in secondary schools. The course includes readings, discussion, and supervised practice work in supervision. Prerequisites, D150, F175, F110. (Credit to be arranged.) MISS IRONS.

F273w. PROBLEMS IN HOME ECONOMICS EDUCATION. This course furnishes opportunities for experienced teachers to study problems of teaching, supervision, critic teaching, or administration of home economics and related subjects. (3) MISS IRONS.

Industrial Arts and Trades and Industries

F140w. SUPERVISION AND CRITICISM OF ELEMENTARY HANDWORK. Lectures, observation, and discussion. Special emphasis on the theory and purposes of classroom projects in illustrative and technical handwork. Topics considered in their relation to the work of the trained supervisor and also from the standpoint of the principal and superintendent who lack practical training. (2) MISS DOBBS.

F190w. ORGANIZATION OF SUBJECT MATTER. A study and comparison of the types of individual instruction units and teaching plans. The determination of content and the development of written instruction material with a view of providing for individual progress. (2) MR. SELVIDGE.

F194f. PRINCIPLES OF TRADE AND INDUSTRIAL TEACHING. This course will deal with the principles involved in the selection of instructional material, the analysis and organization of material, classroom practice, lesson planning, and the preparation of instruction. (3) MR. SELVIDGE.

F196f. ADMINISTRATION OF INDUSTRIAL EDUCATION. Designed especially for superintendents and principals. The course deals with the purpose and character of industrial work in the junior high school, senior high school and the continuation school. It gives plans for the organization of subject-matter, methods by which administrative officers may check results, the kind of teachers required, the schedule, equipment and costs. (2) MR. SELVIDGE.

F197f and w. SPECIAL PROBLEMS IN INDUSTRIAL EDUCATION. MR. SELVIDGE.

F201w. JOB ANALYSIS APPLIED TO CURRICULUM MAKING. The course will deal with the organization of the subject-matter of the individual units of the curriculum. The problem will be to state definitely what we expect the pupil to know with respect to the unit when he has finished his period of training. Each of these elements must be justified before it is accepted and then a plan developed for teaching it. The development of instruction sheets will be considered in this connection. (2) MR. SELVIDGE.

F221f. VOCATIONAL GUIDANCE. The purpose and limitations of guidance, elements to be considered, personal, social and industrial factors, the accidental elements, the source of material and the adviser's job. (2) MR. SELVIDGE.

General

F200f and w. SEMINAR IN VOCATIONAL EDUCATION. (1-3) MR. DICKINSON; MR. DIPPOLD; MISS IRONS; MR. SELVIDGE.

F250f and w. SPECIAL INVESTIGATIONS IN VOCATIONAL EDUCATION. (Credit to be arranged.) MR. DICKINSON; MR. DIPPOLD; MISS IRONS; MR. SELVIDGE.

F290f and w. RESEARCH IN VOCATIONAL EDUCATION. (Credit to be arranged.) MR. DICKINSON; MR. DIPPOLD; MISS IRONS; MR. SELVIDGE.

ELECTRICAL ENGINEERING

Prerequisite: Prerequisite for graduate study with a major in Electrical Engineering are the degree of Bachelor of Science in Engineering with electrical engineering as the field of specialization, or the substantial equivalent of the required undergraduate course in this field. Candidates for advanced degrees should consult the chairman of the department.

The following courses may be counted toward a minor only in Electrical Engineering:

110f. ALTERNATING CURRENT CIRCUITS. Prerequisites, EE 50 and Math. 100. Fundamental laws of alternating current flow; general methods of circuit solutions. Circuits with uniformly adjusted properties; magnetically coupled circuits. Solution of single phase circuits subject to non-sinusoidal voltages. Elementary study of recurrent networks. Analysis and solution of balanced and unbalanced polyphase circuits. (4) Three class periods and one three-hour problem or laboratory period. MR. WEINBACH.

149w. ALTERNATING CURRENT MACHINERY. Prerequisite, EE 110. The constant potential two-winding transformer. Special types; auto-transformers, three-winding, potential and current, and constant current transformers, the induction potential regulator. Single-phase transformer interconnections. Polyphase transformers and induction potential regulators. The principle of the polyphase induction motor. (4) Three class periods and one three-hour laboratory period per week. MR. LANIER; MR. WALLIS.

150f. ALTERNATING CURRENT MACHINERY. Prerequisite, EE 149. Wound rotor and squirrel-cage induction motors; characteristics and control. Induction generator. Single-phase induction motor. Theory and characteristics of round rotor and salient pole synchronous generators and motors. Parallel operation of alternators. (4) Three class periods and one three-hour laboratory period per week. MR. LANIER. MR. WALLIS.

151w. COMMUTATING MACHINERY. Prerequisite, EE 150. The direct-current dynamo. Commutation. Characteristics and control of direct-current generators and motors. Parallel operation of generators. Rotary converters. Commutator type alternating current motors. (3) Two class periods and one three-hour laboratory period per week. MR. LANIER. (Not offered in 1936-37).

160w. POWER TRANSMISSION AND DISTRIBUTION. Prerequisite EE 110. Detailed study of the generation, transmission, and distribution of electrical energy for municipal and domestic lighting and industrial application. (4) Three class periods and one three hour laboratory period per week. MR. WEINBACH.

170f. COMMUNICATION. Prerequisite, EE 110. Production and classification of speech sounds; frequency characteristics. Sound waves, their conversion into electric waves and reconversion into sound waves. Propagation of electric waves of voice frequencies along conductors. Principles of electrical transmission; line characteristics; attenuation and phase shift, distortion phenomena; the distortionless line and its properties; reflection. Equivalent circuits of lines; amplification. (4) Three class periods and one three-hour problem or laboratory period per week. MR. WEINBACH AND MR. WALLIS.

180w. THERMIONIC TUBES AND TUBE CIRCUITS. Prerequisite, EE 110. Fundamental theory of vacuum and gas filled tubes; mathematical analysis of the vacuum tube and its associated circuit when acting as an amplifier, oscillator, detector and modulator; theoretical discussion of rectifier circuits utilizing the gas filled tube. (4) Three class periods and one three hour laboratory period per week. MR. WALLIS.

The following courses may be counted toward either a major or a minor in Electrical Engineering:

185w. SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING. Prerequisite, EE 150 or 170. Analytical or experimental problems pertaining to electrical circuits, machines, or thermionics. (2-4) MR. LANIER, or MR. WEINBACH, MR. WALLIS.

200f or w. SEMINAR. Prerequisite, graduate standing. Reviews of recent investigations and projects of major importance in the field of electrical engineering. (1) DEPARTMENT STAFF.

210f. ELECTRICAL MACHINERY C. Prerequisite, EE 151w. Multi-circuit transformers. Synchronous machines under balanced steady state conditions; Polyphase banks of transformers, polyphase induction and synchronous machines under unbalanced conditions. The single-phase induction motor. Phase converters. Higher harmonics in transformers and rotating machines. (3) MR. LANIER.

220w. ANALYSIS OF ELECTRICAL DESIGN. Prerequisite, EE 151w. Electric and magnetic fields; Methods of field plotting circuit parameters of symmetrical and unsymmetrical conducting systems. Skin effect in conductors. Magnetic fields in media containing iron. Current distortion in the conductors of alternating current machines; effects upon performance. Transient conditions in synchronous machines. (3) MR. LANIER.

242w. HIGH VOLTAGE TRANSMISSION. Prerequisite, EE 160 and 170. Transmission of electrical energy; practical limitations due to static stability; line regulation; transient instability due to faults and switching; operative precautions. (3) MR. WEINBACH.

250f. POWER RECTIFICATION, INVERSION, AND CONTROL. Prerequisite, 180w. Pulsating currents and laws of average values. Rectifier cut-off and non cut-off characteristics. Exact solution of single-phase and polyphase rectifier circuits; anode circuit unbalance. Mathematical analysis of the controlled rectifier and inverter circuit; inverter stability. (3) MR. WALLIS.

280f. ADVANCED ELECTRIC CIRCUIT ANALYSIS. Prerequisite, EE 110. Specialized study of higher mathematical analysis as applied to the solution of circuit networks with fixed and variable parameters under steady and transient conditions, (3) MR. WEINBACH.

285f and w. SPECIAL STUDIES IN ELECTRICAL ENGINEERING. Prerequisites, EE 150, 170, and 180. Analytical or experimental investigation of problems pertaining to electric circuits, machinery or systems. (2-5) MR. LANIER; MR. WEINBACH; MR. WALLIS.

299f and w. RESEARCH. Prerequisites, EE 151, 170, and 180. Independent investigation of some problem or design in the field of electrical engineering, to be presented in the form of a thesis. (Min. 4 hrs.) MR. LANIER; MR. WEINBACH; MR. WALLIS.

ENGLISH

The requirements for the degree of Master of Arts, with English as a major, are as follows: A total of thirty-two hours, with approximately twenty-four hours of class work (at least half of which must be in the 200, i. e., strictly graduate group) and a thesis upon an approved subject. The thesis may count for as much as eight hours. No fixed body of courses is required, except the two courses in the English language and the course in Chaucer, or the equivalent of these.

Some acquaintance with at least two foreign languages (preferably Greek, Latin, German, French) is not only desirable but practically indispensable for the successful

pursuit of graduate work in English and is a prerequisite for the two courses in the English language and the course in Chaucer.

In order to secure the degree of Master of Arts in one year, students in English must already have had the equivalent of the English undergraduate major. This major calls for twenty-four hours of work (not counting freshman composition) including at least one course in composition beyond the required freshman courses, one course in the English language or Chaucer (prerequisite stated above), one course in the later literature, and one course in the earlier literature.

The requirements for the degree of Master of Arts, with emphasis in speech, are as follows: A total of thirty-two hours, with approximately twenty-four hours of class work (at least half of which must be in the 200, i. e. strictly graduate group) and a thesis upon an approved subject. The thesis may count for as much as eight hours. No fixed body of courses is required of students who have completed the equivalent of the undergraduate major with emphasis in speech (see *Catalog* announcements for 1936-1937), except an additional course in the English language, 217 SEMINAR IN RHETORICAL CRITICISM, and either 206 SEMINAR IN FORENSICS or 207 SEMINAR IN DRAMATIC PRODUCTION.

Graduates who have not met these requirements may enter, but will require a longer time for the attainment of the degree.

100f and w. THE SHORT STORY. An advanced course in the art of story writing. Prerequisite, course 50 or its equivalent. (3) MR. RAMSAY.

101f. ADVANCED WRITING. Advanced course open to a limited number. Prerequisite, consent of the instructor. (3) MR. RANKIN.

104w. THE APPRECIATION OF LITERATURE. Discussion of the appreciation of literature and theories of criticism. Practice in writing reviews and critical essays. (3) MR. RANKIN.

105f. ARGUMENTATION. Technique of persuasion by means of logical and psychological analysis, with practice both oral and written. (3) MR. ALY.

106w. DEBATING. Analysis of current problems in public discussion, with the application of principles derived from the theories of persuasion and the study of historic debates. (3) MR. ALY.

107s and f. DRAMATIC INTERPRETATION. Thorough study and practice of principles of make up. Stage technique of pantomime in theory and practice. Improvisation which gives an elementary training in the theory and method of conversational line reading. (3; 2½-3 in Summer Session) MR. HAKE.

108w. CHARACTERIZATION AND ACTING. Theory and method of building characterizations for plays. Class work includes individual and group rehearsal and performance. (3) MR. HAKE.

109s and w. STAGECRAFT. Functions of stage settings. Theory of various methods and periods of stage decoration. Procedure in mounting play from first floor plans and sketches, through models and final construction and painting of scenery. (3; 2½-3 in Summer Session) MR. HAKE.

110s and f. DRAMATIC PRODUCTION. Theory and technique of directing and producing plays, from the selection of plays through casting, planning stage movement, stage business, procedure of rehearsals to final production. Principles of design and composition as applied to stage direction. (3; 2½-3 in Summer Session) MR. RHYSBURGER; MR. HAKE.

114w. PUBLIC ADDRESS. Persuasive speaking adapted to audience and occasion; study and delivery of deliberative, professional, social, and ceremonial speeches. Prerequisite, course 75. (3) MR. GILMAN.

115f. PRINCIPLES OF RHETORIC. Development of rhetoric from the time of Aristotle; derivation and application of standards for judging effectiveness in writing and speaking. (3) MR. GILMAN.

116w. BRITISH ORATORY. A study of structure, modes of persuasion, and style in typical British oratory from the seventeenth century to the present. (2) MR. GILMAN.

118w. APPLIED PHONETICS. The principles of phonetics applied to the problems of the speaker, actor, teacher, and speech clinician. Laboratory work: standards of pronunciation, clinic cases, dialect studies. (2) MR. REID.

119f. THE ENGLISH LANGUAGE, PART ONE. Modern English, looking backward; a survey of the present facts of English, especially its vocabulary; dialects and kindred languages, grammar, and pronunciation, studied in the light of its past history and development. (3) MR. RAMSAY.

120s and w. THE ENGLISH LANGUAGE, PART TWO. Old English, looking forward; an elementary knowledge of Old English, with special attention to our modern inheritances from it, both in language and in life. Either Part One (119) or Part Two (120) may be taken first. (3; 2½-3 in Summer Session) MR. RAMSAY.

Some acquaintance with at least two foreign languages (preferably Greek, Latin German, French) is practically indispensable to students of the English language, and especially to prospective teachers of English.

125s and f. CHAUCER AND HIS TIME. A careful reading of some of the *Canterbury Tales* and rapid reading of other parts of Chaucer's work, together with a consideration of the social background of Chaucer's England; introduction to Middle English. (3; 2½-3 in the Summer Session) MR. RANKIN; MR. MOFFETT.

135f and 136s and w. SHAKESPEARE. (3; 2½-3 in Summer Session) MR. FAIRCHILD; MR. S. JOHNSON.

145f. MILTON. Life, works, times. (3) MR. FAIRCHILD.

155f. THE AGE OF REASON. Dryden and his time; Pope, Swift, and the essayists. (3) MR. BELDEN.

156w. JOHNSON AND HIS TIME. Philosophy, criticism, and social ideas as reflected in English literature from 1730-1780. (3) MR. BELDEN.

162w. THE NOVEL. The English novel from Fielding to Conrad. (3) MR. AINSWORTH.

165f. THE ROMANTIC PERIOD. A study of literary tendencies and representative authors. (3) MR. AINSWORTH.

166s and w. THE VICTORIAN PERIOD. A study of literary tendencies and representative authors. (3; 2½-3 in Summer Session) MR. RANKIN; MISS BRASHEAR.

171f. MODERN PROSE WRITERS. Study of selected prose writers of the nineteenth and twentieth centuries who deal with important present-day problems of American life. (3) MR. RANKIN.

175s and f and 176w. AMERICAN LITERATURE. (a) Sectional development; (b) the growth of nationality. (3; 2½-3 in Summer Session) MR. BELDEN; MR. MOFFETT.

177s and w. THE AMERICAN NOVEL. A study of the extent to which the novel represents the American experiment, social and political. (3; 2½-3 in Summer Session) MISS BRASHEAR.

190w. MODERN POETRY. A study of representative poets and political movements in England and America in the last fifty years. (3) MR. RAMSAY.

195f. MODERN DRAMA. The development of English and American drama during the last half century, with a survey of some foreign dramatists who have influenced its course. (3) MR. RAMSAY.

206s. SEMINAR IN FORENSICS. Analysis and criticism of propositions, with review of current bibliography and materials. (2½-3) MR. ALY.

207s. SEMINAR IN DRAMATIC PRODUCTION. Seminar discussions cover the methods of producing tragedy, melodrama, comedy, and farce. Influences of directors upon style and mood of presentation and interpretation. Study of the influence of the theater upon society. Each member is to prepare director's manuscript and model for one-act play and director's manuscript and stage plans and designs for one long play. (2½-3) MR. RHYNSBURGER.

210w. ENGLISH METHODS. Problems in the investigation of the aims, materials, and methods of English instruction in the schools. (3) MR. MOFFETT.

212s. METHODS IN ENGLISH LITERATURE IN SECONDARY SCHOOLS. Materials commonly studied in high schools reviewed and organized; the procedures of teaching evaluated; significant innovations in the field of English reviewed; emphasis made on the results of research in the field of English literature; courses of study planned for various types of schools. (2) MISS CHAMBERLAIN.

213s. METHODS IN ENGLISH COMPOSITION IN SECONDARY SCHOOLS. Materials for the curriculum in composition reviewed and organized; methods of teaching composition evaluated; important innovations in the field of communication reviewed, with emphasis on the results of research in this field; building a progressive course of study for schools of various types. (2) MISS CHAMBERLAIN.

219f and 220w. LITERARY CRITICISM. History of critical theory from Plato to the present; current theories and problems. The two courses constitute a unit; if at all possible, students should plan on taking both of them. (3) MR. FAIRCHILD

224s and f. RISE OF THE DRAMA. The beginnings of modern drama in the medieval church, and its development in the English miracle plays, moralities, and interludes. (3; 2½-3 in Summer Session) MR. RAMSAY.

231f. ELIZABETHAN LITERATURE. Non-Dramatic, 1500-1600. The Renaissance in England; the rise of humanism; the beginnings of English prose fiction. (3) MR. AINSWORTH.

256s. JOHNSON AND HIS TIME. Philosophy, criticism, and social ideas as reflected in English literature from 1730 to 1780. (2½-3) MR. WEATHERLY.

265s. PROBLEMS IN ROMANTICISM. A study of the elements of romanticism as found in the chief English poets and prose writers of the period 1780-1825. (2½-3) MR. WEATHERLY.

267w. TENNYSON AND BROWNING. The author for more special study will be Browning. (3) MR. AINSWORTH.

275f and 276w. AMERICAN LITERATURE. Problems for special investigation. (3) MR. BELDEN.

280w. THE FOREIGN DEBT OF ENGLISH LITERATURE (LYRIC POETRY). A study of the English lyric from the beginnings to the present time. with emphasis upon the foreign influences which have demonstrably affected the content, mood, or form of lyric verse. (3) MR. RANKIN.

299s, f and w. RESEARCH. Candidates for advanced degrees will meet with instructors for consultation upon their individual problems. (1-8) MR. AINSWORTH; MR. BELDEN; MISS BRASHEAR; MISS CHAMBERLAIN; MR. FAIRCHILD; MR. GILMAN; MR. MOFFETT; MR. RAMSAY; MR. RANKIN; MR. RHYNSBURGER.

With the consent of the adviser, graduate students who have begun their research work in residence may enroll for from one to three hours credit in the Extension Division. Work in research done in this way will be under the personal direction of a professor in the Graduate School.

ENTOMOLOGY

Prerequisites, a minimum of 24 hours of undergraduate work in entomology or allied subjects, including zoology, botany, chemistry, horticulture, etc. Thesis required of all candidates for advanced degrees.

104f. INSECT TAXONOMY. A technical study of insect taxonomy. (2) MR. BIRKETT; MR. HASEMAN.

115w. VETERINARY AND MEDICAL ENTOMOLOGY. A detailed study of those insects which are parasitic on poultry, live stock, and man. Especial attention is paid to those which transmit disease. (3) MR. HASEMAN; MR. BIRKETT.

116f. MORPHOLOGY AND DEVELOPMENT OF INSECTS. A technical study of the embryology, growth, development, and transformation of insects. (3) MR. HASEMAN; MR. BIRKETT.

117w. ANATOMY AND PHYSIOLOGY OF INSECTS. A technical study of external and internal anatomy and of insect physiology (3) MR. BIRKETT; MR. HASEMAN.

118w. ADVANCED ECONOMIC ENTOMOLOGY. This course includes an intensive study of the behavior, development, and control of the major insect pests. (3) MR. HASEMAN; MR. BIRKETT.

120f, 121w, and 122s. SPECIAL PROBLEMS. Properly prepared students may undertake special problems in the different fields of entomology as preparation for research. (Credit to be arranged.) MR. HASEMAN; MR. BIRKETT.

130f. INSECT ECOLOGY. The course covers the field of animal ecology but deals more especially with insects. A reading knowledge of French and German is essential. Open to students who have had adequate training. (3) MR. HASEMAN.

200f and 201w. SEMINAR. Reviews of current literature and reports on original investigations are presented and discussed by the students and members of the faculty. (1) MR. HASEMAN; MR. BIRKETT.

205f, 206w, and 207s. RESEARCH. Students who have had adequate training may undertake original research in economic entomology, systematic entomology, or insect morphology. A reading knowledge of French and German is essential. (Credit to be arranged) MR. HASEMAN.

EXTENSION

AGRICULTURE AND HOME ECONOMICS

101s, f and w. FIELD WORK IN AGRICULTURAL EXTENSION. A field course occupying the full time of students for a minimum period of six weeks. Daily conferences by arrangement. (5) MR. HEARNE.

110s, f and w. FIELD WORK IN HOME ECONOMICS EXTENSION. A field course occupying the full time of students for a minimum period of six weeks. Daily conferences by arrangement. (5) MR. HEARNE.

200s, f and w. SPECIAL STUDIES IN AGRICULTURE AND HOME ECONOMICS EXTENSION. A problem course in methods of conducting and administering extension work in agriculture and home economics. (2-5) MR. HEARNE.

FIELD CROPS

The requirement of a dissertation for the master's degree will depend upon the individual qualifications of the candidate.

100s and w. FIELD CROPS MANAGEMENT. Prerequisite, course 1. A study of crop rotations for Missouri conditions; the management of crops in various systems of farming. (2) MR. HELM.

101s and w. **FIELD CROPS IMPROVEMENT.** A summary of the principles and practices in the economic breeding of crop plants. (3) MR. STADLER.

103f. **FORAGE CROP PRODUCTION.** Prerequisite, course 1. An advanced study of the production of the principal forage crops, based mainly on experimental data. (3) MR. BROWN.

114f. **FIBER CROP PRODUCTION.** Prerequisite, course 1. An advanced study of the production of the principal fiber crops with especial attention to cotton. (2) MR. ETHERIDGE.

105w. **GRAIN CROP PRODUCTION.** A summary of the important results of investigation of factors related to the yield of each crop will be the essential aim of the course. (3) MR. ETHERIDGE.

200f and w. **SEMINAR.** During the fall term, a critical study and discussion of the current literature of genetics. A reading knowledge of German is required. Credit 1 or 2 hours. During the winter term a discussion of research problems in the production, management and improvement of field crops; abstracts of literature on special topics. Required without credit of graduate students majoring in field crops. MR. ETHERIDGE; MR. STADLER.

201s and w. **CROP EXPERIMENTATION.** A study of the methods of experimentation and research with crops in the laboratory, green house, and field. (2) MR. STADLER.

202s, f and w. **SPECIAL STUDIES.** A course scheduled by appointment for graduates who wish to investigate along special lines the production of field crops. Credit to be arranged. The teacher may be elected.

299s, f and w. **RESEARCH.** Original research in problems of the production, management, and improvement of field crops. MR. ETHERIDGE; MR. STADLER.

215w. **ADVANCED GENETICS.** See Botany 215w.

216w. **ADVANCED CYTOLOGY.** See Botany 216w.

FRENCH AND ITALIAN

FRENCH

Candidates for the master's degree who plan to major in French should have had about 25 hours work (courses 1, 2, 3, 101, 103, 108, or their equivalent).

Candidates for the master's degree will be required to submit a dissertation. On the recommendation of the department, the dissertation may count for a fourth of the requirements toward the degree.

101w. **PHONETICS.** The organs of speech, sound formation, drill in pronunciation. (1) MR. JESSE.

102f. **FRENCH CIVILIZATION.** (2) MR. FESS.

103f, w and s. **COMPOSITION.** Prerequisite, course 3. Aural and oral drill; practice in composition. (5) MRS. HUDSON.

104f and w. **ADVANCED COMPOSITION.** Prerequisite, course 103. More advanced work along the lines of course 103. (3) MR. TROMBLY; MR. JESSE.

108f. **MASTERPIECES OF FRENCH LITERATURE TO 1700.** A study of representative writings of the French masters. It is advisable that students take this and the following course before taking others in French literature. (3) MR. JESSE.

108w. **MASTERPIECES OF FRENCH LITERATURE FROM 1700 TO THE PRESENT DAY.** (3) MR. DORRANCE.

112f. **FRENCH NOVEL TO 1900.** This course will stress the 19th century novel. (3) MR. DORRANCE.

- 114f. LYRIC POETRY FROM CHENIER TO VERLAINE. (Alternate with 115). (3) MR. TROMBLY.
- 115f. LYRIC POETRY OF TODAY. (Alternates with 114). (3) MR. TROMBLY.
- 116w. HISTORY OF FRENCH LANGUAGE. An introduction to the scientific study of the language. Of special interest to teachers. (Alternates with 117.) (3) MR. FESS.
- 117w. THE FRENCH RENAISSANCE. (Alternates with 116.) (3) MR. FESS.
- 130f, w and s. SPECIAL READINGS. (1-3) MR. TROMBLY.
- 199w. DISTINCTION. (3).
- 201f and w. OLD FRENCH. Phonology, morphology, and the reading of Chanson de Roland, Chrestien de Troyes, and Marie de France. (2) MR. FESS.
- 202w. SURVEY OF OLD FRENCH LITERATURE. (3) MR. FESS.
- 203w. VULGAR LATIN. Appendix Probi and Peregrinatio Sanctae Silviae. (2) MR. FESS.
- 205w. LITERARY CRITICISM. (3) MR. TROMBLY.
- 206w. MOLIERE. Reading of all the plays and especial study of some. (3) MR. TROMBLY.
- 207f, w and s. SPECIAL INVESTIGATIONS. (1-4) MR. TROMBLY; MR. FESS.
- 210w. STUDIES IN MODERN LITERATURE. (2) MR. FESS.
- 290f, w and s. RESEARCH. (1-8) MR. TROMBLY; MR. FESS.

ITALIAN

- 120f. READINGS IN ITALIAN LITERATURE. (3) MR. TROMBLY.
- 121w. DANTE. The Vita Nuova and the Divina Commedia. (3) MR. TROMBLY.
- 127f. INDIVIDUAL WORK. (2) MR. TROMBLY.

GEOLOGY

Prerequisite for graduate study in geology: Geology, courses 1, 14, 15, 50, 90, 91, and at least 12 hours in addition, which may be selected from other courses in geology listed in the Graduate Bulletin; at least 8 hours of chemistry and one or more courses in physics; 10 hours of zoology, if the student intends to specialize in paleontology; 10 hours of botany, if the student intends to specialize in paleobotany; a fair reading knowledge of two foreign languages is desirable.

- 107w. MINERALOGY. Prerequisite, courses 1 and 14. (5) MR. TARR; MR. PEERY.
- 120f. HISTORICAL GEOLOGY. Prerequisite, course 15. (3) MR. BRANSON.
- 121w. INTRODUCTION TO PALEONTOLOGY. Prerequisite, course 1. (3). MR. PECK. (MR. CULLINSON, Rolla.)
- 134f. OPTICAL MINERALOGY. Prerequisite, course 107. (4) MR. KELLER. (MR. MUILENBERG, Rolla.)
- 135w. PETROGRAPHY. Prerequisite, course 134. (3-5) MR. KELLER. (MR. MUILENBERG, Rolla.)
- 136s. FIELD COURSE. The area to be studied is in the Wind River Mountains of Wyoming. (6) MR. MEHL; MR. KELLER; MR. PECK.
- 140s. GEOLOGIC REPORT. The selection of field data and their arrangement and expansion into a comprehensive statement of the geology of a region. (2) MR. MEHL; MR. KELLER; MR. PECK.
- 200f and w. SEMINAR. (1-2).
- 201w. PRINCIPLES OF SEDIMENTATION. Prerequisite, courses 107 and 134. (3) MR. TARR.
- 202w. PETROGRAPHY OF SEDIMENTARY ROCKS. Prerequisite, courses 107 and 134. A laboratory course for the study of sedimentary rocks by mechanical methods,

heavy mineral suites, elutriation, insoluble residues, and other methods. (2) MR. KELLER.

204w. GEOLOGY OF OIL AND GAS. Prerequisite, courses 91 and 120. (3-5) MR. MEHL. (MR. MUILENBERG, Rolla.)

205w. HISTORY OF GEOLOGY. Prerequisite, an undergraduate major. (2) MR. BRANSON.

206f. WEATHERING. Prerequisite, course 107. (2) MR. TARR.

207w. VULCANISM AND METAMORPHISM. Prerequisite, courses 107, 134, and 135. Offered in 1937-38 and alternate years. (3) MR. KELLER.

208f. PRINCIPLES OF ORE DEPOSITS. Prerequisite, courses 107 and 134. Offered in 1936-37 and alternate years. (3-5) MR. TARR.

210s, f and w. FIELD PROBLEMS. Prerequisite, course 105, and other courses, depending on the problem selected. (1-8).

216f. STRUCTURAL GEOLOGY. Prerequisite, courses 105, 107, and 120. (3-5) MR. TREFETHEN. (MR. GRAWE, Rolla.)

224f. PALEOZOIC STRATIGRAPHY. Prerequisite, courses 120 and 121. Offered in 1936-37 and alternate years. (3-5) MR. BRANSON.

225f. MESOZOIC AND CENOZOIC STRATIGRAPHY. Prerequisite, courses 120 and 121. Offered in 1935-36 and alternate years. (3-5) MR. BRANSON.

233f. THE GEOLOGIC HISTORY OF THE VERTEBRATES. Prerequisite, courses 50 and 121. Offered in 1937-38 and alternate years. (2-5) MR. MEHL.

234f. PALEONTOLOGY OF PORIFERA, COELENTERATA, BRYOZOA, AND ECHINODERMATA. Prerequisite, courses 120 and 121. Offered in 1936-37 and alternate years. (3-5) MR. PECK.

235w. MICROPALAEONTOLOGY OF CONODONTS, FORAMINIFERA, AND OSTRACODA. Prerequisite, course 121. (3-5) MR. BRANSON; MR. MEHL; MR. PECK.

236f. PALEONTOLOGY OF MOLLUSCA, BRACHIOPODA, AND ARTHROPODA. Prerequisite, courses 120 and 121. Offered in 1937-38 and alternate years. (3-5) MR. BRANSON.

290s, f and w. RESEARCH. (1-8).

GEOGRAPHY

160w. GEOGRAPHY OF SOUTH AMERICA. Prerequisite, course 6, or 80, or a regional course. (3) MR. ADAMS.

170f. GEOGRAPHY OF CARIBBEAN AMERICA. Prerequisite, course 6, or 80, or a regional course. A study of the countries bordering upon the Caribbean Sea. (3) MR. BRATTON.

180w. RELATIONS OF GEOGRAPHY AND HISTORY IN THE UNITED STATES. Prerequisite, fifty hours of college credit. Offered in 1937-38 and alternate years. (3) MR. BRATTON.

190f and w. GEOGRAPHIC PROBLEMS. For students able to do semi-independent work. (1-3) MR. ADAMS.

200f and w. SEMINAR. (1-3) MR. BRATTON; MR. ADAMS.

240w. ADVANCED PHYSIOGRAPHY. Offered in 1936-37 and alternate years. (3) MR.

250f and w. FIELD PROBLEMS. (2-4) MR. ADAMS.

260f. CLIMATOLOGY. Offered in 1937-38 and alternate years. (3) MR. BRATTON.

280w. MATHEMATICAL GEOGRAPHY. Offered in 1937-38 and alternate years. (3) MR. BRATTON.

290f and w. RESEARCH. (1-8).

GERMANIC LANGUAGES

Prerequisite for graduate study: Those wishing to specialize in Germanic Languages should consult the chairman of the department. The prerequisites for successful study are, in a large way, a facile use of modern German. Courses 1, 2, 3 are planned with this end in view.

104s, f and w. MASTERPIECES IN MODERN GERMAN DRAMA, LYRICS, AND NOVEL. Intensive study, from the literary and cultural side of a number of carefully chosen modern German dramas, lyric poems, and novels. Parallel reading and reports. (3) MR. ALMSTEDT.

106s, f and w. ADVANCED GERMAN COMPOSITION AND CONVERSATION. Advanced course in German theme-writing; discussion of grammatical, syntactical, and stylistic points. This course is intended for teachers of German or for students whose purpose is to become teachers of German; conducted in German. (2) MISS NAGEL.

107w. LESSING. Lectures on Lessing's life and works; intensive study of Lessing, the dramatist and the critic. (3) MR. REHDER.

108s, f and 109w. SCHILLER. Lectures on Schiller's life and works; intensive study of Schiller's drama and poetry. (3) MISS NAGEL.

110s, f and 111w. GOETHE. Lectures on Goethe's life and works; intensive study of Goethe's poetry and drama. (3) MR. ALMSTEDT.

112s and w. GERMAN DRAMATISTS OF THE NINETEENTH CENTURY. (3) MR. ALMSTEDT.

113w. THE MODERN GERMAN NOVEL. The course deals with the German novel of the past decades in intimate connection with philosophical, psychological and social problems of modern life. (3) MR. REHDER.

114f. OUTLINE COURSE IN GERMAN LITERATURE. The aim of the course is to acquaint the student with the most important works in the evolution of German literary life. (3) MR. REHDER.

115w. OUTLINE COURSE IN GERMAN LANGUAGE. This course, together with course 114, is arranged to meet the needs of the prospective teacher of German. Though the knowledge of the older periods is desirable, it is not required. (3) MR. ALMSTEDT.

199f and w. SPECIAL READINGS. In this course advanced seniors will be given the opportunity to do special readings in language and literature. Admission upon conference with the chairman. (1-3) MR. ALMSTEDT.

200f and w. SEMINAR. (1-3).

213f. ROMANTICISM. This course is intended to comprise a study of German romanticists and their works and to show the relation of this movement to similar ones in other literatures. (3) MR. REHDER.

214s. MIDDLE HIGH GERMAN. Introductory course. (3) MR. ALMSTEDT.

215w. WALTHER VON DER VOGELWEIDE. A continuation of the introductory Middle High German course; intensive study of W. v. d. V. on the background of the historical and cultural conditions of the Hohenstaufen period. (3) MR. ALMSTEDT.

216f. RECENT MOVEMENTS IN GERMAN LITERATURE (since 1880). The course discusses naturalism, neo-romanticism, expressionism, and the post-expressionistic period. Stress is laid throughout on the intimate connection between German literature and German thought at large. (3) MR. REHDER.

217w. OLD HIGH GERMAN. (3) MR. ALMSTEDT.

218s, f and 219w. GOTHIC. Phonology, morphology, and syntax; reading from *Ulfilas*; the relationship of Gothic to Indo-European and to later Germanic dialects; general introduction to the study of Germanic Philology. (3) MR. ALMSTEDT.

220f. BEGINNING SANSKRIT. Elements of the language. Translation of Sanskrit into English and English into Sanskrit. Thorough drill in forms. Perry's Primer, Whitney's Sanskrit Grammar, Lanman's Sanskrit Reader. (3) MR. ALMSTEDT.

221w. CONTINUATION OF 220f. (3) MR. ALMSTEDT.

290f and w. SPECIAL STUDIES. In this course graduate students will be given an opportunity to do special investigation work (other than their thesis assignment). Admission only upon conference with the chairman. (1-3) MR. ALMSTEDT; MR. REHDER.

299s, f and w. RESEARCH. The integral part of this course is work on a thesis. Admission only upon conference with the chairman. (1-8) MR. ALMSTEDT; MR. REHDER.

Other courses in Germanic languages, in Middle and Old High German, Old Norse, Old Saxon, the Reformation, the Nineteenth Century, will be arranged if the needs of the student require.

GREEK

See under CLASSICAL LANGUAGES AND ARCHAEOLOGY.

HISTORY

The Department of History offers two programs leading to the degree of Master Arts, differing in the preparation required and the objectives of the student. Either program is regarded as a satisfactory preparation for Junior College teaching or further graduate work. Students with less than the preparation specified may be admitted to graduate work on probation, but the Department reserves the right to require that the deficiencies in preparation be made up, in addition to the requirements for the degree. A reading knowledge of French or German is an absolute prerequisite for a student majoring in Modern European History, and, in addition, of Greek or Latin for a Student majoring in Ancient History.

Program I. The prerequisite preparation is the equivalent of the major in History for the degree of A. B. at the University of Missouri. A thesis carrying eight hours of course credit is required.

Program II. This program is planned for students preparing for public school teaching. The prerequisite preparation is the equivalent of the major in Social Studies for the degree of B. S. in Education at the University of Missouri. A thesis carrying four hours of course credit is required, and the total program includes five hours of graduate work in Education.

Candidates for the degree of Ph. D. should consult the chairman of the department.

MINOR IN HISTORY

The following courses may be counted toward a minor in History; they may not be counted for a major:

106s, f and w. CONTEMPORARY EUROPE. A survey of European History in the twentieth century, dealing with political and economic developments and the insistent problems of world politics. (2-3) MR. WOLF.

110s, f and w. RECENT UNITED STATES HISTORY. A study of the United States since 1898 as an historical background to present day problems. (2-3) MR. ELLIS.

MAJOR IN HISTORY

The following courses may be counted toward a major or minor in history:

124s and f. GREEK HISTORY. A study of the political and social institutions

and the intellectual life of the Greek city-states to the time of Alexander. (2½-3) MR. BRADY.

125w. ROMAN HISTORY. The origin and development of Roman institutions and of Rome's expansion and culture, through the reign of Constantine. (2-3) MR. BRADY.

128s and w. THE HELLENISTIC AGE. The history of the Greek World from Alexander to the death of Cleopatra. (2) MR. BRADY.

132f. THE EASTERN ROMAN EMPIRE. A study of the institutions, culture, and foreign contacts of the Byzantine Empire. (2) Alternate years. Given in 1937-38. MR. BRADY.

139f. HISTORY OF ISLAM. The institutions and culture of the Moslem world to the Mongol conquest. (2) Alternate years. Given in 1936-37. MR. WRENCH.

146s and w. THE BRITISH EMPIRE. A survey of its growth and organization and of the relations of the colonies and dependencies to the mother country. (Alternate years.) Given in 1936-37. MR. (3) MULLETT.

150f. INTELLECTUAL HISTORY. A survey of the predominant ideas of the intellectual classes in the realms of religion, science, and social philosophy in ancient and medieval times as determining factors in historical development. Alternate years Given in 1935-36. MR. MULLETT.

151f. INTELLECTUAL HISTORY. Continuation of 150w in modern times. (3) Alternate years. Given in 1936-37. MR. MULLETT.

152f. MEDIEVAL SOCIAL AND ECONOMIC HISTORY. A study of the development of social and economic institutions from the fifth to the fourteenth centuries. (2-3) MR. WRENCH.

154s and w. EUROPEAN CULTURE: Medieval Period. A survey of European culture from 500 to 1300 A. D. (2½-3) MR. WRENCH.

157w. MEDIEVAL FRANCE. A study of French history, institutions and influence from 987 to 1350. (2) MR. WRENCH.

158s and f. THE MEDIEVAL CHURCH. A study of the organization and development of the Medieval Church between 300 and 1300. (2) Alternate years. Given in 1937-38. MR. WRENCH.

162f. FRENCH REVOLUTION. Chief emphasis will be placed upon the social and intellectual background and the transitional aspects of the period. (2) MR. BRADY.

165w. MODERN FRANCE. A study of the French internal and external problems and policies since 1815. (Alternate years. Given in 1936-37.) (3) MR. WOLF.

166w. MODERN GERMANY. The origins and development of the institutions and ideas of the German Empire and post-war Germany. (Alternate years. Given in 1937-38.) (3) MR. WOLF.

167s and f. ECONOMIC HISTORY OF MODERN EUROPE. The changes in agriculture and manufacturing and their effect on capital, labor, and governmental policies, external and internal. (Alternate years. Given in 1936-37.) (2-3) MR. WOLF.

168s. DIPLOMATIC HISTORY OF EUROPE SINCE 1815. The policies of the Great Powers and the Alliances in the imperialistic period in relation to social, economic, political, and military conditions of the time. (Alternate years. Given in 1937-38.) (3) MR. WOLF.

170f. ENGLISH CONSTITUTIONAL AND LEGAL HISTORY. A study of the development of English constitutional and legal institutions, the chief emphasis being placed on their relation to the general social and economic background. (3) MR. MULLETT.

171f. TUDOR AND STUART ENGLAND. A comprehensive treatment of the period 1485-1688, which saw the rise of the middle class, the evolution of parliamentary

sovereignty, the separation from the Roman Church, and the beginning of overseas expansion. (2-3) MR. MULLETT.

172s and w. MODERN ENGLAND. A survey of English evolution in the eighteenth and nineteenth centuries, emphasizing political and economic developments. (Alternate years. Given in 1937-38.) (3) MR. MULLETT.

180w. SOCIAL FORCES IN AMERICAN HISTORY. The origins and development of American social and economic conditions, colonial and national. (3) MR. ELLIS.

181s. HISTORY OF AMERICAN MACHINE AGE. The Background of our Machine Age Civilization. A history of the inventions, technical devices, and processes which have produced this Machine Age (3) MR. OLIVER.

182s and f. HISTORY OF THE WEST. A study of the frontier in American history; its development and its influence on American ideals and politics. (2-3) MR. VILES.

183s. THE FAR WEST. The Great Plains and the Rocky Mountain-Pacific Coast areas and their influences on national development. (2) MR. DALE.

188f. FOUNDATION OF TWENTIETH CENTURY AMERICA. The economic, social, cultural and political development of the United States from the end of the Civil War to the opening of the Twentieth Century. (3) MR. ELLIS.

189w. AMERICAN CONSTITUTIONAL HISTORY, 1763-1876. The development of Constitutional theories and interpretations with special reference to sectional interests and party politics. (3) MR. VILES.

190f. AMERICAN DIPLOMATIC HISTORY. A survey of the foreign relations of the United States. (2-3) MR. STEPHENS.

200s and f. HISTORICAL BIBLIOGRAPHY AND METHODS. A general introduction to the advanced study of history and other social sciences, including a survey of bibliographical aids and an examination of the methods of historical research. Lectures and practical exercises. Required of all graduate students in history and recommended to graduate students in the other social sciences. (2) MR. WRENCH.

201w. HISTORICAL INTERPRETATION. The nature and content of History and its relations to the other social studies. (2) MR. VILES.

210s, f, and w. SPECIAL STUDIES. Designed especially for graduate students whose major interest or whose research work demands additional directed training. (Credit to be arranged.) THE DEPARTMENT.

220s and w. STUDIES IN GREEK AND ROMAN HISTORY. (2-3) MR. BRADY.

250f and w. STUDIES IN MEDIEVAL HISTORY. (2) MR. WRENCH.

260s, f and w. STUDIES IN CONTEMPORARY EUROPE. Selected topics in the recent history of Europe and world politics. (2) MR. WOLF.

270w. READINGS IN ENGLISH HISTORY. (2) MR. MULLETT.

280s, f and w. STUDIES IN WESTERN HISTORY. (2) MR. VILES.

281w. STUDIES IN RECENT AMERICAN DIPLOMATIC PROBLEMS. (2) MR. STEPHENS.

283s, f and w. READINGS IN RECENT U. S. HISTORY. (2-4) MR. ELLIS.

299s, f and w. RESEARCH. (Credit to be arranged.) THE DEPARTMENT.

HOME ECONOMICS

The Home Economics Department offers graduate work in the following specialized lines: food preparation, nutrition, textiles and clothing, applied design, home management and home economics education.

For Home Economics Education courses, see page 45.

Prerequisites for graduate study in home economics:

In addition to the equivalent of the physical and biological sciences, art, economics, sociology and textiles and clothing required in the undergraduate course for training teachers, there is required for

1. Textiles and Clothing: A minimum of eight hours, five in physical science and the other three in science, art or economics.
2. Applied Design: A minimum of eight hours in history, art or language.

In addition to the equivalent of physical and biological sciences, foods, nutrition and dietetics, required in the undergraduate course for training teachers, there is required for

3. Nutrition: A minimum of eight hours of physical science, and for
4. Food Preparation: A minimum of eight hours of physical science.

In addition to the equivalent of physical and biological sciences, art, economics, sociology, psychology and home economics subjects required in the undergraduate course for training teachers, there is required for

5. Home Management: A minimum of eight additional hours in economics, sociology or psychology.

The equivalent of the four-year undergraduate course for training teachers is prerequisite for

6. Home Economics Education.

111w. **ADVANCED HOUSE PLANNING AND FURNISHING.** Prerequisite, home economics 110. A study of contemporary and historic decorative periods. (2) MISS SCHELL.

116f and w. **THE CONSUMER-BUYER AND THE MARKET.** Prerequisite, General Economics. A study of the present day market from the standpoint of the consumer-buyer. (3) MISS COLES.

117f and w. **ECONOMIC PROBLEMS OF THE HOUSEHOLD.** Prerequisite, General Economics. A study of the economic problems of the modern family including the size, source, control, adequacy, and security of the money income; the spending of the money income; and the utilization of time, energy and ability of members of the household in direct production. (3) MISS COLES.

123w. **ADVANCED DIETETICS.** Prerequisite, home economics 122. Advanced problems in normal dietetics and the application of the principles of normal dietetics to diet in disease. (3) MISS BISBEY.

124w. **FIELD WORK IN DIETETICS.** Prerequisite, home economics 123. Individual work, such as problems in child nutrition, institutional or clinical dietetics. (Credit to be arranged). MISS WHIPPLE.

146f. **HISTORIC COSTUME.** Prerequisite, home economics 145. A study of historic costume as a basis for modern costume design. (2) MISS BERESFORD.

152w. **CLOTHING DESIGN AND CONSTRUCTION.** Prerequisite, home economics 145 and 150. (3) MISS BERESFORD.

155f. **ADVANCED TEXTILES.** Prerequisite, course 150 and organic chemistry. Analysis of the physical and chemical characteristics of the textile fibers; methods of testing textile materials; history of textile industry and economic studies of the present problems in the textile and clothing industry. (3) MISS GINTER.

162f and w. **PROBLEMS IN HOME ECONOMICS.** This course deals with problems that arise in special phases of home economics work. (Credit to be arranged.)

170f. **EXPERIMENTAL COOKERY.** Prerequisite, home economics 121. This course involves elementary research in the science of food preparation under controlled conditions. (2) MISS CLINE.

180f and w. **SPECIAL PROBLEMS IN HOME ECONOMICS.** With approval of instructor, opportunity is provided to work independently on special problems in home economics. (Credit to be arranged.)

200f and w. **SEMINAR.** The most recent work in various lines of home economics will be reviewed and discussed. (Credit to be arranged.) MISS BISBEY; MISS CLINE; MISS COLES; MRS. GINTER.

202f. **METABOLISM.** Prerequisites, home economics 122 and chemistry 25, preceding or parallel. A study of various phases of metabolism through calorimetry, and human feeding experiments. (5) MISS WHIPPLE.

280f and w. **SPECIAL STUDIES IN HOME ECONOMICS.** Prerequisites. With approval of instructor, investigation of special problems in various home economics fields are made.

290f and w. **RESEARCH IN HOME ECONOMICS.** (Credit to be arranged.)

HORTICULTURE

Prerequisites for graduate work: Graduate students majoring in Horticulture must have had, in addition to requirements for B.S. degree in Agriculture (including Botany 100w and Horticulture 115w) 19 hours of electives in Horticulture, Botany 102f (3) and Entomology 2f or w (3), or the equivalent from another institution.

100f. **GENERAL POMOLOGY.** Prerequisite, course 1 or equivalent. A course dealing with the establishment and maintenance of orchards. Lectures, assigned readings, and laboratory work. (3) MR. TALBERT.

101w. **ADVANCED POMOLOGY.** Prerequisite, course 1. A continuation of course 100, dealing especially with the subjects of pruning, fertilizing, and spraying orchards. (3) MR. TALBERT.

106s and f. **COMMERCIAL VEGETABLE GROWING.** The use of irrigation, fertilizers, spraying equipment and forcing structures in their relation to vegetable growing, with discussions on seed growing, truck-farm management, and methods of marketing vegetables. Three lectures and assigned readings. (3) MR. VINSON; MR. TALBERT; MR. SCHROEDER.

112w. **ADVANCED LANDSCAPE DESIGN.** Prerequisite undergraduate work in landscape gardening. Principles of landscape design, with tracings and original designs in home, school, church, cemetery and railroad gardening. (3) MR. MAJOR.

113w. **SPRAYING.** A study of spray materials, spray machinery and results. Lectures, laboratory work and assigned readings. (5) MR. SWARTWOUT.

114f. **COMMERCIAL POMOLOGY.** The harvesting, grading, packing, storage, and marketing of fruits. Lectures, assigned reading and laboratory exercises. (3) MR. MURNEEK.

115w. **EVOLUTION OF HORTICULTURAL PLANTS.** A study of the fundamental laws of genetics, as applied to evolution and breeding of horticultural plants. Lectures, assigned reading, and problems. (3) MR. MURNEEK.

116s, f and w. **SPECIAL PROBLEMS.** Topics in landscape gardening, pomology, forestry, gardening, and floriculture. Hours by appointment. MR. TALBERT; MR. MURNEEK; MR. SWARTWOUT; MR. VINSON; MR. WESTVELD.

119w. **VEGETABLE FORCING.** Types and equipment of forcing structures with discussions on crops. Two lectures and one laboratory period. (3) MR. SWARTWOUT; MR. SCHROEDER.

133w. **SMALL-FRUIT CULTURE.** A course dealing with the planting, culture, and harvesting of small fruits and grapes. Two lectures and one laboratory period. (3) MR. SWARTWOUT.

203w. CHEMISTRY AND PHYSICS OF SPRAYING. Prerequisite, course 113w. A study of the composition, toxicity, compatibility, deterioration, spreading, and adhesion of spray materials. Credit to be arranged. MR. SWARTWOUT.

204w. BREEDING OF HORTICULTURAL PLANTS. Prerequisite, course 115w or equivalent. Study of literature and original investigation on breeding and selection of horticultural plants. Hours by appointment. MR. MURNEEK.

206w. FORCING PROBLEMS WITH TRUCK CROPS. A study of such problems as soil sterilization, temperature and humidity, training, pruning, pollination and the use of fertilizers. (3) MR. SWARTWOUT; MR. SCHROEDER.

208w. NUTRITION. A detailed study of the important nutrient elements, their absorption and utilization; of the manufacture and utilization of carbohydrates; and of fertilizer treatments with reference to horticultural plants. (3) MR. VINSON; MR. MURNEEK.

210f. METHODS OF HORTICULTURAL RESEARCH. A study of methods of procedure in work of investigation—outlining problems, assembling and analyzing data, and presenting results. (3) MR. VINSON; MR. MURNEEK.

212w. PRUNING PROBLEMS. Prerequisite, course 100 or equivalent. The fundamental principles of pruning and its physiological effects upon deciduous fruit trees. Laboratory, assigned readings, and problems. (3) MR. TALBERT.

215f and w. SEMINAR. Course limited to seniors and graduate students and required of those specializing in Horticulture. A critical study of recent investigations in horticulture and of investigations in other fields as they relate to horticulture. (1) MR. TALBERT; MR. MURNEEK; MR. VINSON; MR. SWARTWOUT; MR. WESTVELD.

220f. ROOT STOCK FOR DECIDUOUS FRUIT TREES AND VINES. Prerequisite, course 100, or equivalent. Suitable stocks for apples, pears, and grapes. Propagation of apples and pears upon their own roots by means of whole roots and crown grafts. Native grapes as stocks for the best commercial varieties. (Credit to be arranged.) MR. TALBERT.

221f. MORPHOLOGY OF HORTICULTURAL PLANTS. Prerequisite, Botany 1 and 104f. A detailed study of morphological and histological structure of horticultural plants of economic importance. (Credit to be arranged.) MR. MURNEEK.

290s, f, and w. RESEARCH. Hours by appointment. MR. TALBERT; MR. MAJOR; MR. MURNEEK; MR. SWARTWOUT; MR. VINSON; MR. WESTVELD.

JOURNALISM

In addition to the Fall, Winter, and Summer Sessions, the School of Journalism holds an intersession of five weeks during August and the first part of September. The work, giving one credit hour for each week, is in laboratory courses, with one registration fee for enrollment during the entire session or any part thereof.

Three courses, intended primarily for students from other Divisions in the University, carry graduate credit and are offered without journalistic prerequisite, but do not count toward a major in journalism.

170f. THE AGRICULTURAL PRESS. Writing for and editing agricultural publications. For students who expect to become farm journal contributors, county agents, teachers, extension workers or farm managers. (3).

180s. THE SCHOOL NEWSPAPER AND ANNUAL. Primarily for high school teachers in charge of student publications. Available material, headlines, construction of the news story, illustrations, make-up, and editorial problems. (2).

181s. ADVERTISING-PROMOTION IN SCHOOL PUBLICATIONS. For high school and college teachers in charge of school publications. The writing and selling of adver-

tising, with special attention to problems of student solicitors and methods of publication sale. (1).

MAJOR IN JOURNALISM

Graduate students majoring in Journalism must have had at least the equivalent of the professional courses required for the degree of Bachelor of Journalism. A degree in Journalism from any institution holding membership in the American Association of Schools and Departments of Journalism will be recognized as meeting this requirement. These prerequisite courses are: Two semesters of History and Principles of Journalism; The News; Advertising Principles and Practices; Reporting I; Copy Reading I; and Copy Reading II. News majors must have in addition, Copy Reading II, and Reporting II. Majors in Advertising must have the courses in Advertisement Writing and Advertising Layout. None of these prerequisite courses carries graduate credit. Candidates for the Master's Degree in Journalism are required to take two semesters of course 204, Research in Journalism, or course 222, Research in Advertising, the total of either one not to exceed 10 credit hours for the two semester. In these courses a thesis must be written showing capacity for original research and independent thought. Candidates are further required to take course 203, Journalism Seminar, or course 221, Advertising Seminar. Approximately half of the student's graduate study should be in professional courses, the rest in academic subjects related to journalism.

The following courses may be taken for graduate credit and be counted toward a major, or minor, in Journalism:

105f, w, s and ss. REPORTING III. Advanced reporting and writing for a daily newspaper. Enrollment by permission. (3-5) MR. SHARP; MR. GERALD.

112f, w, s and ss. COPY READING III. Continuation of course II. Enrollment by permission. (3) MR. MORELOCK; MISS ANDERSON.

132f. ADVERTISING AND DISTRIBUTION. The mechanism and operation of markets, in relation to effect on distribution of advertised commodities and service. (2) MR. JOHNSTON.

133w. ADVERTISING CAMPAIGN-PROCEDURE. Planning and presenting of national and local advertising campaigns, with special reference to a particular investigation of a product or service. (2) MR. JOHNSTON.

134f. RETAIL STORE ADVERTISING. Analysis, from the advertising viewpoint, of the selling and store-management problems encountered in the local field. (2) MR. JOHNSTON.

135w. DIRECT-MAIL ADVERTISING. Practice writing to a selected audience through all forms of direct media, and a consideration of the physical make-up of each. (2) MR. JOHNSTON.

136f. ADVERTISING PROBLEMS. Analysis and solution, by the case method, of a wide variety of advertising, merchandising, and distribution problems, from the approach of the business executive. (2) MR. JOHNSTON.

137w. PROMOTIONAL ADVERTISING. The scope and possibilities of modern methods of promoting advertising for civic, co-operative, public, institutional and business organizations. (2) MR. JOHNSTON.

150f. NEWSPAPER ADMINISTRATION. Conduct of newspapers from the editorial point of view. (3) MR. MARTIN.

151w. COMPARATIVE JOURNALISM. Study of foreign and American publications. (3) MR. MARTIN.

152f, w, s and ss. THE EDITORIAL. Practice work in editorial writing for the daily newspaper, and discussion of editorial background and editorial problems. (3) MR. ELLARD; MR. MORELOCK.

153f, w, s and ss. **NEWSPAPER MAKING.** Special laboratory instruction for advanced students in both news and advertising. Enrollment by permission. (1-3) MR. MARTIN; MR. ELLARD; MR. JOHNSTON; MR. MORELOCK; MR. SHARP; MISS ANDERSON; MR. GERALD; MISS GRINSTEAD; MR. BELL; MR. LATHROP.

154s. **SPECIAL CORRESPONDENCE.** Field trip, including the daily writing of articles for newspapers. Details of each year's trip available about May 1. (8) MR. MARTIN; MR. ELLARD; MR. MORELOCK.

160f and w. **FEATURE WRITING.** The writing of feature stories, with related problems. Prerequisite, course 103. (3) MISS GRINSTEAD.

161f and w. **THE SPECIAL ARTICLE.** Writing of articles for syndicates, newspapers and magazines. Prerequisite, course 160 or its equivalent in writing experience. (3) MISS GRINSTEAD.

162f and w. **LITERARY REVIEWING.** Critical study of modern books; study of newspapers and magazines devoted entirely or in part to this type of journalism; preparation of book pages. Prerequisites, courses 103 and 110. (3) MISS GRINSTEAD.

163f and w. **NEWSPAPER AND MAGAZINE DEPARTMENTS.** Writing for and editing of special pages or departments. Prerequisites, courses 103 and 110. (4) MISS GRINSTEAD.

173f and w. **COUNTRY NEWSPAPER PRODUCTION.** A course in which students are given practical experience, by means of field trips, in newspaper production. Lecture and laboratory work in accounting and cost accounting, and shop management. Enrollment by permission only with courses 103, 111 and 171 as prerequisites, Courses 121 and 122 are recommended. (1-3) MR. GERALD.

200f, w, s and ss. **NEWS-DESK METHODS.** The handling of assignments and futures; the direction of reporters. (3) MR. SHARP; MR. GERALD

201f, w, s and ss. **COPY-DESK METHODS.** The handling of copy; direction of copy-readers; advanced headline writing; principles of headline display. (3) MR. MORELOCK; MISS ANDERSON.

202f, w, s and ss. **ADVANCED EDITORIAL WRITING.** Prerequisite, course 152 or by permission. A study of effective style, of public opinion campaigns, page policy and make-up, current events from standpoint of editorial interpretation, and of current practices on leading editorial pages of the United States. (3) MR. ELLARD; MR. MORELOCK.

203f, w, s and ss. **JOURNALISM SEMINAR.** A discussion of graduate problems, including a survey of bibliographical methods and aids in research. Must be taken with course 204. (1) MR. MARTIN; MR. ELLARD; MR. MORELOCK; MR. SHARP; MISS ANDERSON; MR. GERALD; MISS GRINSTEAD.

204f, w, and s. **RESEARCH IN JOURNALISM.** Thesis. (1-10) MR. MARTIN; MR. ELLARD; MR. MORELOCK; MR. SHARP; MISS ANDERSON; MR. GERALD; MISS GRINSTEAD.

220f, w, s and ss. **ADVERTISING-DESK METHODS.** Advertising-office equipment and methods; direction of solicitors, selling procedure, and publication contracts. (2) MR. BELL.

221f, w, and s. **ADVERTISING SEMINAR.** Special problems, methods, organization and objectives for research in advertising and related subjects. Must be taken with course 222. (1) MR. JOHNSTON; MR. BELL; MR. LATHROP.

222f, w and s. **RESEARCH IN ADVERTISING.** Thesis. (1-10) MR. JOHNSTON; MR. BELL; MR. LATHROP.

LATIN

See under CLASSICAL LANGUAGES AND ARCHAEOLOGY.

MATHEMATICS

An undergraduate major of twenty-four hours in Mathematics or equivalent training is prerequisite to work in Mathematics for graduate credit with mathematics as the major subject. This shall include courses 104 and 105 or 110 and 111. These two sequences of courses in Advanced Algebra and in Advanced Calculus must precede or accompany all courses above 200.

Courses above 200 may be elected repeatedly in different semesters for credit as the topics covered in each of these courses will be varied from term to term to fit the needs of the student. A grade will be given in 290 only after completion of a thesis.

A dissertation will not be required for the master's degree, but the candidate may offer an acceptable dissertation in lieu of not to exceed eight hours work in course on the advice of his adviser and with the consent of the dean.

100s, f and w. INTEGRAL CALCULUS. Prerequisite, five hours of Calculus and five hours of Analytic Geometry. At least one-third of the time in the latter course must have been devoted to solid analytics. No graduate credit for students specializing in mathematics. (5).

104s and f, and 105s and w. ADVANCED ALGEBRA. Prerequisite, course 100. (3) MR. WAHLIN.

110f and s and 111w and s. ADVANCED CALCULUS. Prerequisite, course 100. (3) MR. WESTFALL.

180f, w and s. SPECIAL READINGS. Prerequisite, course 100. (1 to 3).

200f and w. SEMINAR.

210s and f and 215w and s. TOPICS FROM GEOMETRY. The topic treated in any term will be selected from the following: (a) differential geometry; (b) the invariants of space; (c) projective geometry; (d) Riemannian Geometry; (e) Non-Riemannian Geometry. (3)

220f and s and 225w and s. TOPICS FROM MATHEMATICAL PHYSICS.

230s and f and 231w and s. TOPICS FROM ANALYSIS. The topic treated in any term will be selected from the following: (a) number sets and point sets; (b) real variables; (c) complex variables; (d) infinite processes; (e) extremes; (f) special functions; (g) integral equations. (3) MR. WESTFALL.

260f and s and 261s and w. TOPICS FROM ALGEBRA. The topic treated in any term will be selected from the following: (a) number theory; (b) group theory; (c) Galois theory; (d) linear algebra; (e) quadratic forms. (3) MR. WAHLIN.

280f, w and s. SPECIAL STUDIES. (1 to 3).

290f, w and s. RESEARCH. (1 to 6).

MECHANICAL ENGINEERING

Entrance to graduate work in the field of mechanical engineering requires a full undergraduate preparation in that field. Candidates for advanced degrees should consult the chairman of the department.

The following courses may be counted toward a minor in Mechanical Engineering:

150f and w. SPECIAL PROBLEMS IN MECHANICAL ENGINEERING. Prerequisite, senior standing in mechanical engineering. Special design, experiments, or analytical problems in the field of mechanical engineering. (2-4) DEPARTMENTAL STAFF.

151w. INTERNAL COMBUSTION ENGINES. Prerequisite, engineering thermodynamics II. A study of gas and oil engines. Thermodynamics, of ideal and actual

cycles, fuels and combustion, carburetor and injection systems, performance, construction. (3) MR. GRAY.

153f. REFRIGERATION SYSTEMS. Prerequisite, engineering thermodynamics II. A study of compression, absorption, and steam jet refrigeration system. Properties of refrigerants. (3) MR. WHARTON.

154w. REFRIGERATION PLANTS. Prerequisite, refrigeration systems. Types of refrigerating machinery and equipment, operating characteristics of ice plants and cold storage industries, economic consideration. (3) MR. WHARTON.

155f. HEATING AND AIR CONDITIONING. Prerequisite, engineering thermodynamics II. Fundamental laws and general principles; conditioning of air in buildings for comfort, ventilation, and industrial purposes; steam, water, and hot air heating systems. (3) MR. GRAY.

The following courses may be counted toward either a major or minor in Mechanical Engineering:

211f and w. THERMODYNAMICS. Prerequisite, graduate standing and equivalent of engineering thermodynamics II. General theory, properties of working substances, engineering applications. (Minimum, 4 hours). MR. SCORAH.

251f and w. REFRIGERATION. Prerequisite, graduate standing and equivalent of refrigeration systems and refrigeration plants. Designs, plans, specifications, estimates for one or more selected studies, as: ice factory, cold storage, district refrigeration, nursery markets, Research, tests, improvements, appraisals, sales, management. (Credit as arranged). MR. WHARTON.

285f and w. SPECIAL STUDIES IN MECHANICAL ENGINEERING. Prerequisite graduate standing in mechanical engineering. Independent design, experimental, or analytical problems to be presented in the form of a report. (Credit as arranged) DEPARTMENT STAFF.

299f and w. RESEARCH. Prerequisite, graduate standing in mechanical engineering. Independent investigation in the field of mechanical engineering to be presented in the form of a thesis. (Minimum, 4 hours). DEPARTMENT STAFF.

MECHANICS

112f and w. ADVANCED MECHANICS. Problems in dynamics. Prerequisite, course 100. (2 or 3) MR. WOOD.

113f and w. ADVANCED MECHANICS OF MATERIALS. Continuation of course 101 involving analysis of more complicated problems in stresses and strains. (2 or 3) MR. WOOD.

MEDICAL BACTERIOLOGY AND PREVENTIVE MEDICINE

Prerequisites: Organic Chemistry 112; Physical Chemistry 130, or their equivalent, and a total of 8 credits from the Departments of Zoology, Botany (including Botany 100), or Physiology, in addition to General Bacteriology. A satisfactory dissertation is part of the requirement for an advanced degree.

101f. MEDICAL BACTERIOLOGY. Prerequisite, General Bacteriology and Organic Chemistry 110. The relation of bacteria to disease. The fundamental principles of infection, immunity, vaccine and serum therapy. Sophomore medical students and others by permission. 9 hours. (6) credits. DR. ZIEGLER; MR. PETERSON.

102w. GENERAL HYGIENE. Prerequisite, course 101, or its equivalent. Deals in a somewhat detailed manner with the fundamental principles of public and personal hygiene. Sophomore medical students and others. 2 hours. (2) credits. MR. MOON.

200w. IMMUNITY. Prerequisite, course 101. Theory of immunity; antigenanti-

body reactions; opsonins; preparations of vaccines. Wasserman reaction. 4 hours (2) credits. Alternates with Bact. 202w. Not offered in 1936-37. DR. ZIEGLER.

201f and w. SPECIAL INVESTIGATIONS. Qualified students are assigned a problem in bacteriology or immunology for special study. Prerequisite, General Bacteriology and Organic Chemistry 112, or course 101. Hours and credits arranged. DR. ZIEGLER; MR. MOON.

202w. PUBLIC HEALTH AND SANITATION. Prerequisite, General Bacteriology and Organic Chemistry 110. Canning inspection; testing of disinfectants; bacteriology of water and sewage; sanitary surveys. 5 hours (3 credits). Permission of instructor required. Alternates with Bact. 200w. Offered in 1936-37. DR. ZIEGLER; MR. MOON.

225f and 226w. ADVANCED BACTERIOLOGY. Designed to give the student more detailed information and training in the newer aspects of bacteriology and immunology. Assigned reading and laboratory work with lectures on special topics. Hours and credits arranged. DR. ZIEGLER; MR. MOON.

250f and w. SEMINAR IN BACTERIOLOGY. A presentation and critical discussion of current literature and original investigation in the field of Bacteriology and Immunology. (1) credit. DR. ZIEGLER.

290f and w. RESEARCH. Prerequisite, course 225. Graduate students of suitable preliminary training may pursue original investigation in the field of bacteriology and Immunology. Credit arranged. DR. ZIEGLER; MR. MOON.

METALLURGY

The following courses are given at the University of Missouri School of Mines and Metallurgy at Rolla:

113. METALLURGY OF THE NON-FERROUS METALS. Lectures. A course devoted to the metallurgy of copper, zinc, lead, gold and silver, tin, antimony, and other metals. (3) MR. HANLEY.

114. METALLURGY OF THE NON-FERROUS METALS. Laboratory. To accompany 113. (3) MR. HANLEY.

121. ELECTRO-METALLURGY. Lectures. A study of all metallurgical operations in which electricity plays a part, either electrolytically or electrothermally. Efficiency calculations based on these processes are given. (3) MR. HANLEY.

132. ELECTRO-METALLURGY. Laboratory. To accompany 121. (6) MR. CLAYTON.

163-164. ALLOYS AND METALLOGRAPHY. This course deals with the theoretical and practical considerations that influence the structure and properties of metals. (8) MR. CLAYTON.

165. ALLOYS AND METALLOGRAPHY. Lectures. A continuation of course 163. (2) MR. CLAYTON.

166. ALLOYS AND METALLOGRAPHY. Laboratory. (3) MR. CLAYTON.

200 GROUP

236. ORE DRESSING PROBLEMS. Laboratory. The design of ore-dressing machinery and plant. The course includes the determination of a practical process for treating a given ore, and the design for a mill utilizing this process. (6) MR. CLAYTON.

268. ALLOYS AND METALLOGRAPHY. Laboratory. Credit arranged. MR. CLAYTON.

292. ADVANCED METALLURGY. Advanced work in ferrous and non-ferrous metallurgy and metallography. Credit arranged. MR. CLAYTON; MR. HANLEY.

296. THESIS.

MUSIC

The music department offers two fields of concentration leading to the degree of Master of Arts. (a) history, criticism, analysis, theory and musicology. (b) Original Composition. The general requirements for graduate work in both fields include the following: two years of Harmony, one year of Counterpoint, one year of History of Music, two years of applied music,—that is, sufficient proficiency in technic and in sight-reading to be able to use it as a tool for investigation,—and ability to read French and German.

In addition to these general requirements, the following special requirements apply:

(a) For students whose field is history, criticism, analysis, theory or musicology: one year of Musical Analysis, formal and harmonic; and approximately three hours of upper-class History, preferably dealing with European culture.

(b) For students whose field is original composition: One year of Elementary Composition and one year of Orchestration.

Candidates for the Master's degree will submit either a dissertation covering some phase of music history, criticism, theory, analysis or musicology; or an original composition in one of the larger musical forms. Eight hours of upper-class work in applied music may be included in partial satisfaction of requirements for the degree.

MINOR IN MUSIC

The following courses may be counted toward a minor in music:

105f and 106w. **MUSICAL FORM AND ANALYSIS.** Analysis of the construction of works in the various musical forms. Original work in elementary form. Prerequisite, course 4. (2) MR. QUARLES.

124w. **SYMPHONIC LITERATURE.** A course dealing with the various forms of symphonic music. The work of the first half of the course will include a comprehensive survey of orchestral works by Bach, Haydn, Mozart, Beethoven, and the appreciation of classic forms, while the second half will deal with romantic treatments of these forms and the more recent innovations introduced by Liszt, Berlioz, and the moderns. Two class periods and third at pleasure of instructor. Prerequisite, upper-class standing. Introduction to Music desirable. (2) MR. GOLDTHWAITE.

MAJOR IN MUSIC

The following courses may be counted toward a major or a minor in music:

103f and 104w. **ADVANCED COUNTERPOINT.** Imitative counterpoint founded on choral melodies; canon of various kinds; the two and three part fugue. Prerequisite, course 4. (2) MR. GOLDTHWAITE.

107f and 108w. **ORCHESTRATION I.** A course dealing with the capacities of the instruments of the orchestra, singly and in the separate groups of strings, woodwind, brass and percussion. Prerequisite, course 4. (2) MR. GOLDTHWAITE.

Whichever one of the following three courses (121, 122, 123) were not offered to meet prerequisites for graduate music study.

121f. **THE PRE-CLASSIC PERIOD.** (Courses 121, 122 and 123 may be taken in any convenient order.) A lecture course with collateral reading, dealing with the development of music from medieval times through the age of Bach and Handel. Two class periods and third at pleasure of instructor. Prerequisite, upper-class standing. Introduction to Music desirable. (2) MR. GOLDTHWAITE.

122f. **THE CLASSIC AND ROMANTIC PERIODS.** A lecture course with collateral reading, dealing with the development of music from pre-Haydn times through

Wagner. Two class periods and third at pleasure of instructor. Prerequisite, upper-class standing. Introduction to Music desirable. (2) MR. GOLDTHWAITE.

123w. MODERN MUSIC. A lecture course with collateral readings, dealing with the development of music in Europe and America since 1870. The inauguration of new music systems, the growth of nationalism, and other modern trends will be discussed. Two class periods and a third at pleasure of instructor. Prerequisite, upper-class standing. Introduction to Music desirable. (2) MR. GOLDTHWAITE.

223f. BACH AND HIS TIME. An historical and critical investigation of the work of this master and its influence on subsequent music. Special topics assigned for original investigation. Prerequisite, courses 102 and 106. (2-5) MR. QUARLES.

224w. HAYDN, MOZART AND BEETHOVEN. The classic period. An intensive study of the work of these masters, including historical and biographical details as revealed in their works, and a critical and analytical review of their works; research and collateral reading. Prerequisites, courses 102 and 106. (2-5) MR. QUARLES

225f. RICHARD WAGNER AND THE MUSIC DRAMA. A detailed study of the life, theories, and works of Wagner through his own writings and those of others, combined with an analytical study of his operas. His contribution to harmony, orchestration, and form will occupy a portion of the course. Prerequisites, courses 102, 106, and 108. (2-5) MR. GOLDTHWAITE.

226f and w. ORCHESTRATION II. A course in writing and arranging for the full orchestra, progressing from the treatment of instruments in pairs to combinations in threes and fours. Part of the course will be devoted to the study of the development of orchestration through score study. Prerequisite, course 108. (2-5) MR. GOLDTHWAITE.

227f and w. COMPOSITION. A practical application of the principles of musical form in works of large mold including the rondo and sonata form. The student must show marked creative ability and must satisfy the instructor that he has completed sufficient work in elementary composition as a general prerequisite. Prerequisites, courses 10 and 106. (2-5) MR. GOLDTHWAITE.

230f and w. SPECIAL PROBLEMS IN MUSICAL CRITICISM. Hours and credit to be arranged. This course may be repeated for credit. MR. QUARLES; MR. GOLDTHWAITE.

290f and w. RESEARCH. Thesis course. Hours and credit to be arranged. This course may be repeated for credit. MR. QUARLES; MR. GOLDTHWAITE.

PATHOLOGY

Prerequisite for graduate work: The required medical subject courses in Anatomy, Bio-Chemistry, Bacteriology, Physiology, and Pathology, or their equivalents.

101f. GENERAL PATHOLOGY. The course consists of 64 lecture or recitation hours and 96 laboratory hours. (6) MR. NEAL; MR. ROBNETT; MR. MOORE.

102w. SPECIAL PATHOLOGY. A course of 64 lecture or recitation hours and 96 laboratory hours. Prerequisite, 101f. (6) MR. NEAL; MR. ROBNETT; MR. MOORE.

103f, 106w, 107s. CLINICO-PATHOLOGIC CONFERENCES. An elective, open to advanced and graduate students in Medicine. (1) MR. NEAL; MR. ROBNETT; MR. MOORE.

104w. CLINICAL PATHOLOGY. An elective course of 48 lecture, recitation, or demonstration hours and 64 laboratory hours. A laboratory course covering a careful study in the chemical, bacteriological, and microscopical methods used in examining blood, urine, sputum, gastric contents, spinal fluids, feces, exudates, etc. for diagnostic purposes. Prerequisites, bacteriology, histology, and physiological chemistry. (5) MR. NEAL; MR. MOORE; MISS BROWN.

201f and 202w. **ADVANCED PATHOLOGY.** The amount and character of the work will depend upon the needs and qualifications of the student. MR. NEAL; MR. MOORE.

203f and 204w. **RESEARCH.** MR. NEAL; MR. MOORE.

PHILOSOPHY

103f. **ETHICAL THEORY.** An introductory study of the main problems of ethics and of the chief methods of their solution with constant reference to the principal historic schools for illustration and interpretation. (3) MR. HUDSON.

104f. **ANCIENT PHILOSOPHY.** The major part of Plato's *Republic* will be read. (3) MR. MOORE.

105w. **MODERN PHILOSOPHY.** Properly follows course 104, though this is not required. The development of modern systems, and their relations to science and to political and social movements. (3) MR. HUDSON.

107f and 108w. **SPECIAL READINGS.** For qualified students who desire to do reading in philosophy independent of formal courses. (1-3) MR. HUDSON; MR. MOORE.

112w. **AMERICAN IDEALS.** A study of the philosophic interpretations of life implied in American social and political institutions of the present, including their international reference. (3) MR. HUDSON.

117w. **AESTHETICS.** The philosophy of beauty from a historical and critical standpoint. (3) MR. HUDSON.

121f. **CURRENT PHILOSOPHICAL PROBLEMS.** Prerequisite, course 105 or an equivalent. Representative systems and issues of the present, including Absolute and Pluralistic Idealism, Pragmatism, the New Realism, and Bergson's Philosophy. (3) MR. MOORE.

125f. **THE PHILOSOPHY OF THE STATE.** A study of the basic philosophical concepts involved in the state as a social institution. Admission to the course only after conference with the instructor. (3) MR. HUDSON.

200f. **SEMINAR.** The Philosophy of Science. For graduate students in the special sciences. A critical study of the nature and validity of scientific methods together with a study of the inter-relations of the special sciences and their relation to philosophy. The physical sciences and the social sciences in alternate years. (1-3) THE DEPARTMENT STAFF.

200w. **SEMINAR.** Subjects to be determined. (Two or three hours credit according to the amount of work done.) MR. HUDSON.

290f and w. **RESEARCH.** (3-5).

PHYSICAL EDUCATION

In general the prerequisite for graduate work in physical education is an approved undergraduate major in this field. In certain cases exceptions may be made by the chairman of the department.

170w. (Same as Education D170) **TESTS AND MEASUREMENTS IN PHYSICAL EDUCATION.** Prerequisite, physical education 152w and Education D110; a course in statistics is desirable but not required. Measurement of aptitude and achievement in physical education activities with particular reference to the determination of standards. (3) MR. HINDMAN.

175s. **APPLIED ANATOMY.** This course presents the anatomy necessary to understand nerve control and joint and muscular mechanism of big muscle activity, as a

background for the development of motor skills and correction of body defects. (3) MISS CLINE.

180w. BODY MECHANICS. Prerequisite, Anatomy. Technique of posture examinations; the application of individual exercises, including the principles of massage and the necessary background in kinesiology. (4) MISS KELLY.

190w and s. ADMINISTRATION OF PHYSICAL EDUCATION. Problems of the administrator and supervisor; classification of students; class schedules, finances, equipment, etc. (3) MR. HINDMAN.

200f and w. SEMINAR. Reports on selected topics are presented by students and instructors, and criticized by the group. (1-2) THE STAFF.

210f. KINESIOLOGICAL ANALYSIS. Prerequisites, Anatomy, Body Mechanics. The kinesiological background of physical education practices with emphasis on the application of body mechanics to the development of sport techniques and motor skills. (3) MISS CLINE.

215w. REMEDIAL GYMNASTICS. Advanced study of postural problems and corrections of them. Prerequisite 180w. (2) MISS KELLY.

220w. ADMINISTRATION OF INTERSCHOOL ATHLETICS. The organization and management of interscholastic and intercollegiate athletics. (3) MR. EDWARDS.

235f. PHILOSOPHY OF THE DANCE. Prerequisites, 27f, 28w, 250f and w. A historical analysis of the dance as an art form; the dance as correlated with philosophy, art, science, and theory; relation of music to the dance; elements of dance composition and program planning. (2) MISS TAYLOR.

240f. SCIENTIFIC STUDIES IN PHYSICAL EDUCATION. A survey and critical evaluation of reports of research in the field of physical education. Does not include the carrying on of research, but only the study of research reported by others. (3) MR. HINDMAN.

250f, w, and s. RESEARCH IN PHYSICAL EDUCATION. (2-6) THE STAFF.

PHYSICS

In order to be admitted as a candidate for a Master's degree with a major in physics, the student must have completed at least two years of college physics, and have a working knowledge of calculus.

104f. ELECTRICAL MEASUREMENTS. General physics and calculus are prerequisite. (3 or 4).

The following group of four courses constitutes a general course in advanced physics. None of them include laboratory work.

110f and s. ELECTRICITY AND MAGNETISM. General physics and calculus are prerequisite. (3).

112f and s. HEAT. Largely descriptive in character. Includes an introduction to thermodynamics. General physics is prerequisite. (3).

113w and s. LIGHT. Largely descriptive in character. General physics is prerequisite. (3).

114w and s. MECHANICS. General physics and calculus are prerequisite. (3).

125s. FUNDAMENTALS OF HIGH SCHOOL PHYSICS. No credit allowed for this course in Arts and Science, nor toward a graduate major in physics. (2).

The following three courses consist entirely of laboratory work. They must be preceded by courses 1 and 2 or 3 and 4, or their equivalent. They offer training in the more exact methods of laboratory measurement.

106w. IONIZATION OF GASES. A laboratory course involving experiments in the conduction of electricity through gases, electronic emission, and radioactivity. Calculus is prerequisite. (2).

107f and s. **ELECTRICITY.** Much the same as laboratory part of course 104f. Calculus is prerequisite. (1 to 3).

108w and s. **LIGHT.** Wavelength and refractive index measurements, experiments in polarization, spectroscopy, etc. (1 or 2).

Integral calculus and two years of physics are prerequisite for all courses numbered 200 or higher.

200f, w and s. **SEMINAR.** A colloquium in which all members of the departmental staff and students of sufficient attainments participate. (1).

202s, 203f, 204w. **SPECIAL INVESTIGATIONS.** Largely laboratory work, involving also study of the literature of special experiments. Intended as an introduction to research methods. (1 to 4).

213f and s. **INTRODUCTION TO THEORETICAL PHYSICS.** Some familiarity with differential equations is desirable. (3).

214w and s. **CONDUCTION OF ELECTRICITY THROUGH GASES.** (4) in winter, (3) in summer.

217f and s. **SOUND.** Mathematical theory of sound, with applications to some recent developments. (3).

218w and s. **X-RAYS.** The modern theory of X-radiation and its bearing on various physical phenomena.

Students who elect from the following group of four courses in mathematical physics should take the course in Advanced Calculus, either before or concurrently.

221f and s. **DYNAMICS.** (4) in fall, (3) in summer.

222w. **ELECTROMAGNETIC THEORY AND LIGHT.** Prerequisite 221. (4).

215w. **ADVANCED ELECTRICITY AND MAGNETISM.** (4).

241f. **WAVE MECHANICS.** Prerequisite 221. It is desirable that the student should also have taken Advanced Algebra. (4).

232w. **THEORY OF SPECTRA.** (3).

230f and w. **READING COURSE.** Selected topics in advanced reading, varied from year to year. (3).

290f, w and s. **RESEARCH.** Work for the preparation of a thesis for the Master's or Doctor's degree. Students who do all their graduate work in summer sessions may not register for research.

PHYSIOLOGY AND PHARMACOLOGY

100w. **ELEMENTARY PHYSIOLOGY.** Intended for students who desire a general knowledge of physiology. Three lectures and two laboratory periods a week. (5) MR. ELLIS AND MR. WESTFALL.

102w. **PHYSIOLOGY OF MUSCLE AND NERVE.** This course presents the principles of the physiology of tissues as such, using the subject-matter of muscle and nerve, with emphasis on the physical and chemical conditions influencing their reactions. (3) MR. ELLIS; MR. PIERCE.

103f. **ALIMENTARY MECHANISMS.** The physiology of the alimentary canal, of the secretory processes, digestive mechanics, absorption, excretion, metabolism, internal secretions, heat regulation and reproduction. (3) MR. GREENE; MR. WADDLE; MR. TERRY.

104w. **PHYSIOLOGY OF THE CIRCULATION AND RESPIRATION.** (2) MR. WADDLE; MR. TERRY; MR. GREENE.

105f. **THE CENTRAL NERVOUS SYSTEM AND SENSE ORGANS.** (2) MR. ELLIS; MR. PIERCE.

108w. **PHARMACOLOGY.** The physiological action of drugs on man and lower animals. (5) MR. GREENE; MR. WADDLE.

200f and w. SEMINAR. Review of current literature. (1) MR. GREENE.

216w. INTERNAL SECRETIONS. An advanced study of hormone producing organs, experimental and clinical. Given in alternate years with course 224w, Metabolism. (2-3) MR. GREENE.

218w. CLINICAL AND SURGICAL PHYSIOLOGY. The modifications of function by clinical and surgical processes. (2) MR. GREENE; MR. WADDLE.

222w. ADVANCED RESPIRATION. An advanced consideration of the normal and modified respiratory activities of man and animal. (3) MR. WADDLE.

224w. METABOLISM. A critical study of the heat-regulating mechanisms; of temperature; food; and the dynamic activity of the thyroid and other internal secreting glands. (2-3) MR. GREENE.

225f. ADVANCED CIRCULATION. A detailed study of the blood vascular apparatus and its modification by drugs and by disease. (2-4) MR. GREENE; MR. WADDLE.

231f and w. SPECIAL STUDIES. Elemental problems in physiology of pharmacology are assigned in preparation for research. MR. GREENE; MR. ELLIS; MR. WADDLE.

291f and w. RESEARCH. Opportunity is offered for research into questions of current physiological interest. MR. GREENE; MR. ELLIS; MR. WADDLE.

POLITICAL SCIENCE AND PUBLIC LAW

Prerequisite for graduate study in political science: An undergraduate major in political science; or a major in one of the social sciences and at least three courses in political science.

100w. EUROPEAN GOVERNMENTS. A comparative study of the constitutional development, present functions, and practical workings of the governments of England, France, Germany, Italy, and Russia. (5) MR. HEINBERG.

101f. LOCAL RURAL GOVERNMENT. A study of the development, present organization, and functions of county and township government in the United States, with especial reference to Missouri. (3) MR. BRADSHAW.

104w. COLONIAL GOVERNMENT. Imperialism, government of the British dominions and the administration of mandates and modern dependencies, with special reference to American colonial problems. (3) (Not given 1936-1937) MR. BRADSHAW.

105s and f. POLITICAL PARTIES. A study of the theory, organization, methods of action and functions of political parties, especially in the United States. (3) MR. BRADSHAW.

106s and f. MUNICIPAL GOVERNMENT AND ADMINISTRATION. A comprehensive study of municipal government and administration in the United States, dealing with the law of municipal corporations, municipal politics and elections, forms of city government, and administrative functions and activities. (5) MR. FAUST.

108w. STATE ADMINISTRATION. A study of the development, organization, and functions of the administrative branch of the American state governments. (3) MR. FAUST.

109f. INTERNATIONAL LAW. A general treatment of the laws governing international relations in peace and war. (3) MR. HILL.

112f. NATIONAL ADMINISTRATION. The development, present organizations, and activities of the administrative departments, boards and commissions of the national government. (3) MR. FAUST.

115w. ADMINISTRATION OF AMERICAN FOREIGN RELATIONS. An examination of governmental organization in the United States for the control and conduct

of foreign relations, with especial reference to the diplomatic and consular services. (2) MR. HILL.

120s and w. THE AMERICAN CONSTITUTION. A consideration of the American federal system, with especial reference to interstate commerce, the powers of Congress, governmental relations between the states and the United States, constitutional limitations for the protection of life, liberty, and property; police power, taxation, and eminent domain. (3) MR. HEINBERG.

175w. LEGISLATION IN THE UNITED STATES. The nature of the legislative power; constitutional limitations; organization, rules of procedure and practice of American legislative bodies; bill drafting. (2) MR. BRADSHAW.

185f. INTERNATIONAL ORGANIZATION. Prerequisite, course 5 or 109. A study of the form and functions of the various cooperative international organizations, with especial reference to the League of Nations and Permanent Court of International Justice. (3) MR. HILL.

200s and f and 201w. SEMINAR. Reviews of current literature and reports on original investigations are presented and discussed by students and members of the faculty. Required of all graduate students majoring in Political Science and Public Law without credit.

202f. PROBLEMS OF EUROPEAN GOVERNMENTS. Prerequisite course 100. A detailed study of selected problems of English, French, German, Italian and Russian governments, particularly in the fields of administration and in the relations between government and economic activity. (3) MR. HEINBERG.

203w. PRINCIPLES AND PROBLEMS OF PUBLIC ADMINISTRATION. Prerequisite, course 101, 106, 108, or 112. A study of administrative organization, practice, and procedure and the methods of controlling administrative action. (3) MR. FAUST.

204f. MUNICIPAL PROBLEMS. A detailed study of selected problems of municipal government, including such problems as city charters, zoning and planning, finance, metropolitan areas. (3) (Not given 1936-1937) MR. FAUST.

205f. PROBLEMS OF POLITICAL PARTIES. Prerequisite, course 105f or consent of instructor. A detailed study of certain specific problems in the field of party organization, public opinion and elections. (2) (Not given 1936-1937). MR. BRADSHAW.

208w. PROBLEMS IN INTERNATIONAL LAW. Prerequisite, course 109. A detailed study of certain specific problems in international law. (3) MR. HILL.

210f. HISTORY OF POLITICAL THOUGHT. A review of the history of political thought from Plato to Rousseau. (3) (Not given 1936-1937) MR. HEINBERG.

211s. MODERN POLITICAL THEORY. A review of modern political theories, with some attention to their historical settings. Recent tendencies in political theory will be considered. (3) MR. FAUST.

212s, and f, and 213w. SPECIAL STUDIES. Opportunity is offered to graduate students who have completed the necessary prerequisite courses to choose topics in one or more of the several fields of Political Science for individual investigation and study. Credit to be arranged. MR. BRADSHAW; MR. FAUST; MR. HEINBERG; MR. HILL.

290s and f, and 291w. RESEARCH. A thesis is required of all candidates for advanced degrees majoring in Political Science and Public Law. A student should confer with the instructor in whose field he wishes to do his research work relative to the selection of a thesis subject. Credit to be arranged. MR. BRADSHAW; MR. FAUST; MR. HEINBERG; MR. HILL.

The following courses in Public Law, given in the School of Law, may be taken

for graduate credit with the approval of the student's major adviser and with the permission of the instructor in the course.

249w. TAXATION. (3) MR. HOWARD.

251f. ADMINISTRATIVE LAW. (3) MR. HOWARD.

257f. MUNICIPAL CORPORATIONS. (2) MR. HOWARD.

258f. PUBLIC UTILITIES. (3) MR. HOWARD.

POULTRY HUSBANDRY

MINOR IN POULTRY HUSBANDRY

The following courses may be counted toward a minor in Poultry Husbandry; they may not be counted for a major:

104f. POULTRY JUDGING. Prerequisites, I. Special attention is given to exhibition and production judging, and the judging of poultry products. (3) MR. FUNK.

106w. INCUBATING AND BROODING PRACTICE. May be preceded by or accompany course 2. The student hatches and raises chickens, keeping accurate records. Nine weeks, by appointment. (3) MR. FUNK.

108w. ADVANCED POULTRY PRODUCTION. A study of the problems of the poultry farmer and breeder. Special attention is given to breeding, feeding, and management practices. Prerequisites, Poultry Husbandry I and Animal Nutrition. (3) MR. KEMPSTER.

MAJOR IN POULTRY HUSBANDRY

The following courses may be counted toward a major or minor in Poultry Husbandry:

103. MARKETING POULTRY PRODUCTS. Prerequisite, course 1. A course dealing largely with the practices in commercial poultry and egg handling establishments, both in reference to fattening and killing poultry and to handling of eggs. (3) MR. KEMPSTER.

105w. POULTRY FARM MANAGEMENT. Must be preceded or accompanied by course 1. A study of poultry farm methods and practices. (3) MR. KEMPSTER.

107f and w. SPECIAL PROBLEMS. MR. KEMPSTER; MR. FUNK.

200f and 201w. SEMINAR. Special investigations in poultry husbandry literature are reviewed and discussed by the class. (1) MR. KEMPSTER.

202f and 203w. RESEARCH IN POULTRY HUSBANDRY. Special phases of poultry production. In some cases students will assist in experimental work being conducted by the department. MR. KEMPSTER; MR. FUNK.

PSYCHOLOGY

Psychology 1 and 6 additional hours in psychology are a prerequisite for graduate credit in the following courses:

122f and w. ABNORMAL PSYCHOLOGY. A study of the more frequent abnormalities of personality, with special reference to their significance for mental normality. (3) MR. PETERS.

125f. SOCIAL PSYCHOLOGY. The psychological factors involved in social behavior. The course will include a critical survey of the major principles and points of view in social psychology. (3) MR. MCKINNEY.

126w. MENTAL DEVELOPMENT. The origin of mental traits and their growth from birth to maturity. (3) MR. MCKINNEY.

180w. COMPARATIVE PSYCHOLOGY. A survey of the experimental work upon the mental activities of animals, with special reference to the implications of this.

work for general psychology. There will be some discussion of the experimental literature upon the mental traits of different races. (3) MR. PETERS.

195f. EXPERIMENTAL PSYCHOLOGY. A general introduction to the experimental psychology of sensation, perception, motor learning and emotion. (3) MR. PETERS.

196w. EXPERIMENTAL PSYCHOLOGY. A general introduction to the experimental psychology of association, memory, imagination and thought. (3) MR. PETERS.

197f. THE PSYCHOLOGY OF LEARNING. A study of the experimental work on the acquisition and retention of skilled acts, verbal and ideational materials. Theories of learning and memory, and the implication of both facts and theories for general psychology. (3) MR. MELTON.

198w. SYSTEMATIC PSYCHOLOGY. A survey of the contemporary schools of psychology and of their methods of treating the major problems of psychology. The course aims to give the student a critical grasp of the outstanding theoretical issues in modern psychology. (3) MR. MELTON.

209f and w. PSYCHOLOGICAL TEXTBOOKS. A comparative study of the psychological systems as found in the chief textbooks, laboratory manuals, and journals on psychology published during the last thirty years. (4) MR. MELTON.

210f and w. RESEARCH. Theoretical and experimental. MR. MELTON.

RURAL SOCIOLOGY

Prerequisite for graduate work. At least twelve hours of sociology and courses in agricultural economics, political science, psychology, history, and biology, or their equivalent. Thesis required.

115s and f. RURAL SOCIOLOGY. A study of rural social life and organization, together with comparisons with the city and the interrelations between the two. (3) MR. MORGAN.

117s and f. COMMUNITY ORGANIZATION. Considers the principles and methods of organization and development of various types of communities. Designed for those who will have occasion to use the community as an organization unit in their professional work. Prerequisite, course 115 or equivalent. (3) MR. MORGAN.

145w. GROUP AND CLUB WORK. Treats of principles and methods of organization and leadership of those groups and clubs customarily used in carrying on programs in Agricultural and home economics extension, public schools, and church recreation, and in adult and youth education and in community and neighborhood social activities. Prerequisite, Course 115 or equivalent. (2) MR. MORGAN.

190s and f. LEADERSHIP. A study of the biological psychological, and sociological aspects of leadership, and of the training of leadership in community affairs. Leaders in such fields as agriculture, business, education, religion, politics, and social organization are analysed. Prerequisite, psychology and eight hours of sociology. Senior standing. (3) MR. MORGAN.

200s, f and w. SEMINAR. Special lectures and review of literature. Credit arranged. MR. MORGAN.

234w. FARMER MOVEMENTS. A critical study of the principal farmer movements in Europe and in America with a view to an evaluation of present day movements in the light of current trends in agriculture and country life. Offered alternate years. Given in 1935-36. (2) MR. MORGAN.

235f. HISTORICAL AND COMPARATIVE COUNTRY LIFE. An historical study of rural life in England, Denmark, Germany, and other countries. Comparisons are made between European conditions producing particular types and present day

rural problems in the United States with a view to their possible solution. Offered alternate years. Not given in 1935-36. (2) MR. MORGAN.

240s, f, and w. SPECIAL INVESTIGATIONS. Credit arranged. MR. MORGAN.
290s, f, and w. RESEARCH. Thesis required. Credit arranged. MR. MORGAN.

SOCIOLOGY

At least twelve hours in undergraduate courses in Sociology are required for beginning graduate work. A thesis is required for all advanced degrees.

110f and w. SOCIAL PATHOLOGY. A study of social disorganization and personal demoralizations. Emphasis is placed on the processes by which social variants become maladjusted, and on the processes by which institutions and communities tend to disintegrate. Prerequisite, Course 1. (3) MR. BROWN.

111f and w. CRIMINOLOGY. A study of the biological and social factors in the development of the criminal; penal treatment, reform, and prevention. Prerequisite, Course 1. (3) MR. PIHLBLAD.

112f. CHILD WELFARE. A study of the socializing process and its conditioning by heredity and physical and social factors; a description of social policies and agencies for the promotion of child welfare. Prerequisite, Course 1. (3) MR. PIHLBLAD.

113w. CONSTRUCTIVE SOCIAL POLICIES. A critical analysis of policies and agencies for dealing with the social and economic aspects of sickness, invalidity, old age, accident, and unemployment. Prerequisites, Courses 1 and 110. (2) MR. PIHLBLAD.

114w. THE FAMILY. A study of the family as a natural and institutional group, the influences which tend to modify its form and functions, the process of disintegration, current theories of reconstruction. Prerequisites, Courses 1 and 110 or 112. (3) MR. EMIG.

115f. RURAL SOCIOLOGY. See Rural Sociology 115.

116f. URBAN SOCIOLOGY. An analytical and critical study of the structure and function of city life, a development of concepts with which to understand urban problems. Prerequisite, Course 1. (3) MR. BERRY.

117f. COMMUNITY ORGANIZATION. See Rural Sociology 117.

125f. GENERAL ANTHROPOLOGY. A general introduction to the study of man and his culture; the origin and evolution of man as an animal; fossil man; problems of race; prehistory of Europe and the western hemisphere. Prerequisite, Course 1. (3) MR. BERRY.

126w. CULTURAL ANTHROPOLOGY. A comparative study of primitive folkways and institutions such as forms of marriage, property, religion, etc. The factors affecting culture and the principles of its development and the significance of the study of primitive culture for an understanding of contemporary civilization. Prerequisites, Courses 1 and 125. (3) MR. BERRY.

127f. IMMIGRATION AND AMERICAN SOCIETY. A study of the cultural background of principal immigrant groups, their adjustments, and their contributions to American society. Prerequisite, Course 1. (2) MR. BROWN.

130w. ETHNOGRAPHY. A descriptive survey of representative primitive tribes of Africa, Australia, Oceania, and the Americas, with special reference to their racial characteristics, customs, and institutions. The American Indian will be studied thoroughly. Prerequisites, Courses 1 and 125 or 126. (2) MR. BERRY.

150f. FIELD OF SOCIAL WORK. A historical survey and analysis of the origin, development, and present status of the various fields in social work. Prerequisite, Course 1. (3).

153f and w. **SOCIAL CASE WORK I.** An introduction to the basic processes involved in case work, and to recognized methods of dealing with them. Prerequisite, 8 hours of Sociology. (3).

155f and w. **FIELD WORK I.** Unpaid practice work under the supervision of an accredited agency. Credit is arranged.

157w. **SOCIAL CASE WORK II.** An analysis of case records in order to discover sound techniques in serving the client. Prerequisite, Course 153. (2).

159w. **COMMUNITY PROBLEMS FOR SOCIAL WORK.** Information concerning the community and its problems, the interrelationship between social agencies, and the relationship of the social worker to them. Community resources and the manner in which they are utilized by the social worker. Prerequisite, Course 1. (3).

180f. **PUBLIC WELFARE ADMINISTRATION.** A study of the principles and methods of the organization and administration of social welfare work. Prerequisite, Course 153. (3).

185w. **SOCIAL LEGISLATION.** A study of the laws and legal principles to be understood in social welfare work. Prerequisite, Course 153. (2).

187w. **MEDICAL INFORMATION.** Medical information necessary to the welfare worker. The relation of medicine to social case work. Prerequisite, Course 153. (2).

200f and w. **THE SEMINAR.** Reports of research by students and faculty members. The recent outstanding contributions are revised. Required of all graduate majors in sociology with or without credit. (1-2) **THE STAFF.**

205f and w. **SPECIALIZED CASE WORK.** Training for case work in any specific field: Delinquency, Child Welfare, Family, etc. (2-3) Prerequisite, 12 hours Sociology.

207w. **PROBATION AND PAROLE.** A study of the history, theory and practice of probation and parole. An attempt will be made to acquaint the student with the practical problems of administration as they are found in Missouri courts and correctional institutions. Prerequisite, Courses 111, 140 and Psychology 122. (3) **MR. PIHLBLAD.**

210w. **PSYCHIATRIC INFORMATION.** A study of social and mental variants, and of the processes by which they become maladjusted. The social worker's approach to these problems and his relationship to the specialist in the field of psychiatry. Prerequisite, 12 hours of Sociology. (3) **MR. BROWN.**

212f and w. **FIELD WORK II.** Field work for graduate students. Credit is arranged.

220f. **PRINCIPLES OF SOCIOLOGY.** A critical study of contemporary theories and schools of social thought. Prerequisite, 12 hours in Sociology. (3) **MR. EMIG.**

221w. **THEORY OF POPULATION.** A review of population theory from Malthus to the present with special reference to contemporary population problems. Prerequisite, 12 hours Sociology. (2) **MR. PIHLBLAD.**

222f. **METHODS OF SOCIAL RESEARCH.** A critical study of methods applicable to the study of social problems. Problems of investigation by the class. Required of all graduate majors. Prerequisite, 12 hours of Sociology. (3) **MR. EMIG; MR. BROWN.**

227f. **THE AMERICAN NEGRO.** A study of the historical background and present status of the American Negro. Prerequisite, 12 hours of Sociology. (2) **MR. PIHLBLAD.**

230w. **HISTORY OF SOCIAL PHILOSOPHY.** The development of social thought from the Hebrews to the present. Some of the outstanding sources are assigned. Prerequisite, 12 hours in Sociology. (3) **MR. EMIG.**

240f and w. SPECIAL INVESTIGATION. Directed reading and investigation not leading to a thesis. (1-3) THE STAFF.

290f and w. RESEARCH. A thesis is required for all advanced degrees in Sociology. Credit is arranged. THE STAFF.

SOILS

Prerequisites for graduate study include 32 hours in soils and related subjects—quantitative, organic and physical chemistry, plant physiology, bacteriology, geology and physics. The minimum in soils depends on the courses offered. Exceptions to the above named prerequisites must meet the approval of the student's adviser. A dissertation is required of candidates for the master's degree, except in special cases when the substitution of other work may be permitted.

100f. SOIL FERTILITY. Prerequisite, course 1. Eight hours of chemistry should precede this course. (3) MR. ALBRECHT.

101w. SOIL MANAGEMENT. Prerequisite, course 1. A course dealing with the principles of soil management. (3) MR. MILLER.

102f. SOIL SURVEYING AND LAND APPRAISAL. Prerequisite, course 1. A course designed for those wishing to become familiar with methods of soil surveying and of land appraisal. (3) MR. KRUSEKOPF.

104f. SOILS OF THE UNITED STATES. Prerequisite, course 1. The soils of the United States, their characteristics, crop adaptations, and systems of farming to which they are adapted. (2) MR. MILLER. (Offered in alternate years. Not offered in 1936-37).

105w. SOIL BACTERIOLOGY. Prerequisite, course 1 and general bacteriology. Micro-organic life of the soil in relation to soil fertility. (3) MR. ALBRECHT.

106w. SOIL DEVELOPMENT AND MORPHOLOGY. Prerequisite, course 1. A course having to do with the pedological principles determining soil origin and development. (2) MR. KRUSEKOPF; (Offered in alternate years. Offered in 1936-37).

107w. PHYSICAL PROPERTIES OF SOILS. Prerequisites, course 1 and college physics. A course in physical chemistry is recommended. A fundamental study of the physical constitution and colloidal properties of soils in their relation to soil structure and consistency, water absorption and movement, aeration and temperature. Practical applications to cultivation, drainage and erosion problems. (3-5) MR. BAVER. (Offered in alternate years. Not offered in 1936-37).

108f. SOIL CONSERVATION AND UTILIZATION. A course emphasizing the principles underlying soil conservation and utilization for the major Missouri soil types. The course includes a consideration of the factors influencing land use, erosion losses and agronomic principles of erosion control (3) MR. MILLER; MR. KRUSEKOPF; MR. BAVER.

120f, w and s. SPECIAL PROBLEMS. Prerequisite, at least eight hours credit in the subject of soils. Assigned problems or problems chosen by the student with approval. (2-5) MR. MILLER; MR. ALBRECHT; MR. KRUSEKOPF; MR. BAVER.

200f and w. SEMINAR. Discussions of recent developments in soil science. Papers on assigned topics are presented for discussion. (1) MR. MILLER.

202f and w. SPECIAL INVESTIGATIONS. Prerequisite, one year of graduate study for non-majors in soils. Independent investigation of soil problems not terminating in a thesis. (2-5) MR. MILLER; MR. ALBRECHT; MR. KRUSEKOPF; MR. BAVER.

203w. THEORIES AND APPLICATIONS IN SOIL RESEARCH. Prerequisite, graduate standing in soils. A course designed to familiarize students with the development of theories underlying the major phases of soil research and with the methods of

conducting soil investigations. (2) MR. MILLER; MR. ALBRECHT. (Offered in alternate years. Not offered in 1936-37).

204w. PHYSICAL CHEMISTRY OF SOILS. Prerequisite, physical or colloid chemistry. The application of methods of physical and colloid chemistry to soil problems with special emphasis upon the physico-chemical nature of the inorganic colloids as affecting soil acidity, base exchange, absorption, and the nature of the soil solution. (3-5) MR. BAVER. (Offered in alternate years. Offered in 1936-37).

205f, w and s. SOIL RESEARCH. Special investigations in soils. MR. MILLER; MR. ALBRECHT; MR. KRUSEKOPF; MR. BAVER.

SPANISH

Prerequisites for the major and the minor: for students majoring in Spanish, 21 hours of Spanish or equivalent; for students minoring in Spanish, 15 hours of Spanish or equivalent.

Prerequisites for the courses listed below: for 105, 107, 108, 109, 113, 125, 128, 132, course 3 or equivalent; for 111 and 122, course 105 or equivalent; for 112, 21 hours of Spanish; for 117 and 119, 16 hours of Spanish.

A dissertation for the master's degree is not required, but students may elect to offer a dissertation representing an approved portion of the 32 hours credit for which candidates ordinarily register.

105f and w. COMPOSITION AND CONVERSATION. (3) MISS WALKER; MR. SCHERR.

107w. MODERN SPANISH DRAMA. (3) MR. WARSHAW.

108f. THE DRAMATIC WORK OF BENAVENTE. (3) MR. WARSHAW.

109s. TRANSITION DRAMA OF THE 19TH CENTURY. (2) MR. SCHERR.

111f. ADVANCED COMPOSITION AND CONVERSATION. (2) MR. WARSHAW.

112s, f, and w. SPECIAL READINGS. Directed study of work suited to the needs of the individual student. (1-3) MR. WARSHAW; MR. SCHERR.

113s and f. NINETEENTH CENTURY SPANISH NOVEL. Alternates with course 114f, Contemporary Spanish Novel, which will not be offered in 1936-37. (2), (3) MISS BOHANNON.

117s. CERVANTES. (2) MR. SCHERR.

119f. SPANISH DRAMA OF THE 16TH AND 17TH CENTURIES. Alternates with course 117f, Cervantes, which will not be offered in 1936-37. (3) MR. SCHERR.

122w. COMMERCIAL SPANISH. (2) MISS WALKER.

125w. MEXICAN LITERATURE. Alternates with course 120w, Masterpieces of Spanish Literature, which will not be offered in 1936-37. (3) MISS WALKER.

128w. SPANISH ROMANTIC PERIOD. Alternates with course 126w, Spanish Literature of the 18th Century, which will not be offered in 1936-37. (3) MR. SCHERR.

132w. SPANISH SHORT STORY. Alternates with course 130w, Spanish Lyric Poetry, which will not be offered in 1936-37. (2) MR. SCHERR.

201s, f, and w. SPECIAL INVESTIGATIONS. (1-4) MR. WARSHAW; MR. SCHERR.

202w. OLD SPANISH. Alternates with course 204w, Historical Spanish Grammar, which will not be offered in 1936-37. (3) MISS JOHNSON.

203s, f, and w. SPECIAL STUDIES. (1-4) MR. WARSHAW; MR. SCHERR.

290s, f, and w. RESEARCH. Required of students who elect to present a thesis. (Credit to be arranged.) MR. WARSHAW; MR. SCHERR.

PHILOLOGY. Courses 202 and 203 will provide for the needs of students primarily interested in Spanish philology. Attention is called to courses in philology offered in the Department of French and Italian.

VETERINARY SCIENCE

Prerequisites for graduate work: Graduate students majoring in Veterinary Science must have had in addition to the requirements for a B. S. Degree in Agriculture or a D. V. M. from a recognized school, 12 hours of electives in the Veterinary Science Department or the equivalent from another institution.

101f. STOCK FARM SANITATION AND DISEASE PREVENTION. Prerequisites, course 1 and general bacteriology. (a) Infectious Diseases of Farm Animals. A study of the causes, symptoms, pathology, special diagnostic methods, preventive measures, quarantine methods, disinfectants and their uses. Lectures, laboratory, and demonstrations. (3) MR. ELDER.

102w. STOCK FARM SANITATION AND DISEASE PREVENTION. Continuation of 101w. (a) Infectious Diseases. (b) Animal Parasites. A study of internal and external parasites of farm animals and their economic importance. (3) MR. ELDER.

103f and 104w. DISEASES OF POULTRY. Diagnosis of the common ailments of poultry parasitic and infectious diseases, prevention and treatment. For graduate students not majoring in veterinary science only. (2) MR. DURANT.

105f and 106w. SPECIAL PROBLEMS. Assignment of special problems for training in research in animal diseases. Prerequisite, course 101w, 102f or 104w according to problems assigned. These prerequisites waived in case of graduate veterinarians who desire instruction on some special problems. Hours by arrangement. MR. DURANT; MR. ELDER; MR. UREN.

200f and 201w. SEMINAR. Study of researches in animal and poultry diseases. Open to advanced students specializing in animal dairy and poultry husbandry. (1-2) MR. DURANT; MR. ELDER; MR. UREN.

202f and 203w. RESEARCH. Experimental investigation of animal and poultry diseases and of measures of prevention and treatment. Open to graduate students who have the requisite preparation. The student may assist in Experiment Station projects now in progress or may be assigned a special problem. Proper credit is given toward an advanced degree. Hours by arrangement. MR. CONNAWAY; MR. DURANT; MR. ELDER; MR. UREN.

ZOOLOGY

Prerequisite for graduate study: It is expected that all students enrolling for the degree of Master of Arts or Doctor of Philosophy in zoology will have completed undergraduate courses equivalent to a major in zoology consisting of twenty-four hours of work as specified for the College of Arts and Science. As the facilities of the department are limited, any who intend to enroll for either of these advanced degrees should correspond with the chairman before coming to Columbia. Graduate students majoring in other departments may elect work in zoology subject to their preparation for particular courses. Students may receive the degree of Master of Arts in zoology either by presentation of a thesis in partial fulfillment of the requirements or by completing 32 hours of graduate work and comprehensive examinations. A reading knowledge of French and German is necessary in most of the work offered in the 200 series.

105f. COMPARATIVE HISTOLOGY. Prerequisite, at least 8 hours of work in zoology. A comparative study of the microscopic structure of animal cells, tissues, and organs. (3-5) MR. WOODS.

110w. PARASITOLOGY. Prerequisite, at least 8 hours of work in zoology. A study of animal parasites. (3) MR. CURTIS; MR. CAMERON.

115w. **EXPERIMENTAL ZOOLOGY.** Prerequisite, at least 8 hours of work in zoology and 5 hours of chemistry. A course dealing with some of the fundamental principles of general physiology, with special reference to the relations between animals and their environment. (3-5) MR. BENNITT.

120f. **EMBRYOLOGY OF VERTEBRATES.** Prerequisite, at least 8 hours of work in zoology. The development of the vertebrates is discussed from a comparative point of view as a coordinated sequence of events, conditioned by both the genetic constitution and the environment. Successive stages in the development of the chick furnish the major portion of the laboratory material. (3) MISS GUTHRIE; MR. CAMERON.

125f. **GENETICS.** Prerequisite, at least 8 hours of work in zoology or its equivalent in other biological lines. A course dealing with the experimental study of genetics. (5) MISS GUTHRIE.

130f. **PROTOZOOLOGY.** Prerequisite, at least 13 hours in zoology or its equivalent in other biological lines. A general study of the protozoa. (3-5) MR. CURTIS.

135w. **CYTOLOGY.** Prerequisite, at least 13 hours of work in zoology or an equivalent in other fields of biological science. The morphology of cells with reference to the nature of protoplasm and the functions of cells in development and heredity. Cytological technique. (5) MISS GUTHRIE.

150f and w. **SPECIAL PROBLEMS.** Individual work under supervision, designed to supplement regularly organized courses in zoology, including experimental embryology (continuation of 120f) and beginning research in zoology. (1-5) MR. CURTIS; MR. BENNITT; MISS GUTHRIE; MR. WOODS.

200f and w. **SEMINAR.** Presentation and discussion of zoological problems and investigations by instructors and students. (1) MR. CURTIS; MR. BENNITT; MISS GUTHRIE; MR. WOODS.

215w. **ADVANCED GENETICS.** Prerequisite, Zoology 125f, or the equivalent. Lectures and readings from the original literature. To alternate with Zoology 220w; given in 1936-37. (3) MISS GUTHRIE; MR. STADLER; MR. RICKETT.

220w. **ADVANCED CYTOLOGY.** Prerequisite, Zoology 125f and 135w. or their equivalents. Study of the chromosomes as related to genetics. Lectures and readings from the original literature. To alternate with Zoology 215w; not given in 1936-37. (3) MISS GUTHRIE; MR. RICKETT.

250f and w. **SPECIAL STUDIES.** Research not expected to terminate in a thesis; or advanced study in special fields of zoology, especially regeneration and protozoology. (1-5) MR. CURTIS; MR. BENNITT; MISS GUTHRIE; MR. WOODS.

290f and w. **RESEARCH.** Investigation of unsolved problems in zoology, undertaken with the expectation that the work will terminate in a thesis. MR. CURTIS; MR. BENNITT; MISS GUTHRIE; MR. WOODS.

FELLOWS AND SCHOLARS

GREGORY SCHOLARS

PERRY LEONARD BIDSTRUP, A. B., University of Missouri, 1932.

DONALD C. BOND, A. B., University of Missouri, 1931, A. M. University of Missouri, 1932.

BURNS W. BREWER, JR., A. B., University of Missouri.

IRVIN FOLK COYLE, B. S. in Ed., Southwest Missouri State Teachers College, 1928, A. M., University of Missouri, 1932.

ELBERT H. GREEN, A. B., University of Missouri, 1935.

FRANCES K. HUNT, A. B., University of Oklahoma, 1929.

C. TRUMAN STEELE, A. B., Drury College, 1934.

SILAS EDWARD SUMMERS, A. B., West State Teachers College of Colorado, 1931.

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