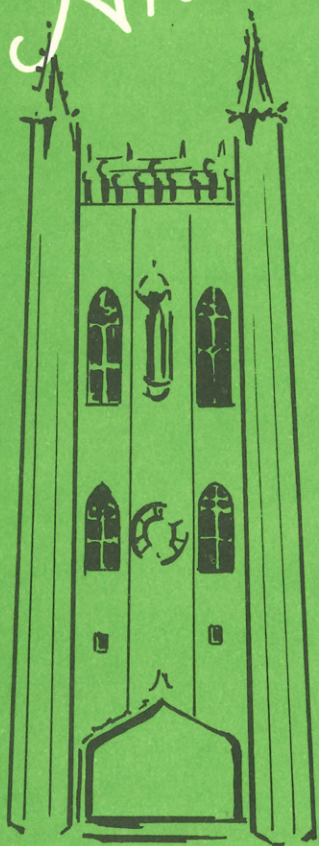


*Announcement of*  
**COURSES**



*The*

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**June 20, 1958**

# THE UNIVERSITY OF MISSOURI

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## *Statement of Courses* *for* *1958-1959*

FOR THE DIVISIONS AT COLUMBIA:

COLLEGE OF ARTS AND SCIENCE  
*including* SCHOOL OF SOCIAL WORK—  
DIVISION OF AGRICULTURAL SCIENCES,  
*including* COLLEGE OF AGRICULTURE,  
SCHOOL OF FORESTRY AND SCHOOL  
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## *Foreword*

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The University catalog is issued in three parts. The first part, *The University—Its Schools and Colleges*, contains general information on administration, facilities, regulations, requirements for admission, and on the various schools and colleges.

The second part, *Announcement of Courses*, contains descriptions of all courses of instruction for the schools and colleges for the divisions at Columbia and lists officers of administration and instruction. The third part, entitled *Aids and Awards*, contains information on scholarships, loan funds, employment, and other aids to students.

For these bulletins or for other general information, persons interested may address the Director of Admissions, 130 Jesse Hall, University of Missouri, Columbia, Mo.

# Contents

---

The Boards .....	7
Faculty and Administration .....	9
Description of Courses .....	37
Accounting and Statistics .....	38
Agricultural and Home Economics Extension .....	41
Agricultural Chemistry .....	42
Agricultural Economics .....	43
Agricultural Engineering .....	46
Air Force ROTC .....	48
Anatomy .....	49
Animal Husbandry .....	50
Anthropology .....	191
Archaeology .....	70
Army ROTC .....	53
Art .....	53
Astronomy .....	57
Bacteriology .....	57
Biochemistry .....	57
Botany .....	58
Chemical Engineering .....	61
Chemistry .....	63
Civil Engineering .....	66
Classical Languages and Archaeology .....	70
Dairy Husbandry .....	73
Dramatic Art .....	197
Economics and Business .....	76
Education .....	80
Electrical Engineering .....	94
English .....	97
Entomology .....	101
Field Crops .....	103
Forestry .....	104
French .....	181
Genetics .....	107

## *Contents*

---

Geography .....	108
Geology .....	110
German .....	113
Germanic and Slavic Languages .....	113
Greek .....	70
History .....	114
Home Economics .....	119
Horticulture .....	125
Humanities .....	129
Italian .....	183
Journalism .....	129
Latin .....	71
Law .....	134
Library Science .....	137
Mathematics .....	138
Mechanical Engineering .....	142
Medical Technology .....	146
Medicine .....	146
Microbiology .....	147
Music .....	149
Naval ROTC .....	155
Nursing .....	156
Obstetrics and Gynecology .....	158
Pathology .....	159
Pediatrics .....	159
Philosophy .....	160
Physical Education .....	162
Physics .....	164
Physiology and Pharmacology .....	168
Political Science .....	169
Portuguese .....	186
Poultry Husbandry .....	172
Psychology .....	173
Radiology .....	177

## *Contents*

---

Religion .....	178
Romance Languages .....	181
Rural Sociology .....	187
Russian .....	114
Social Work .....	188
Sociology and Anthropology .....	191
Soils .....	195
Spanish .....	184
Speech and Dramatic Art .....	197
Surgery .....	201
Veterinary Anatomy .....	201
Veterinary Bacteriology and Parasitology .....	202
Veterinary Medicine and Surgery .....	203
Veterinary Pathology .....	204
Veterinary Physiology and Pharmacology .....	205
Zoology .....	205





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Agnes H. McDonald, A.M.; James C. McDonald, A.M.; Nancy A. McKeown, B.S. in Ed.; Dewey M. McLean, A.B.; Russell A. Mann, Jr., B.J.; Finley D. Marshall, B.S.; Richard Matter, B.S.; Albert Meier, A.B.; Arthur Mendel, A.M.; \*Clarence W. Mettenburg, A.B.; John A. Moir, B.S., B.J.; Ward J. Moore, B.S. in Ed.; Wilton W. Murphy, A.B.; Richard Myers, A.M.; James D. Norris, B.S. in Ed.; Thomas A. Odneal, Jr., B.S. in Ed.; Carol J. Oen, A.B.;

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\*School of Mines and Metallurgy.



# *Description of Courses*

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All courses offered at the University are listed by departments or fields of learning in alphabetical order. Approximately four weeks prior to the opening of each semester a Schedule of Courses is published which lists the specific courses to be offered for that semester with the time of meeting, the building, and room number for each course. This description of courses includes only those courses given on the Columbia campus. A separate catalog is issued by the University's School of Mines and Metallurgy for courses given on the campus at Rolla.

The University reserves the right to cancel without further notice any course listed in this publication or in the Schedule of Courses for any semester or to withdraw any course which does not have an adequate enrollment at the close of the registration period.

## **Course Numbers**

Each course bears a distinguishing number which identifies it within the department and indicates, broadly, its rank. The numbering system is as follows:

- 1 to 24 indicate courses regularly open to freshmen;
- 25 to 99, courses primarily for sophomores;
- 100 to 199, courses primarily for upperclassmen;
- 200 to 299, courses for undergraduates and for graduate students except those whose graduate major is in the department in which the course is given;
- 300 to 399, courses for undergraduates and for graduate students without restriction as to a student's graduate major;
- 400 to 499, primarily for graduate students. Undergraduate students are admitted to courses in this series only with the approval of the dean of the division in which the course is offered.

## **Credit**

The unit of credit at the University is the semester hour, which represents a subject pursued one period a week for one semester of approximately sixteen weeks or for a total of approximately sixteen periods for one term. In general, a course valued at three semester hours meets for three periods a week for one semester.

Following the title of the course, the number of hours of credit is given in parentheses; thus Statistics (4). If the credit is variable, to be fixed in consultation with the teacher, that fact is indicated by (credit to be arranged) or by the minimum and maximum credit, as Research (2-8).

### Semester Designation

The small letters, following the title of the course and the credit it carries, indicate in which semester the course is expected to be offered. Thus *f* indicates the course is to be offered in the first or fall semester; *w* indicates the second or winter semester; *s* indicates the summer session; and *ss*, the intersession, a period between the close of the summer session and the opening of the first semester when certain laboratory courses are offered in the School of Journalism. No attempt is made to designate all the courses that may be offered in the summer session but only those usually offered. The Summer Session Announcement and Schedule of Courses should be consulted for the complete list.

## ACCOUNTING AND STATISTICS

### Accounting

Courses 36, 37, and 425 are accepted in the College of Arts and Science.

- 36 Elementary Accounting I (3) f, w.**  
Prerequisite, 24 points. A study of the fundamental principles of accounting and their application. Analysis of the balance sheet and income statement. MEMBERS OF THE STAFF.
- 37 Elementary Accounting II (3) f, w.**  
Prerequisite, course 36, or equivalent training. A continuation of the study of accounting principles and procedures with emphasis on the accounts of the corporation. MEMBERS OF THE STAFF.
- 103 Accounting for Small Business (1-2) f, w.**  
Prerequisite, 37. Solution and discussion of problems illustrating various accounting procedures with emphasis on the requirements of business enterprises operated on a small scale. MEMBERS OF THE STAFF.
- 217 Intermediate Accounting (3) f, w.**  
Prerequisites, 37 and general economics. The financial statements of a going enterprise; organization and interpretation; classification and determination of the contents and values of accounts. RICHARD, EVERETT, SKELLY.
- 301 Problems in Accounting (1-3) f, w.**  
Independent investigations and reports on topics approved by the instructor. MEMBERS OF THE STAFF.
- 319 Advanced Accounting (3) f, w.**  
Prerequisite, 217. Application of accounting principles to special topics such as branch house accounting, fiduciary accounting, partnerships, installment sales, consignment sales, annuities, and bonds. BAUER, KOHLER.
- 321 Industrial Accounting (3) f, w.**  
Prerequisite, 217. The technique of accounting control as applied to industrial enterprise. Historical and critical appraisal of product, process cost systems, and standard costs. RICHARD, SKELLY.
- 323 Consolidated Statements (2) f, w.**  
Prerequisite, 217. Problems of adjusting accounting statements to current complex forms of business organization; holding company and partnership control over groups of corporations. Emphasis on working papers. EVERETT.



- 325 Governmental Accounting and Auditing (3) f.**  
Prerequisite, 217, or 37 and Political Science 310 and senior standing. Principles and operation of fund accounting; financial reporting, budgetary control, and auditing for effective financial administration of governmental and non-profit institutions. KOHLER, EVERETT.
- 328 Managerial Accounts and Statistics (3) f, w.**  
Prerequisites, 31 and 217. Accounting and statistical functions in the management of large-scale business stressing the effects of big business upon accounts and statistics, including cost accounting for sales. SILVOSO.
- 334 Auditing (3) f, w.**  
Prerequisite, 217. Principles underlying the verification, analysis, and interpretation of accounting records and statements with emphasis on preparation of working papers and audit reports. BAUER, SILVOSO.
- 373 Tax Accounting (3) f, w.**  
Prerequisite, 217, or 37 and Political Science 321 and senior standing. Accounting principles and procedures required by current laws and regulations relating to federal and state income taxes and social security taxes. BAUER, KOHLER.
- 390 C.P.A. Problems (3) f, w.**  
Prerequisites, 217 and 319. Application of accounting principles to problems of a professional level. An analysis and study of representative problems from C.P.A. examinations. RICHARD, EVERETT.
- 401 Problems in Accounting (1-3) f, w.**  
Independent investigations and reports on topics approved by the instructor. MEMBERS OF THE STAFF.
- 410 Seminar in Accounting (3) w.**  
Presentation and critical analysis of problems in accounting theory and practice. MEMBERS OF THE STAFF.
- 413 Controversial Accounting Problems (3) w.**  
Prerequisites, 217 and consent of instructor. Problems on which the views of accountants differ, noting especially divergencies between accounting theory and rules of thumb developed in practice. KOHLER.
- 414 Income Determination (3) w.**  
Prerequisites, 321 and 328. A study of the historical development of the process of arriving at net income and the relation of this process to accounting theory. SILVOSO.
- 415 Advanced Principles of Accounting (3) f.**  
Prerequisite, ten hours of accounting. Technical theory carrying further the theoretical aspects of undergraduate courses with special emphasis upon discussions of principles in recent accounting literature. KOHLER.
- 421 Advanced Cost Accounting Theory (3) f.**  
Prerequisites, 217 and 321. A study of current theoretical developments in cost accounting and their relationship to accounting as a whole. SILVOSO.
- 425 Advanced Accounting Theory (5) f.**  
Prerequisite, 217. An orientation course presenting the cultural situation which gives importance to modern accounting. Critical appraisals of trends in theory and functions of current accounting. SILVOSO.
- 491 Research in Accounting (credit to be arranged) f, w.**  
MEMBERS OF THE STAFF.

## Statistics

Course 31 is regularly accepted in the College of Arts and Science, and courses 205, 208, 303, 309, 340, 341, 360, and 370 are accepted when in an approved area of concentration.

- 31 Elementary Statistics (3) f, w.**  
Prerequisites, Mathematics 3, 7, or 10, and 24 points. Descriptive statistics, elementary probability and probability distributions, simple hypothesis testing and estimation. MEMBERS OF THE STAFF.
- 200 Problems in Statistics (1-3) f, w.**  
Graduate students in other departments who are interested in selected types of statistical analysis should register for this course, but only after receiving approval of instructor. Not open to undergraduate students. MEMBERS OF THE STAFF.
- 205 Index Numbers (2) f.**  
Prerequisites, one course in statistics, one course in economics, and junior standing. Construction and interpretation of index numbers; problems of weighing and splicing; measuring the cost of family maintenance; adjustment of data for inflation and deflation. KING, HOLSTEIN.
- 208 Punch Card Methods (3) f, w.**  
Prerequisites, 31 and junior standing. Organization of large volumes of data to facilitate analysis by modern methods involving International Business Machine punch card alphabetical equipment. HOGAN.
- 234 Applied Statistics I (3) f.**  
Prerequisite, 31. For students not majoring in statistics. Elements of sampling, tests of hypotheses, regression, and correlation. (Students completing this course may receive half credit only for 303 and 309.) KING, HOLSTEIN.
- 235 Applied Statistics II (3) w.**  
Prerequisites, 31 and Economics and Business 41 or 51. For students not majoring in statistics. This course covers less intensively the material included in courses 340 and 341. (Students completing this course may receive half credit only for 340 and 341). KING, HOLSTEIN.
- 300 Problems in Statistics (1-3) f, w.**  
Graduate students in this department interested in selected types of statistical analysis not covered in formal courses should register for this course, but only after receiving approval of instructor. MEMBERS OF THE STAFF.
- 303 Univariate Analysis (3) f.**  
Prerequisite, 31. A study of frequency distributions, descriptive and inductive statistics, principles of sampling, sampling distributions, estimation, and theory underlying tests of hypotheses. KING.
- 309 Multivariate Analysis (3) w.**  
Prerequisite, 303. Measurement of relationship among variables; simple, partial, and multiple correlation. KING.
- 340 Secular Trend (3) f.**  
Prerequisite, 1 or Mathematics 175. Measurement of longtime movements, adjustment and smoothing of data, quantitative meaning of normal. Method of moving averages, least squares, selected points, etc. HOLSTEIN, HOGAN.
- 341 Periodic Variation (3) w.**  
Prerequisite, 340 or Mathematics 175. Measurement of movements in data that repeat themselves in a constant pattern or a shifting pattern, quarterly, monthly, weekly, daily, hourly. Periodogram analysis. HOLSTEIN, HOGAN.
- 360 Quality Control (3) w.**  
Prerequisite, 303. A study of statistical techniques that have application in control of repetitive processes in industry and business with emphasis on the theoretical basis. Acceptance sampling with an objective analysis of producer's and consumer's risks in terms of probability, tolerance limits, and confidence limits. KING, HOLSTEIN.
- 370 Survey Sampling (3) f.**  
Prerequisite, 303. Design of probability sampling methods for estimation of characteristics of finite populations. Consideration of bias, response errors, non-probability sampling, and other associated problems. KING, HOGAN.

**400 Problems in Statistics (1-3) f, w.**

MEMBERS OF THE STAFF.

**407 Statistical Methods for Research Workers (5) w.**

Prerequisites, three courses in statistics. Design of projects and experiments, selection of appropriate methods, interpretation of results.

**420 Cycles and Forecasting (5) w.**

Prerequisites, three courses in statistics. Theory, history, and statistics of business and other cycles, problems of their prediction and control, and their relation to speculative and investment transactions.

**428 Analysis of Variance (5) f.**

Prerequisites, three courses in statistics. One criterion of classification, two criteria, latin square, unordered groups in one classification, disproportionate frequencies, use of interactions as measures of sampling variation, three or more criteria, design of experiments.

**470 Advanced Statistical Analysis (3) w.**

Presentation and critical analysis of problems in statistical theory and practice.

**480 Non-Linear Multiple Correlation (2) f.**

Prerequisites, three courses in statistics, including 309. Methods of fitting non-linear planes and surfaces resulting from the joint effects of two or more factors.

**490 Research in Statistics (credit to be arranged) f, w.****AGRICULTURAL AND HOME ECONOMICS EXTENSION****210 Agricultural Services (3) w.**

Prerequisite, junior standing. Study of mass communications media and visual teaching aids available to workers serving agriculture. WINNER.

**290 Apprentice Training in County Home Agent Work (4) w, s.**

Prerequisite, junior standing. Enrollment by permission only. This course occupies the full time of the student for a minimum period of eight weeks. A combination of study and observation of fieldwork in agricultural extension under supervision of experienced extension workers. ZIMMERMAN, ROGERS.

**291 Apprentice Training in County Agricultural Agent Work (4) w, s.**

A combination of study, observation, and fieldwork in agricultural extension under supervision of experienced extension workers. This course occupies the full time of the student for a minimum period of eight weeks. Students must have completed their junior year in college. Enrollment by permission only. ROGERS, ZIMMERMAN.

**301 Extension Methods in Public Affairs (2) w, s.**

Techniques in presenting public affairs information and methods of assisting people to appraise the probable effect of various public policies on agriculture. KLINGNER.

**400 Problems (credit to be arranged) f, w, s.**

Independent investigations of extension problems. ROGERS.

**401 Principles and Procedures in Extension Teaching (2) w, s.**

Designed primarily for experienced workers. Principles and techniques involved in extension teaching. The relation of methods in teaching will be studied from the point of view of reaching and teaching more people. ROGERS.

**402 Organizing and Planning of Extension Work (2) s.**

Program determination, teaching plans, and ways of measuring extension progress. For experienced workers. BODENHAMER.

- 404 Extension Evaluation (2) s.**  
Adaptation of the principles of evaluation to extension program development, execution, and appraisal. Includes defining of objectives, determination of the population and sampling techniques, construction of measuring devices, and collection, summarization, analysis, and interpretation of information collected. MEMBERS OF THE STAFF.
- 410 Seminar (1) f.**  
The presentation and discussion of original extension investigations and literature. ROGERS.

## AGRICULTURAL CHEMISTRY

- 210 General Agricultural Biochemistry (5) f, w.**  
Prerequisite, 3 hours of organic chemistry. A chemical study of the materials recognized as pertaining to agriculture. GARNER, MUHRER, O'DELL.
- 212 Physiological Chemistry of Domestic Animals (5) f.**  
Prerequisite, 3 hours of organic chemistry. Required of candidates for the degree, Doctor of Veterinary Medicine. Open to graduate students in lieu of 210. O'DELL.
- 220 Agricultural Analysis (3-5) w.**  
Prerequisite, Chemistry 25. Quantitative analysis of agricultural products. GEHRKE.
- 310 Chemical Spectroscopy (2-3) w.**  
Prerequisites, quantitative analysis, general physics; physical chemistry and a course in light are desirable. The theory and application of atomic and molecular spectra and their use in qualitative and quantitative analysis. One lecture, one laboratory period. PICKETT.
- 312 Instrumental Methods of Analysis (2-3) f.**  
Prerequisites, quantitative analysis and physical chemistry. Methods of instrumentation applied to chemical analysis including polarography, potentiometry, and colorimetry. One lecture and one laboratory period. ARCAND, PICKETT.
- 400 Problems (2-6) f, w, s.**  
FLYNN, GARNER, GEHRKE, HIBBARD, MARSHALL, MAYER, MUHRER, O'DELL, PICKETT.
- 402 Advanced Physiological Chemistry of Domestic Animals (3) w.**  
Prerequisites, Organic Chemistry 212, and Agricultural Chemistry 210 or equivalent. Designed for students fitting themselves for investigations in animal industry. Offered in 1958-59 and alternate years. MUHRER.
- 403 Animal Breeding Investigations (2-3) w (Same as Animal Husbandry 403).**  
Prerequisites, Agricultural Chemistry 210 and Animal Husbandry 303 or 313. Consideration of current and historical literature in animal genetics, reproductive biochemistry and physiology, and endocrine factors in growth and reproduction. Emphasis on experimental design and techniques, methods of analysis and interpretation of results. LASLEY, MAYER.
- 404 Plant Chemistry (3-5) f.**  
Prerequisite, Chemistry 212. The biochemistry of plant growth. Plant constituents, their occurrence, transformations and metabolism. HIBBARD.
- 406 Phytohormones and Vitamins (3) f.**  
Prerequisites, elementary botany, plant physiology, and six hours of organic chemistry. The chemistry, physiology, and practical applications of phytohormones and vitamins in development of plants. Offered in alternate years. Not offered in 1958-59. HEMPHILL.
- 408 Dairy Chemistry (3) w (Same as Dairy Husbandry 408).**  
Prerequisite, Agricultural Chemistry 210, or equivalent. Dairy Husbandry 415 is recommended. The colloidal and physicochemical properties of the constituents of milk. Three lectures. GEHRKE.

- 410 Seminar (1) f, w.**  
MEMBERS OF THE STAFF.
- 412 Hormone Chemistry (3) w.**  
Prerequisite, Chemistry 212. The chemistry and mechanism of action of the hormones with special emphasis on relations between chemical structure and biological activity. **MAYER.**
- 413 Physiology of Reproduction (3) f (Same as Animal Husbandry 413).**  
Prerequisite, Chemistry 212. The chemistry and mechanism of action of the hormones with special emphasis on relations between chemical structure and biological activity. **MAYER.**
- 414 Physiological Chemistry of Microorganisms (3) w.**  
Prerequisites, Agricultural Chemistry 210, Chemistry 212, Botany 202, or equivalent. Essential nutrients, metabolic activities, environmental requirements, and bacteriostatic and bacteriocidal mechanisms. Offered in alternate years. Not offered in 1958-59. **FLYNN.**
- 416 Colloid Chemistry (3 or 5) w (Same as Chemistry 416).**  
Prerequisite, 3 hours of physical chemistry. Principles of colloid chemistry. Lectures only, 3 hours; with laboratory, 5 hours. **MARSHALL.**
- 418 Amino-Acid and Vitamin Assay (3) f.**  
Prerequisites, quantitative analysis, bacteriology, organic chemistry, or equivalent training. Spectroscopy is recommended. Quantitative analysis of amino acids and vitamins by chemical, physical, and biological methods. **FLYNN.**
- 419 Rumen Bacteriology (3) w (Same as Dairy Husbandry 419).**  
Prerequisites, Botany 202 and Agricultural Chemistry 210. Rumen microorganisms, methods of study, functions, and environmental factors. Offered in 1958-59 and alternate years. **EDMONDSON, MERILAN.**
- 420 Chemistry of Vitamins (3) w.**  
Prerequisites, Chemistry 212 and Agricultural Chemistry 210, or equivalent. Discovery, isolation, structure, and functions. Offered in alternate years. Not offered in 1958-59. **O'DELL.**
- 421 Enzymes (2) f.**  
Prerequisite, organic chemistry. Biochemistry is recommended. The chemistry and mechanism of selected examples. Two lectures. **GEHRKE.**
- 450 Research (2-8) f, w, s.**  
Does not include the preparation of a dissertation. **MEMBERS OF THE STAFF.**
- 490 Research (2-8) f, w, s.**  
Includes the preparation of a dissertation. **MEMBERS OF THE STAFF.**

## AGRICULTURAL ECONOMICS

- 1 Agricultural Economics (5) f, w.**  
A study of the principles of economics with special application in the field of agriculture. **MEMBERS OF THE STAFF.**
- 120 Farm Accounts (3) f.**  
Farm record keeping and summarization of inventories and cash accounts with attention to detailed records, such as feed and labor records, plus cost accounting based on the debit-credit entry system as applied to the farm business. **SPANGLER.**
- 200 Problems (credit to be arranged) f, w, s.**  
Prerequisite, the introductory course in the phase of agricultural economics in which the special problem falls. **MEMBERS OF THE STAFF.**

- 220 General Agricultural Marketing (3) or (4) f, w.**  
Prerequisite, course 1. A general study of the marketing system for farm products from a functional viewpoint. Four hours credit is earned by enrolling for the laboratory section which includes a three-day field trip to a central market. MCKINSEY, GRADY, HARRINGTON.
- 250 Economics of Agricultural Production and Distribution (3) w.**  
Prerequisite, course 1 or equivalent. Application of general economic principles to production and distribution of agricultural products. MEMBERS OF THE STAFF.
- 290 Marketing of Milk, Poultry, and Related Products (3) s.**  
Prerequisite, course 220 or equivalent training. Economic factors affecting the supply of and demand for dairy and poultry products. VOSS, WHITTED.
- 291 Marketing of Cotton, Grain, Livestock, and Related Products (3) f.**  
Prerequisite, course 220 or equivalent. The supply of and demand for cotton, grain, livestock, meats, wool, and other farm products. MCKINSEY, KIEHL.
- 292 Marketing of Milk and Related Products (2) f.**  
Prerequisite, course 220 or equivalent training. Economic factors affecting the supply of and demand for dairy products. WHITTED.
- 293 Marketing of Poultry and Related Products (2) f, w.**  
Prerequisite, course 220 or equivalent training. Economic factors affecting the supply of and demand for poultry products. VOSS.
- 307 Agricultural Credit (3) w.**  
Prerequisite, course 1. Financing agriculture with emphasis on the sources and use of credit and the operation of credit institutions serving agriculture. MILLER.
- 310 General Farm Management (3) f, w.**  
Prerequisites, Soils 100 and an introductory course in principles of economics or equivalent training. How to study the farm business, principles in organizing the farm business, economic factors affecting farm business success, with emphasis on getting started in farming. JUSTUS.
- 315 Types of Farming in the United States (2) f.**  
Prerequisite, course 310. The typical farming system in the major types of farming areas of the United States. JOHNSON.
- 321 Economic History of Agriculture (2) w.**  
Prerequisite, course 1. A general historical survey of the economic development of American agriculture. JOHNSON.
- 325 Elementary Agricultural Statistics (3) f, w.**  
This course includes study of the collection, analysis, and presentation of agricultural statistics. FRAME.
- 330 Economics of Broiler Production and Marketing (2) f.**  
Prerequisite, course 250 in Agricultural Economics or 302 in Poultry. An economic evaluation of alternative methods of broiler production and marketing. Offered in alternate years, not offered in 1958-59. VOSS.
- 341 Farmers Cooperative Business Organizations (3) f.**  
Prerequisite, course 220. A course dealing primarily with the importance, principles, and economic problems of farmers cooperative business organizations. Attention is given to formation procedures and operational practices. SMITH.
- 351 Agricultural Prices (3) f.**  
Prerequisite, course 1 or its equivalent. A discussion of price movements and the factors accounting for changes in prices. KIEHL.
- 360 Land Economics (2) f.**  
Prerequisite, course 1. An examination of land utilization emphasizing conservation, land classification, utilization, valuation, taxation, and policies. MILLER.

- 365 Economic Aspects of American Agricultural Policies (3) f.**  
Prerequisite, course 250. An examination of American agricultural policies from the standpoint of their effects. MCKINSEY.
- 370 Land Renting Problems (2) f.**  
Prerequisites, 120, 310, and 250 or its equivalent. The economic and farm management aspects of determining rent rates, acquiring and operating farms for rent. MILLER.
- 375 Farm Mortgage Problems (2) w.**  
Prerequisites, same as for course 370. The use of mortgages in financing the purchase and operation of a farm. MILLER.
- 390 Field Training in Agricultural Marketing (credit to be arranged).**  
Prerequisites, courses 220 and 290 or 291. A combination of study, observation, and employment of students in various commodity marketing fields under the supervision of staff personnel. A course of study to be followed and regular reports will be part of the course. Students must have completed their junior year in college. Enrollment by permission only. MEMBERS OF THE STAFF.
- 400 Problems (credit to be arranged) f, w, s.**  
Special studies or research of graduate caliber not requiring the preparation of a thesis. MEMBERS OF THE STAFF.
- 410 Seminar (1) f, w.**  
Special lectures and reports on economic problems in agriculture. MEMBERS OF THE STAFF.
- 420 Theory of Markets (3) f.**  
Prerequisite, 16 hours of agricultural economics or the equivalent. A development of the theories of monopolistic and oligopolistic competition with emphasis upon their application to agricultural markets. Influence of market structure upon price and nonprice competition in the buying and selling of farm products and inputs is discussed. RHODES.
- 430 Advanced Agricultural Prices (3) f, w.**  
Prerequisite, course 351. A study of the technical methods of analyzing prices of agricultural products. KIEHL.
- 435 Advanced Farm Management (3) w.**  
Prerequisite, course 310. Farm business analysis from the standpoint of both the farm and the individual enterprise, along with other breakdowns such as partnership sharing; actual fieldwork on farm planning leading to one complete plan, record, and analysis of one farm.
- 440 Economics of Marketing Milk and Milk Products (3) f.**  
Prerequisites, courses 220 and 250. An advanced study of the economic problems encountered in marketing dairy products with special attention to price determination and the growing significance of public regulation to dairy processors and consumers. WHITTED.
- 445 Economics of Marketing Cotton (2) w.**  
Prerequisite, course 220. Economic problems arising from current marketing practices. Special attention will be given to economic and technological developments which affect the domestic and international market prospect. MCKINSEY.
- 451 Economics of Marketing Livestock and Livestock Products (3) w.**  
Prerequisites, courses 220 and 250. An analysis of current economic problems encountered in the marketing of livestock and its products with emphasis on possible solutions. KIEHL.
- 455 Economics of Marketing Poultry and Poultry Products (3) f.**  
Prerequisites, courses 220 and 250. An analysis of current economic problems encountered in the marketing of poultry and its products, and factors in determining poultry product prices with emphasis on possible solutions. Offered in odd numbered years. VOSS.

- 460 Agricultural Statistics: Tests of Significance (3) w.**  
Prerequisite, a grade of M or B in course 325 or equivalent. The binomial and normal distributions, statistical inference including Chi square and analysis of variance. Recommended for students in the experimental sciences. FRAME.
- 461 Agricultural Statistics: Correlation Analysis (2 or 3) w.**  
Prerequisite, 325 or its equivalent. Methods of fitting straight lines and different types of curves; gross, partial, and multiple correlation analysis of quantitative data. See instructor. FRAME.
- 465 Current Economic Problems of Agriculture (3) w.**  
Prerequisites, 16 hours of agricultural economics, including 250 and 365, or the equivalent. Analysis of the important economic problems of the farmer, together with proposed remedies. JOHNSON.
- 480 Research Methods in Agricultural Economics (2) f.**  
Research methods including sources of information, manner of collecting and analyzing, and expressing results. The student will develop a research project outline. MEMBERS OF THE STAFF.
- 490 Research in Agricultural Economics (credit to be arranged) f, w, s.**  
Teacher selected by student.

## AGRICULTURAL ENGINEERING

- 1 Farm Power (3) f, w.**  
Mechanics of engines and tractors. Operating adjustments and practices related to performance and maintenance. JONES, MEMBERS OF THE STAFF.
- 10 Farm Shop Work (3) f, w.**  
Selection and use of hand and power tools for the farm shop. Basic tool processes used in repair and maintenance of farm equipment including tool sharpening, woodworking, and metalwork. DAY, MEMBERS OF THE STAFF.
- 21 Surveying (3) f.**  
Prerequisite, trigonometry. Use and adjustment of surveying instruments. Practice and problems in plane surveying including topographic surveying. BEASLEY, CURRY.
- 103 Elementary Farm Buildings (3) f, w.**  
Prerequisite, Mathematics 2 or equivalent. Functional requirements of farm buildings. Planning buildings with emphasis on sanitation, ventilation, materials, convenience, and economy. Farmstead arrangement. HODGES.
- 110 Farm Machinery Maintenance and Repair (3) f, w.**  
Prerequisites, courses 1 and 10; junior standing. Advanced work in methods of repairing farm machinery and equipment, principally oxyacetylene and electric welding and lathe work. McKIBBEN.
- 201 Farm Water Management (3) f, w.**  
Prerequisites, 3 hours of mathematics and Soils 100. The place of farm water management practices in maintaining soil productivity. Farm surveying. Design and layout of terrace systems. BEASLEY.
- 203 Farm Buildings (3) f.**  
Prerequisites, engineering drawing and Physics 23. Analysis of farm building requirements. Building materials, construction practices, costs. Heat and moisture relationships, ventilation, and insulation. STEWART, HODGES.
- 215 Electricity on the Farm (3) w.**  
Prerequisites, Physics 12 and junior standing. Electricity in the home and on the farm with particular emphasis on its use in productive farm enterprises. DAY.
- 221 Soil Conservation Engineering (3) f.**  
Prerequisites, surveying and Soils 100. A study of factors affecting run-off from agricultural lands. The design and layout of terrace systems. BEASLEY, CURRY.



- 240 Farm Machinery (3) f.**  
Prerequisites, trigonometry and Physics 11. Principles of construction and operation of field and farmstead machinery. Selection and management of equipment for economical crop production and processing. BROOKER, DAY.
- 241 Mechanics of Farm Machines (3) w.**  
Prerequisite, Physics 23. Analysis of tillage, planting, harvesting, and crop handling mechanisms. Construction, selection, and economic requirements of agricultural machines. BROOKER, DAY.
- 300 Problems (1-5) f, w, s.**  
Primarily for advanced undergraduates. Problems assigned or selected by the student subject to approval. MEMBERS OF THE STAFF.
- 301 Farm Drainage and Irrigation (2) w.**  
Prerequisite, course 201 or equivalent. Design and layout of farm drainage and irrigation systems. BEASLEY, CURRY.
- 303 Farm Building Design (3) w.**  
Prerequisites, course 203 and mechanics of materials. Functional planning and structural design of various farm buildings. STEWART, HODGES.
- 315 Farm Electrification Engineering (3) f.**  
Prerequisite, fundamentals of electric circuits. Electric power distribution on the farm. Wiring and lighting of farm buildings; motors and controls; farm electrical equipment. DAY.
- 316 Crop Processing (3) f.**  
Prerequisites, course 241 and senior standing. Processes and equipment for drying, refrigerating, reducing, pelleting, blending, cleaning, sorting, and treating agricultural crops and products. BROOKER.
- 321 Irrigation and Drainage Engineering (3) w.**  
Prerequisites, course 221 and fluid mechanics. Irrigation with special emphasis on supplemental irrigation. Open ditch and tile drainage. BEASLEY, CURRY.
- 325 Home and Farmstead Improvement (2) s.**  
Prerequisite, course 103 or equivalent. Arrangement of buildings on the farmstead. Remodeling and modernizing the farm home and farm buildings. Planning for efficiency, comfort, and convenience. HODGES.
- 340 Advanced Farm Power and Machinery (3) f.**  
Prerequisites, course 241 and heat engines. Analytical study of the construction and operating characteristics of engines, tractors, and selected farm machines. Use of instruments and experimental apparatus. BROOKER.
- 400 Problems (credit to be arranged) f, w, s.**  
Analytical study of problems in agricultural engineering. MEMBERS OF THE STAFF.
- 403 Advanced Farm Buildings (3) f.**  
Prerequisite, course 303 or equivalent. Advanced study of farm buildings and farm building design. STEWART.
- 410 Seminar (1) f, w.**  
Studies of recent investigations in agricultural engineering and related fields; discussion of current literature; preparation and presentation of papers. MEMBERS OF THE STAFF.
- 412 Research Methods and Instrumentation (3) w.**  
Prerequisite, graduate standing. Review of literature and planning of research projects. Theory and use of instruments for measuring temperature, humidity, flow, pressure, and strain. STEWART, DAY.
- 416 Agricultural Processing Engineering (3) f.**  
Prerequisite, course 340. Theory of equipment and techniques used in processing farm products. Applications of mechanics, thermodynamics, fluid flow, and heat transfer to problems in size reduction, drying, refrigeration, conveying, and storing of products. BROOKER.

- 421 Water Management Theory (3) w.**  
Prerequisite, course 321. Advanced studies in erosion control, irrigation, drainage. Offered in alternate years. Not offered in 1958-59. BEASLEY.
- 435 Similitude in Engineering (3) f.**  
Prerequisites, mechanics of materials and fluid mechanics. Principles of dimensional analysis. Use of structural and fluid flow models in design. Offered 1958-59 and alternate years. DAY.
- 440 Mechanical Farm Equipment (3) w.**  
Prerequisite, course 340 or equivalent. Advanced study of farm power and mechanical equipment with emphasis on recent developments. BROOKER, DAY.
- 450 Research (credit to be arranged) f, w, s.**  
Independent investigation of some problem in the field of agricultural engineering, to be presented as a report, but not leading necessarily to a thesis. MEMBERS OF THE STAFF.
- 490 Research (credit to be arranged) f, w, s.**  
Original research in farm power and machinery, farm buildings, drainage, or erosion control. Thesis required. MEMBERS OF THE STAFF.

## AIR FORCE ROTC

- 21 Air Science (1) f.**  
Introduction to AFROTC; Introduction to Aviation; Fundamentals of Global Geography; Leadership Laboratory. MEMBERS OF THE STAFF.
- 22 Air Science (1) w.**  
Prerequisite, course 21. International Tensions and Security Organizations; Military Instruments of National Security; Leadership Laboratory. MEMBERS OF THE STAFF.
- 25 Air Science (1) f.**  
Prerequisite, course 22. Careers in the United States Air Force; Moral Responsibility of Air Force Leaders; Introduction to Aerial Warfare; Targets; Weapons; Leadership Laboratory. MEMBERS OF THE STAFF.
- 26 Air Science (1) w.**  
Prerequisite, course 25. Aircraft; Bases; Operations; Leadership Laboratory. MEMBERS OF THE STAFF.
- 123 Air Science (3) f.**  
Prerequisite, course 26. Introduction to Advanced AFROTC; Air Force Commander and Staff; Air Force Base Functions; Creative Problem Solving; Communicating in the Air Force; Leadership Laboratory. MEMBERS OF THE STAFF.
- 124 Air Science (3) w.**  
Prerequisite, course 123. Instructing in the Air Force; Military Justice System; Weather; Air Navigation; Preparation for Summer Training; Leadership Laboratory. MEMBERS OF THE STAFF.
- 127 Air Science (3) f.**  
Prerequisite, course 124. Career Guidance; Moral Responsibility of Air Force Leaders; Leadership and Management Seminar; Military Aviation and Evolution of Warfare; Leadership Laboratory. MEMBERS OF THE STAFF.
- 128 Air Science (3) w.**  
Prerequisite, course 127. Military Aspects of World Political Geography; Briefing for Commissioned Service; Leadership Laboratory. MEMBERS OF THE STAFF.

**ANATOMY****201 Elementary Anatomy (4) f, w.**

Prerequisite, 5 hours of general zoology or the equivalent. The course is designed for nurses and nonmedical students. The fundamentals of embryology, gross and microscopic anatomy are studied. H. E. BROWN, FITCH, AND MEMBERS OF THE STAFF.

**203 Embryology and Histology (7) f.**

A study of the development of the individual, based upon man and the higher mammals, and of the microscopic structure of the tissues and organs of the human body. The course is correlated with the dissection in Gross Anatomy. LOWRANCE, LANDRY, AND MEMBERS OF THE STAFF.

**204 Embryology and Histology (2) w.**

A continuation of course 203. LOWRANCE, LANDRY, AND MEMBERS OF THE STAFF.

**205 Gross Anatomy (7) f.**

A study of the gross structure of the human body covering the dissection of the thorax, axilla, superior extremities, back, neck, and head. OVERHOLSER, DOENGES, AND MEMBERS OF THE STAFF.

**206 Gross Anatomy (7) w.**

A continuation of course 205 covering the dissection of the abdomen, pelvis, perineum, and lower extremities. OVERHOLSER, DOENGES, AND MEMBERS OF THE STAFF.

**207 Neuroanatomy (4) w.**

A study of the gross and microscopic anatomy of the central nervous system with emphasis on the fiber tracts, cell groups, and functions of these structures. J. W. BROWN, FITCH, AND MEMBERS OF THE STAFF.

**208 Applied Anatomy (2) f.**

The course is devoted to the practical consideration of the principal structures stressed in clinical surgery and medicine. J. W. BROWN, STEPHENSON.

**300 Problems (credit to be arranged) f, w, s.**

The intensive study of regions or systems which may include developmental and microscopic as well as gross anatomy. MEMBERS OF THE STAFF.

**301 Functional Anatomy of the Muscular and Skeletal Systems (3) f, w, s.**

Prerequisites, comparative anatomy, elementary anatomy or gross anatomy, and elementary physiology. A study of the function of the muscular and skeletal systems in the performance of body movements and of the mechanical and phylogenetic factors involved in muscular and skeletal structure. LANDRY.

**302 Autonomic Nervous System (2) w.**

Prerequisite, a basic knowledge of neuroanatomy and gross anatomy. The course will emphasize the morphology of the autonomic nervous system and the relationships of this system to the central nervous system. DOENGES.

Courses 303, 304, 305, 306, and 307 are open only to graduate students who hold an A.B. or B.S. degree with a major in zoology or biology, or who have the equivalent training in these fields.

**303 Microscopic and Developmental Anatomy (7) f.**

A consideration of mammalian development in detail correlated with human adult histology and organology. LOWRANCE, LANDRY, AND MEMBERS OF THE STAFF.

**304 Microscopic and Developmental Anatomy (2) w.**

This is a continuation of course 303. LOWRANCE, LANDRY, AND MEMBERS OF THE STAFF.

**305 Human Dissection (7) f.**

The dissection and study of the gross anatomy of the human thorax, axilla, superior extremity, back, neck, and head. OVERHOLSER, DOENGES, AND MEMBERS OF THE STAFF.

**306 Human Dissection (7) w.**

A continuation of course 305 covering the dissection and study of human abdomen, perineum, pelvis, and lower extremity. OVERHOLSER, DOENGES, AND MEMBERS OF THE STAFF.

**307 The Anatomy of the Nervous System (4) w.**

A study of the microscopic and gross anatomy of the central nervous system with particular stress placed on its function. J. W. BROWN, FITCH, AND MEMBERS OF THE STAFF.

**308 Hematopoietic Organs and Connective Tissues (2) f, w.**

Prerequisite, a basic knowledge of histology. A study of the morphological and functional relationships of the blood-forming organs and connective tissues. H. E. BROWN.

**401 Developmental Anatomy of Fetus and Child (credit to be arranged) f, w, s.**

Special consideration of quantitative changes leading to attainment of adult structure. LOWRANCE.

**410 Seminar (1) f, w.**

The presentation and discussion of original investigations and current literature. MEMBERS OF THE STAFF.

**450 Research (credit to be arranged) f, w, s.**

Work fully equal to research done under course 490, but not leading to the preparation of a dissertation. MEMBERS OF THE STAFF.

**490 Research (credit to be arranged) f, w, s.**

Work leading to the preparation of a dissertation. MEMBERS OF THE STAFF.

**ANIMAL HUSBANDRY****1 Animal Husbandry (3) f, w.**

Introduction to the livestock and meat industry and to problems of feeding and management; development of some basic skills in cattle, sheep, and swine selection. ROSS, MEMBERS OF THE STAFF.

**11 Breeds of Livestock (3) w.**

Prerequisite, course 1. History, development, type, and adaptability of the leading breeds of livestock; pedigrees and performances of superior individuals. MEMBERS OF THE STAFF.

**101 Livestock Judging (3) f, w.**

Prerequisite, course 1. A study of the various classes of farm animals with particular reference to utility and breed characteristics. Comparative judging, reference reading, illustrated lectures. BRADLEY, TRIBBLE, THOMPSON.

**104 Meats (3) f, w.**

Prerequisite, course 1. A survey of the livestock and meat industry relationship, live animal—carcass comparisons, slaughter, cutting, curing, smoking, identification, selection, processing, distribution, and utilization. ZOBRISKY, MEMBERS OF THE STAFF.

**202 Principles of Animal Nutrition (3) f, w.**

Must be preceded by Chemistry 15. The fundamentals of animal nutrition and their application to livestock production. PFANDER, ELLIS.

**203 Animal Breeding (3) f, w.**

Prerequisite, Zoology 1 or equivalent. An introduction to breeding methods for improvement of livestock and to principles of animal reproduction. LASLEY.

**204 Advanced Meats (3) f, w.**

Prerequisite, course 104. Carcass yields, cut out values, fabrication, boning, cutting, prepackaging, and pricing. Wholesale, retail, and institutional distribution. HEDRICK, NAUMANN.

- 211 Advanced Livestock Judging (3) f.**  
Prerequisite, course 101. Comparative judging and selecting of farm animals for specific uses; includes excursions to livestock shows and noted breeding farms. THOMPSON.
- 214 Meat Classification, Grading, and Judging (2) f.**  
Prerequisite, course 204. A study of the factors affecting quality; to include meat classification, grading, and judging of beef, pork, and lamb. NAUMANN, HEDRICK.
- 224 Meat Selection and Identification (3) f, w (For students in home economics, same as H.E. 224).**  
Prerequisite, H.E. 131 or consent of instructor. A study of meat with reference to selection, identification, utilization, wholesale and retail buying. Includes field trip to major processing plant. BIRMINGHAM.
- 234 Meat Processing (3) w (For students in the School of Veterinary Medicine only).**  
Prerequisite, course 1. Livestock—meat relationships; live animal—carcass comparisons; anatomical characteristics; processing, distribution, and utilization. BRADY, NAUMANN.
- 290 Apprentice Training in Animal Husbandry (credit to be arranged) s.**  
Special training in animal breeding, animal nutrition, livestock production, or meats—field to be designated when study program is planned. Written reports and final examination required. Enrollment by permission only. MEMBERS OF THE STAFF.
- 300 Problems (1-2) f, w, s.**  
Current problems in animal breeding, nutrition, livestock production and management, and meats. Assigned topics. Each student may, under supervision, undertake a project outlining objectives, planning, keeping records, and summarizing results in a written report. MEMBERS OF THE STAFF.
- 303 Laboratory Techniques in Livestock Breeding (3) f.**  
Prerequisite, course 203. Practice in collection, evaluation, and storage of semen; insemination techniques and methods of pregnancy diagnosis. LASLEY.
- 304 Meat Technology (5) w.**  
Prerequisite, Agricultural Chemistry 210 or equivalent. Characteristics of meat and meat products as related to processing operation, manufacture, and marketing. BRADY, NAUMANN.
- 311 Horse Production (2) f.**  
Preferred prerequisites, courses 1, 202, and 203. Production of horses including breeding, feeding, and management of all classes. Field trips made to outstanding studs and stables throughout the state. KRAMER.
- 313 Genetics of Livestock Improvement (3) f, s.**  
Prerequisite, course 203 or equivalent. Application of genetic principles to improvement of domestic animals. Consideration of methods available to breeders and their effectiveness. LASLEY.
- 321 Beef Production (3) f.**  
Prerequisites, courses 1, 201, and 202. Systems of beef production including breeding, feeding, and management of commercial and purebred beef cattle. COMFORT.
- 331 Sheep Production (3) w.**  
Prerequisites, courses 1, 201, and 202. Systems of sheep and wool production including breeding, feeding, and management of commercial and purebred sheep. ROSS.
- 341 Pork Production (3) w.**  
Prerequisites, courses 1, 202, and 203. Systems of pork production including breeding, feeding, and management of commercial and purebred swine. TRIBBLE.
- 352 Animal Nutrition (2) s.**  
Prerequisite, course 202. Feed requirements and utilization. Evaluation of rations. Recent developments and application of research finding. Offered in alternate years. Not offered in 1958-59. PFANDER.

- 390 Field Course in Animal Husbandry (2-4) Intercession.**  
Prerequisites, courses 201, 202, 203, 204, or equivalent. A study of production, management, marketing, and processing of meat and meat products including visits to successful Missouri commercial and purebred livestock farms, livestock markets, and meat processing plants. MEMBERS OF THE STAFF.
- 401 Livestock Management (2) w.**  
Prerequisites, courses 321, 331, and 341, or equivalent. The operation of livestock farms. Special studies concerning the various classes of livestock and their products. DYER.
- 402 Animal Nutrition (3) w.**  
Prerequisites, Animal Husbandry 202 and Ag. Chem. 210 or equivalent. A study of the more important contributions to the knowledge of animal nutrition; designed for students specializing in some phase of animal industry. PFANDER.
- 403 Animal Breeding Investigations (2-3) w.**  
Prerequisites, courses 303 and 313 or equivalent. Consideration of current and historical literature in animal genetics and reproductive physiology with emphasis on experimental design and techniques, methods of analysis, and interpretation of results. LASLEY.
- 404 Meat Investigations (3) f.**  
Prerequisite, course 304 or equivalent. Discussion of the literature. Special reports, assigned readings, techniques, and interpretation of results. BRADY, MEMBERS OF THE STAFF.
- 410 Seminar (1) f, w.**  
Critical consideration of research and other selected subjects in animal breeding, animal nutrition, meats, or livestock production. (Student should indicate field desired at time of enrollment). MEMBERS OF THE STAFF.
- 411 Livestock Feeding Investigations (2).**  
Prerequisite, course 402 or equivalent. A study of the more important investigations in feeding beef cattle, hogs, and sheep. MEMBERS OF THE STAFF.
- 413 Physiology of Reproduction (3) f.**  
Prerequisite, course 303 or equivalent. The physiology and chemistry of the male and female reproductive organs and a study of their secretions and associated endocrines. LASLEY, MEMBERS OF THE STAFF.
- 420 Design and Analysis in Animal Experimentation (3) f.**  
Prerequisites, six hours of statistics—Agricultural Economics 460, 461, or equivalent. Principles of efficient experimental design and statistical analysis as applied to biological investigations. Offered in alternate years. To be offered in 1958-59.
- 423 Genetics of Populations (4) f.**  
Prerequisites, Animal Husbandry 203 or Poultry Husbandry 307; Agricultural Economics 325 or equivalent. Genetic composition of populations and conditions which influence their rate of change. Relative effectiveness of various breeding plans. Offered in alternate years. Not to be offered in 1958-59. STEVENSON.
- 430 The Organization, Operation, Functions, and Policies of Agricultural Experiment Stations (1) f.**  
Assigned readings and reports. LONGWELL.
- 432 Ruminant Nutrition (3) f.**  
Prerequisite, course 402 or equivalent. Lectures, laboratory, assigned readings on the physiology, chemistry, microbiology, and pathology of the ruminant with special attention to the digestion, absorption, and metabolism of roughages. Offered in alternate years. Not offered in 1958-59. PFANDER.
- 450 Research (credit to be arranged) f, w, s.**  
Investigation in animal breeding, nutrition, livestock production and management, and meats. The results are to be presented in a carefully organized written report. MEMBERS OF THE STAFF.

**490 Research (credit to be arranged) f, w, s.**

Investigation in animal breeding, nutrition, livestock production and management, and meats. The results are to be presented in a carefully organized thesis.  
MEMBERS OF THE STAFF.

**ARMY ROTC**

Satisfactory completion of basic courses 1, 2, 33, and 44 (or acceptable equivalents) are prerequisites for advanced courses 105, 106, 107, and 108.

- 1 Basic Military Science (1) f.**  
Organization of the Army and ROTC; American Military History; Individual Weapons; Leadership and Command.
- 2 Basic Military Science (1) w.**  
American Military History; Individual Weapons; Leadership and Command.
- 33 Intermediate Military Science (1) f.**  
Map and Aerial Photograph Reading; Crew-Served Weapons and Gunnery; Communications; Leadership and Command.
- 44 Intermediate Military Science (1) w.**  
Crew-Served Weapons and Gunnery; Small Unit Tactics; Leadership and Command.
- 105 Artillery Techniques (3) f.**  
Instruments; Organization and Capabilities; Gun-Section Drill; Materiel; Firing Battery; Operation of Firing Battery; Introduction to Antiaircraft Artillery; Field Artillery Tactics; Leadership and Command.
- 106 Artillery Techniques (3) w.**  
Observed Artillery Fires; Fire Direction; Artillery Survey; Military Teaching Methods; Communications; Leadership and Command.
- 107 Artillery Advanced Techniques and Tactics (3) f.**  
Artillery Gunnery; Military Command and Staff; Military Law and Boards; New Developments; Leadership and Command.
- 108 Artillery Advanced Techniques and Tactics (3) w.**  
Psychological Warfare; Artillery in Combined Arms Team; Military Teaching Methods; Geographical Foundations of National Power; Military Administration; Leadership and Command.

**ART****3 Appreciation of Art (2) f, w.**

No prerequisites. Illustrated discussion with examples from varied historic and contemporary art fields on the nature of art, its functions, and methods of creative expression. PEART, WHITMORE.

**Drawing, Painting, and Design****2 Introduction to Art (3) f, w.**

No prerequisites. Basic practice in drawing, painting, and design. An exploratory course for beginners and a prerequisite to all other studio courses, except course 5. MEMBERS OF THE STAFF.

**5 Elementary Drawing (2) f, w.**

No prerequisites. Basic practice in the fundamentals of drawing. Various approaches to drawing problems in black and white. Studies from the human figure and still life. MONTMINY.

- 19 Composition I (2) f, w.**  
Prerequisites, course 2 and one semester of drawing. Theory and practice of making pictures. Intended to quicken the appreciation of technical art values as well as to prepare for more advanced studies. SHANE, MONTMINY.
- 40 Water Color (2) f, w.**  
Prerequisite, course 2. Theory and practice of painting in water color from still life, landscape, and figure. HANSEN.
- 70 Design I (3) f, w.**  
Prerequisite, course 2. Basic study of the elements and principles of two-dimensional design, employing a variety of tools and materials. MCKININ.
- 168 Drawing I (3) f, w.**  
Prerequisite, course 2. Drawing of the human figure in charcoal, crayon, ink, and other media. HANSEN, SHANE.
- 177 Painting I (3) f, w.**  
Prerequisites, course 2 and one semester of drawing. A fundamental course in oil painting with emphasis on color and space organization. HANSEN, SHANE.
- 359 Composition II (2) f, w.**  
Prerequisite, course 19. Form and color organization of paintings in gouache and oil. SHANE, MONTMINY.
- 360 Design II (3) f, w.**  
Prerequisite, course 70. Practical application of design principles with increasing emphasis on dynamics of structure and organization. WHITMORE.
- 370 Design III (3) f, w.**  
Prerequisite, course 360. Emphasis on three-dimensional problems of structure, materials, color, and organization. WHITMORE.
- 377 Painting II (3) f, w.**  
Prerequisite, course 177. A continuation of painting using still life and landscape as subject matter. HANSEN, SHANE.
- 378 Drawing II (3) f, w.**  
Prerequisite, course 168. Study of the human figure continued. HANSEN, SHANE.
- 379 Composition III (2) f, w.**  
Continuation of course 359. SHANE, MONTMINY.
- 380 Design IV (3) f, w.**  
Prerequisite, course 370. Studies in mass and movement. WHITMORE.
- 387 Painting III (3) f, w.**  
Prerequisite, course 377. Advanced study in oil painting. HANSEN, SHANE.
- 388 Drawing III (3) f, w.**  
Prerequisite, course 378. Advanced study of the human figure. HANSEN, SHANE.
- 389 Composition IV (2) f, w.**  
Continuation of course 379. SHANE, MONTMINY.
- 397 Painting IV (3) f, w.**  
Prerequisite, course 387. Advanced study continued. HANSEN, SHANE.
- 398 Drawing IV (3) f, w.**  
Prerequisite, course 388. Advanced study continued. HANSEN, SHANE.
- 400 Problems (8) f, w.**  
Advanced work in drawing, painting, and design. MEMBERS OF THE STAFF.
- 406 Design V (3) f, w.**  
Prerequisite, course 380. Advanced projects combining two-dimensional and three-dimensional studies. WHITMORE.



- 407 Painting V (3) f, w.**  
Prerequisite, course 397. HANSEN, SHANE.
- 408 Drawing V (3) f, w.**  
Prerequisite, course 398. HANSEN, SHANE.
- 409 Composition V (2) f, w.**  
Prerequisite, course 389. SHANE, MONTMINY.
- 420 Graduate Collaboration (4) f, w.**  
Collaborative projects involving two or more students in the Department of Art. MEMBERS OF THE STAFF.
- 440 Historic Research in Drawing, Painting, and Design (4) f, w.**  
Investigation of historic precedent in drawing, painting, and design. MEMBERS OF THE STAFF.
- 460 Advanced Composition (credit to be arranged) f, w.**  
Projects in the designing of easel pictures and mural decoration. HANSEN, SHANE.

### Artcrafts

- 55 Artcraft Fundamentals (2) f, w.**  
Open to all students. Practical work in handling various craft materials. Encourages creative expression in artcraft activities. MEMBERS OF THE STAFF.
- 109 Bookbinding I (2) w.**  
No prerequisite. Includes the making of books and the binding of magazines. WULFEKAMMER.
- 130 Ceramic Art I (3) f, w.**  
Prerequisite, course 2. Pottery and ceramic sculpture including the processes of casting, decoration, firing, and glazing. Emphasis on contemporary structural design and function. BUSSABARGER.
- 140 Weaving I (2) f, w.**  
Prerequisite, course 2. Weaving of textiles on hand and foot power looms. Learning the mechanics of a loom. Reading and writing pattern drafts. Experimenting with yarns to create fabrics. WULFEKAMMER.
- 141 Weaving II (2) f, w.**  
Prerequisite, 120. Experiments in weaving methods. Theory of creative design as applied to the woven fabric. Study of color, texture, and pattern draft. WULFEKAMMER.
- 175 Graphics I (3) f, w.**  
Prerequisite, course 2. Printmaking techniques including woodcut, etching, aquatint, and engraving. DICKERSON.
- 185 Sculpture I (3) f, w.**  
Prerequisite, course 2. Basic techniques of sculpture and sculptural composition. Modeling, casting, and carving. WHITMORE.
- 331 Ceramic Art II (3) f, w.**  
Continuation of course 130, which is prerequisite to this course. BUSSABARGER.
- 335 Ceramic Art III (2) f, w.**  
Prerequisite, course 331. Experimentation with high fire clay bodies and glazes. BUSSABARGER.
- 340 Weaving III (2) f, w.**  
Prerequisite, course 121. Advanced problems in textile designing and weaving. WULFEKAMMER.
- 351 Jewelry I (2) f, w.**  
Prerequisite, course 2. Jewelry design and construction including processes of soldering, forming, stone setting, and finishing. MCKININ.

- 352 Jewelry II (2) f, w.**  
Prerequisite, course 351. Raising methods and centrifugal casting techniques with emphasis on sculptural form. MCKININ.
- 375 Graphics II (3) f, w.**  
Prerequisite, course 175. Advanced study of printmaking with emphasis on individual creative expression within the various media. DICKERSON.
- 385 Sculpture II (3) f, w.**  
Prerequisite, course 185. Advanced problems in sculptural form. WHITMORE.
- 401 Problems in Artcrafts (8) f, w.**  
Advanced individual projects in the artcrafts. MEMBERS OF THE STAFF.
- 441 Historic Research in Artcrafts (4) f, w.**  
MEMBERS OF THE STAFF.

## History of Art

- 111 Introduction to Ancient and Medieval Art (2) f.**  
Architecture, sculpture, and painting of the Near East, Greece and Rome, and medieval Europe. Illustrated lectures and collateral reading. THOMAS.
- 112 Introduction to Renaissance and Modern Art (2) w.**  
Continuation of course 11 tracing the general evolution of art from the fourteenth century to modern times. Illustrated lectures. THOMAS.
- 114 Modern Painting (3) f, w.**  
Painting in France, Spain, England, and Germany from the seventeenth century to the present with particular emphasis on contemporary international movements. THOMAS.
- 120 The Art of America (3) f, w.**  
A discussion of painting, sculpture, architecture, and handicrafts from the seventeenth century to the present day. PEART.
- 125 The Art of England (2) w.**  
Illustrated lectures on the painting, sculpture, and architecture of England in relation to her literature from the seventh century to the present. PEART.
- 151 History of Motion Pictures (2) f, w.**  
Prerequisite, sophomore standing. Origin and growth of motion pictures. Some study of methods and techniques exemplified in notable films leading to a better appreciation of the medium. JOHNSON.
- 312 History of Italian Renaissance Art (3) f.**  
A study of Italian architecture, painting and sculpture from the fourteenth to the seventeenth century. Illustrated lectures. Offered in 1956-57 and every third year. THOMAS.
- 313 History of the Northern Renaissance (3) w.**  
A study of Flemish, German, and Dutch art from the fourteenth to the seventeenth century. Illustrated lectures. Offered in 1956-57 and every third year. THOMAS.
- 316 History of Italian Renaissance Sculpture (2) f, w.**  
The relationship of Italian sculpture to the contemporary architecture and painting from the thirteenth to the seventeenth century. Illustrated lectures. THOMAS.
- 318 Primitive Art (3) f.**  
A study of prehistoric, primitive, and peasant art with discussion of the history of the crafts and with emphasis on their relation to western and contemporary art. Offered every third year. Next offered 1958-59. THOMAS.
- 319 Medieval Art (3) w.**  
A study of Early Christian, Byzantine, Islamic, and western art during the Middle Ages with particular emphasis on contemporary philosophy, literature, and symbolism. Offered every third year. Next offered 1958-59. THOMAS.

- 320 **Oriental Art I (3) f.**  
Architecture, sculpture, and painting of the late ancient and Islamic Near East and India. Illustrated lectures. Offered in 1957-58 and every third year. THOMAS.
- 321 **Oriental Art II (3) w.**  
Architecture, sculpture, and painting of Buddhist India, Southeast Asia, China, Japan, and Central Asia. Illustrated lectures. Offered every third year. Next offered 1957-58. THOMAS.
- 410 **History of Art Seminar (credit to be arranged) f, w.**  
Prerequisite, at least 5 hours of art history. The seminar involves individual research on assigned subjects. THOMAS.
- 490 **Research and Thesis (credit to be arranged) f, w.**  
Independent investigation of some chosen or assigned topic to result in a thesis presented for the degree of Master of Arts. THOMAS.

## ASTRONOMY

- 1 **Introduction to Astronomy (5) f, w.**  
Prerequisite, an elementary knowledge of algebra and plane geometry. A survey of research methods used in astronomy; a description of the solar system; stellar astronomy with an emphasis on physical conditions; the structure of the galaxy and of the universe.

## BACTERIOLOGY

For courses in bacteriology and applied bacteriology, see Agricultural Chemistry 414, 419; Botany 202, 302, 352, 402, 461; Dairy Husbandry 320, 405, 417, 419; Microbiology 25, 201, 202, 205, 301, 302, 303, 304, 305, 400, 401, 402, 403, 404, 410, 490; Soils 305; Veterinary Bacteriology and Parasitology 124, 126, 132, 134.

## BIOCHEMISTRY

- 106 **Medical Biochemistry (6) f.**  
Prerequisites, 8 hours of general chemistry, 5 hours of organic chemistry (some quantitative chemistry is recommended). A lecture and laboratory resume of the aspects of physical and quantitative chemistry important in biochemistry, the chemistry of carbohydrates, proteins, lipids, vitamins, minerals, hormones, blood, urine, respiration, and composition of tissues. LUCKEY, MEMBERS OF THE STAFF.
- 108 **Medical Biochemistry (4) w.**  
Prerequisite, Biochemistry 106 or equivalent. Lectures and experiments on the chemistry of enzymes, energy, metabolism of carbohydrates, lipids, proteins, and nutrition. LUCKEY, MEMBERS OF THE STAFF.
- 203 **Elementary Biochemistry (3) w.**  
Prerequisite, 3 hours of organic chemistry. An outline of the fundamentals of biochemistry. LUCKEY.
- 204 **Elementary Biochemistry Laboratory (2) w.**  
Prerequisite, organic chemistry. Selected experiments in general biochemistry. LUCKEY.
- 304 **General Biochemistry Lectures (5) f.**  
Prerequisites, organic chemistry, quantitative chemistry, biology. Lectures covering the principles of biochemistry with a study of bioconstituents and reactions. This is the first semester of a two-semester course. LUCKEY, KOEPPPE, FRANZ, AND WHITE.
- 305 **Biochemistry Laboratory (2) f.**  
Prerequisites, organic chemistry and quantitative chemistry. A broad view of principles and methods of biochemistry via laboratory practice. LUCKEY, KOEPPPE, FRANZ, AND WHITE.

- 306 General Biochemistry Lectures (4) w.**  
Prerequisite, one course in biochemistry. Lectures of the second semester on enzymes, metabolism, and nutrition are presented to give some understanding of the chemistry of life. LUCKEY, KOEPPE, FRANZ, AND WHITE.
- 307 Biochemistry Laboratory (1) w.**  
Prerequisite, one semester of biochemistry. Experiments in enzymes, metabolism, and nutrition. LUCKEY, KOEPPE, FRANZ, AND WHITE.
- 310 Techniques in Biochemistry (3) f.**  
Prerequisite, one course in biochemistry. This course is designed to give the advanced student greater understanding in the practice of biochemistry. MEMBERS OF THE STAFF.
- 400 Problems (2-5) f, w, s.**  
Assigned problems in supervised research. MEMBERS OF THE STAFF.
- 404 Comparative Biochemistry (2) f.**  
Prerequisite, biochemistry. Lectures and assignments to give a comparison of compounds and reactions which occur in different classes of living organisms. LUCKEY.
- 406 Comparative Nutrition and Metabolism (2) w.**  
Prerequisite, biochemistry. Lectures and assignments covering a broad view of metabolism and nutrition in living organisms representative of viruses, bacteria, yeasts, molds, plants, invertebrates, reptiles, birds, and mammals. LUCKEY.
- 410 Biochemistry Seminar (1) w.**  
Review of current literature and individual presentation of research or classical science topics. MEMBERS OF THE STAFF.
- 430 Methods in Clinical Chemistry (1-3) f, w.**  
Study of biochemical techniques and analytical chemistry as applied to the clinical laboratory. The student will gain theoretical and technical proficiency in the methods selected according to his previous level of experience. WHITE.
- 440 Hormones and Metabolism (2) w.**  
Prerequisites, biochemistry and 306 and consent of instructor. A seminar course concerned with the chemistry of the hormones, their metabolism, and their influence upon intermediary metabolism. FRANZ.
- 462 Advanced Metabolism: Enzymes and Proteins (3) f.**  
Prerequisite, Biochemistry 306 or equivalent. Advanced course in the fields of enzymology and protein metabolism. Includes biological oxidations and bioenergetics. Offered in 1959-60 and in alternate years. KOEPPE.
- 463 Advanced Metabolism: Carbohydrates and Lipids (3) f.**  
Prerequisite, Biochemistry 306 or equivalent. May be taken prior to Biochemistry 460. An advanced course in the fields of carbohydrate and lipid metabolism. Offered in alternate years. Offered in 1958-59 and in alternate years. WHITE, FRANZ.
- 490 Research (credit to be arranged) w, s.**  
Research in biochemistry for qualified students with the counsel of the faculty. MEMBERS OF THE STAFF.

## BOTANY

- 1 General Botany (5) f, w, s.**  
An introduction to fundamental principles of biology as illustrated by plants. WOOD, MEMBERS OF THE STAFF.
- 10 Elementary Taxonomy (3) w.**  
Introductory study of the principles of classification of seed plants with emphasis on the local flora. Lectures, laboratory, and fieldwork. KUCERA.

- 101 Poisonous Plants (2) f.**  
An elementary taxonomy course with emphasis on plants important in veterinary medicine. DUNN.
- 140 General Genetics (3) f (Same as Zoology 140).**  
Prerequisite, 5 hours of botany or zoology. The principles of inheritance in plants and animals. Heredity and environment; linkage, crossing-over, and chromosome maps. Genes and development. Heredity in populations. Natural and artificial selection. WHITE.
- 141 Genetics Laboratory (2) f (Same as Zoology 141).**  
Prerequisite, or accompanying course, Botany 140. Genetic ratios, linkage, and crossing-over. Sex-linked inheritance. Handling of plant and animal material in genetical experiments. GOWANS.
- 201 Taxonomy (4) w, s.**  
Principles of classification of plants; use of keys and the identification of the local flora. DUNN.
- 202 General Bacteriology (4) f, w, s.**  
Prerequisites, general botany or general zoology, and general inorganic chemistry. A general course in the fundamental principles of bacteriology. BROOKS.
- 300 Problems (credit to be arranged) f, w, s.**  
Special studies for advanced students in botanical subjects not included in the courses regularly offered. MEMBERS OF THE STAFF.
- 301 Plant Pathology (4) w.**  
A consideration of diseases of economic plants based on lectures, group study of representative diseases, and individual study of selected diseases. PETERSON.
- 302 Advanced Bacteriology (3) f.**  
Prerequisites, course 202 and 10 hours of chemistry. A detailed and fundamental study of the basic principles of bacteriology as a biological science. Lectures, laboratory, and discussions. BROOKS.
- 303 Comparative Morphology of Vascular Plants (4) w.**  
Evolution, structure, and development of lower vascular plants, ferns, gymnosperms, and angiosperms. Offered in alternate years; not offered in 1958-59. DEHNEL.
- 304 Comparative Morphology of Thallophytes and Bryophytes (4) w.**  
Evolution, structure, and development of the algae, fungi, mosses, and liverworts. Offered in 1958-59 and alternate years. DEHNEL.
- 305 Botanical Microtechnique (4) w.**  
Prerequisite, Botany 308. Principles and special methods employed in the preparation of plant materials for histological and cytological study. DEHNEL.
- 306 Plant Ecology (3) f.**  
Prerequisite, course 1, 10, or 201. Plants and plant communities in relation to environment with special reference to local flora. Lectures, laboratory, and field studies. KUCERA.
- 307 Mycology (4) f.**  
An introduction to the study of fungi with emphasis upon their structure and development in relation to their activity. PETERSON.
- 308 Plant Anatomy (4) f.**  
Comparative structure and growth of meristems; development and structure of important cell types, tissues, and tissue systems; comparative anatomy of stem, root, and leaf. Emphasis is placed upon anatomy of gymnosperms and angiosperms. DEHNEL.
- 309 Plant Geography (3) w.**  
Prerequisite, Botany 10 or 201. Species distribution over the earth; a consideration of population centers, migrations, external factors in isolation, and present-day dispersal. Offered in 1958-59 and alternate years. KUCERA.

- 310 Aquatic Botany (3) f.**  
Prerequisites, Botany 1 and 201. A study of algae and higher forms of local aquatic plant life including classification and the ecological relationships of the various groups. Offered in alternate years; not offered in 1958-59. KUCERA.
- 311 Agrostology (3 or 5) f.**  
Identification and classification of the native grass flora. Five hours credit includes lectures and special assignments. Offered in alternate years; not offered in 1958-59. KUCERA.
- 313 Plant Physiology (5) f, w.**  
Prerequisite, general botany and five hours credit in chemistry. Lectures and laboratory work on the physiology of the common cultivated plants. LEVITT.
- 315 Paleobotany (3) w.**  
Prerequisite, Botany 1 or Geology 1, or consent of instructor. Lectures, discussion, and laboratory work presenting a general survey of plant fossils—their orientation in time and space. WOOD.
- 320 General Botany Materials and Problems (2) f.**  
Prerequisites, 10 hours of biological science, including a course in general botany. A consideration of the objectives of a general course and the merits of various techniques of teaching.
- 352 Taxonomy of Bacteria (2) w.**  
Prerequisites, Botany 202 and one other course in bacteriology, 10 hours of chemistry. Theory and practice of bacterial classification—historical background, development of taxonomic systems, modern concepts and methods. Lectures and laboratory. Offered in 1958-59 and alternate years. BROOKS.
- 350 Advanced Mycology (3) w.**  
Prerequisite, course 307, or equivalent. Reading and discussion of the classical and current mycological literature and the pursuance of individual problems making use of such literature. PETERSON.
- 402 Microbiological Materials and Methods (4) f.**  
Prerequisite, general bacteriology, or consent of the instructor. Instrumentation and research procedures in bacteriology, mycology, and phytopathology. PETERSON.
- 403 Physiological Responses to Environment (3) f.**  
The changes induced in plants by variations in water, light, temperature, etc. Offered in alternate years; not offered in 1958-59. LEVITT.
- 404 Carbon and Nitrogen Metabolism (3) w.**  
Respiration, photosynthesis, metabolism of proteins, alkaloids, and vitamins. LEVITT.
- 405 Physiology of the Mineral Elements (3) f.**  
Essentiality, functions, metabolism, absorption, and translocation of the mineral elements. Offered in 1958-59 and alternate years. LEVITT.
- 406 Advanced Plant Ecology (3) w.**  
Prerequisite, Botany 306. Quantitative evaluation of vegetation structure. Factors of structure development. Lectures, current research papers, and discussion. Offered in alternate years; not offered in 1958-59. KUCERA.
- 409 Plant Morphogenesis (2) f.**  
Reading, discussion, and reports based upon the world's literature dealing with an analysis of the factors involved in development of plants from time of inception to attainment of adult form. Offered in alternate years; not offered in 1958-59. DEHNEL.
- 410 Seminar (1) f, w.**  
Special subjects of botanical work will be discussed including the results of local investigations. Required of all graduate students in botany. MEMBERS OF THE STAFF.

- 412 Seminar in Genetics (1) f, w (Same as Zoology 412, Field Crops 412).**  
Discussion of current investigations in genetics. A reading knowledge of German and French is desirable.
- 420 Advanced Botanical Microtechnique (3) f.**  
Prerequisite, Botany 305 or equivalent. Continuation of course 305 covering more advanced methods of microtechnique, including dehydrating, embedding, staining, mordanting, and histochemistry. Offered in 1958-59 and alternate years. DEHNEL.
- 430 Speciation (2) w.**  
Prerequisites, Botany 140 and 201. Study of the factors involved in the process of speciation; the breeding population structure and its effects; effect of pollinating agents. DUNN.
- 434 Advanced Taxonomy (2) f.**  
Prerequisite, Botany 201. Study of the phylogenetic relationships of the monocotyledonous plant families; a critical evaluation of the views of various workers. Offered in alternate years; not offered in 1958-59. DUNN.
- 435 Advanced Taxonomy (3) w.**  
Prerequisite, Botany 201. Study of the phylogenetic relationships of the dicotyledonous plant families; a critical evaluation of the views of various workers. Offered in alternate years; not offered in 1958-59. DUNN.
- 452 Advanced Genetics (3) w.**  
Prerequisite, Botany 140 or equivalent. Critical evaluation, through lectures, reading, and discussion, of various aspects of genetics. Offered in 1958-59 and alternate years. GOWANS.
- 461 Genetics of Microorganisms (3) w.**  
Prerequisite, Botany 140 or equivalent. Lectures and reading on the genetics and sexuality of the fungi, algae, protozoa, bacteria, and viruses. Offered in alternate years; not offered in 1958-59. GOWANS.
- 490 Research (credit to be arranged) f, w, s.**  
Students who have had adequate preparation will be assigned some special problem for investigation. MEMBERS OF THE STAFF.

## CHEMICAL ENGINEERING

- 204 Chemical Engineering Materials (2) f, w.**  
Prerequisite, Chemical Engineering 223. Properties of engineering materials used in chemical plants and equipment. MEMBERS OF THE STAFF.
- 223 Introduction to Chemical Engineering (2) f, w, s.**  
Prerequisite, eleven hours of chemistry. Industrial chemical processes and equipment. MEMBERS OF THE STAFF.
- 225 Chemical Process Calculations I (3) f.**  
Prerequisites, preceded or accompanied by course 223 and Chemistry 231. Industrial stoichiometry, material and energy balances, thermophysics, thermochemistry, and related topics. MEMBERS OF THE STAFF.
- 226 Chemical Process Calculations II (3) w.**  
Prerequisite, course 225. A continuation of course 225.
- 234 Principles of Chemical Engineering I (3) f.**  
Prerequisite, preceded by course 223. Fluid flow, heat transfer, evaporation, and related topics. MEMBERS OF THE STAFF.
- 235 Principles of Chemical Engineering II (3) w.**  
Prerequisites, courses 225 and 234. Distillation, extraction, absorption, and related topics. MEMBERS OF THE STAFF.
- 236 Principles of Chemical Engineering III (3) f.**  
Prerequisite, course 235. Drying, filtration, mixing, size reduction and separation, and related topics. MEMBERS OF THE STAFF.

- 243 Chemical Engineering Laboratory I (2) w.**  
Prerequisites, course 235 and preceded or accompanied by course 236. A laboratory study of some of the principal unit operations of chemical engineering. MEMBERS OF THE STAFF.
- 244 Chemical Engineering Laboratory II (2) f.**  
Prerequisites, courses 243 and 236. A continuation of course 243. MEMBERS OF THE STAFF.
- 251 Chemical Engineering Project (2) f, w, s.**  
Individual work on a chemical engineering problem. MEMBERS OF THE STAFF.
- 300 Problems (2-4) f, w, s.**  
Directed study of the problems in the field of chemical engineering. MEMBERS OF THE STAFF.
- 330 Chemical Engineering Economics (3) f.**  
Prerequisite, course 235. Economics of the design and operation of chemical plants. MEMBERS OF THE STAFF.
- 361 Chemical Engineering Thermodynamics I (3) f.**  
Prerequisite, course 226. A study of thermodynamics with particular reference to its applications in chemical engineering. MEMBERS OF THE STAFF.
- 362 Chemical Engineering Thermodynamics II (3) w.**  
Prerequisite, course 361. A continuation of course 361. MEMBERS OF THE STAFF.
- 370 Instrumentation (3) w.**  
Prerequisite, senior standing in engineering or the sciences. Theory, design, selection, use, and limitations of various indicating, recording, integrating, and controlling devices used in the process industries. MEMBERS OF THE STAFF.
- 385 Chemical Engineering Design I (3) f.**  
Prerequisite, senior standing in chemical engineering. Integrated use of the engineering, chemical, and economic principles involved in the design and layout of chemical plants and equipment. MEMBERS OF THE STAFF.
- 386 Chemical Engineering Design II (3) w.**  
Prerequisites, courses 236, 361, and Civil Engineering 101. The application of the principles of chemical engineering and mechanics to the selection, design, and layout of equipment for the process industries. MEMBERS OF THE STAFF.
- 390 Nuclear Fuels (3) w.**  
Prerequisite, senior standing or permission of instructor. A study of the nuclear fuel cycle including uranium processing, fuel element design, irradiated fuel reprocessing, radioactive waste disposal, and utilization of radiation. BEYER.
- 400 Problems (2-5) f, w, s.**  
Experimental investigation of problems in the field of chemical engineering. MEMBERS OF THE STAFF.
- 410 Seminar (1) f, w.**  
Reviews of investigations and projects of importance in the field of chemical engineering. MEMBERS OF THE STAFF.
- 415 Fuels, Combustion and Furnaces (3) w.**  
Prerequisites, courses 235 and 362. Advanced work on these topics. LUEBBERS.
- 420 Heat Transfer and Fluid Flow (3) f.**  
Prerequisites, courses 236 and 361. A study of advanced phases of these unit operations. LUEBBERS.
- 421 Drying and Humidification (3) f.**  
Prerequisites, courses 236 and 361. Advanced work on these topics. LORAH.
- 422 Distillation and Rectification (3) w.**  
Prerequisites, courses 236 and 362. Advanced work on these topics with applications to multicomponent mixtures. LORAH, DECHAZAL.



- 423 Absorption and Extraction (3) w.**  
Prerequisite, course 236. Advanced study of gas absorption, liquid-liquid extraction, liquid-solid extraction, and related topics. LORAH, DECHAZAL.
- 424 Mechanical Separation (3) w.**  
Prerequisites, courses 226 and 235. Advanced study of mechanical separation and related topics. LUEBBERS.
- 450 Research (credit to be arranged) f, w, s.**  
Independent investigation in the field of chemical engineering, to be presented as a report. Credit limit, 7 hours. MEMBERS OF THE STAFF.
- 451 Advanced Chemical Engineering Thermodynamics I (3) f.**  
Prerequisite, course 362. Advanced thermodynamics with particular reference to its application to chemical engineering. DECHAZAL, BEYER.
- 452 Advanced Chemical Engineering Thermodynamics II (3) w.**  
Prerequisite, course 451. A continuation of course 451. DECHAZAL, BEYER.
- 461 Process Development and Plant Design (3) w.**  
Prerequisite, course 386. Lectures and individual study of the chemical engineering and economic factors involved in the development of chemical manufacturing and processes.
- 470 Mathematical Studies of Chemical Engineering Operation (3) w.**  
Prerequisites, course 362 and Mathematics 301. Graphical and analytical methods applied to the solution of chemical engineering problems. DECHAZAL.
- 490 Research (credit to be arranged) f, w, s.**  
Independent investigation in the field of chemical engineering, to be presented in the form of a thesis. MEMBERS OF THE STAFF.

## CHEMISTRY

- 1 General Inorganic Chemistry (5) f, w, s.**  
An introductory course. BENT, GADDIS, ABBOTT, ARCAD.
- 2 General Inorganic Chemistry (3) f, w, s.**  
Prerequisite, grade M or better in Chemistry 1 required before enrolling in Chemistry 2. THOMAS.
- 15 Elementary Organic Chemistry (3) f, w, s.**  
Prerequisite, Chemistry 1. Introductory course. Does not satisfy requirement for premedical students or for those majoring in chemistry. MEMBERS OF THE STAFF.
- 25 Analytical Chemistry (5) f, w.**  
Prerequisite, Chemistry 1. Elective for students preparing to take medicine or home economics. A brief survey of the qualitative and quantitative analytical methods. BRECKENRIDGE, ARCAD.
- 26 Qualitative Analysis (2) f, w.**  
Prerequisite, must be preceded or accompanied by Chemistry 2. A brief course for Engineering students. BRECKENRIDGE, ARCAD.
- 27 Qualitative Analysis (3) f, w, s.**  
Prerequisite, must be preceded or accompanied by Chemistry 2. A laboratory course. BRECKENRIDGE, ARCAD.
- 198 Distinction (3) f.**  
MEMBERS OF THE STAFF.
- 199 Distinction (3) w.**  
MEMBERS OF THE STAFF.
- 210 Organic Chemistry (3) f, w, s.**  
Prerequisite, ten hours in chemistry; medical students admitted with eight hours. MEMBERS OF THE STAFF.

- 211 Organic Chemistry Laboratory (2) f, w, s.**  
Should accompany and cannot precede Chemistry 210. MEMBERS OF THE STAFF.
- 212 Organic Chemistry (3) f, w, s.**  
Prerequisite, 5 hours credit in organic chemistry (aliphatic compounds). Continuation of the subject matter of Chemistry 210. Required of chemistry majors and chemical engineers. MEMBERS OF THE STAFF.
- 213 Organic Chemistry Laboratory (2) f, w, s.**  
Should accompany and cannot precede Chemistry 212. MEMBERS OF THE STAFF.
- 221 Quantitative Chemical Analysis (3) f, w, s.**  
Prerequisite, Chemistry 27. The general principles. BRECKENRIDGE, ARCAND.
- 222 Quantitative Chemical Analysis (3) f, w.**  
Prerequisite, Chemistry 221. The analysis of commercial materials and products. BRECKENRIDGE, ARCAND.
- 223 Quantitative Chemical Analysis (2) f, w, s.**  
A continuation of Chemistry 221. BRECKENRIDGE, ARCAND.
- 230 Physical Chemistry (3) w, s.**  
Prerequisites, college course in physics, 3 hours of quantitative analysis, 3 hours of organic chemistry. Recommended to students majoring in biological sciences, home economics, and agriculture. STEARN.
- 231 Physical Chemistry (3) f, s.**  
Prerequisites, Chemistry 210 and 221, college course in physics; preceded or accompanied by Mathematics 201. Must be accompanied by Chemistry 232. Lectures only. STEARN.
- 232 Physical Chemistry Laboratory (2) f, s.**  
Prerequisites, see Chemistry 231 above; must be accompanied by Chemistry 231. Laboratory only. STEARN.
- 233 Physical Chemistry (3) w.**  
Prerequisites, Chemistry 231 and 232. A continuation of Chemistry 231. Lectures only. STEARN.
- 234 Physical Chemistry Laboratory (2) w.**  
Prerequisites, Chemistry 231 and 232. A continuation of Chemistry 232. Must be accompanied by Chemistry 233. Laboratory only. STEARN.
- 310 Chemical Spectroscopy (1-2) w. (Same as Agricultural Chemistry 310.)**
- 312 Instrumental Methods of Analysis (3) f.**  
Prerequisites, quantitative analysis and physical chemistry. Methods of instrumentation applied to chemical analysis including polarography, potentiometry, and colorimetry. Two lectures and one 3-hour laboratory period. ARCAND.
- 314 Advanced Organic Syntheses (2-3)**  
Prerequisite, Chemistry 212, but may be accompanied by Chemistry 213. A continuation of Chemistry 213. MEMBERS OF THE STAFF.
- 315 Intermediate Organic Chemistry (3) f.**  
An advanced treatment of the subject matter of Chemistry 210 and 212. MEMBERS OF THE STAFF.
- 316 Intermediate Organic Chemistry (3) w.**  
A continuation of course 315. Prerequisite, Chemistry 315 or its equivalent. MEMBERS OF THE STAFF.
- 325 Qualitative Organic Analysis (4) f, s.**  
Prerequisite, must be preceded by Chemistry 212. MEMBERS OF THE STAFF.
- 326 Quantitative Organic Analysis (3) w.**  
Prerequisite, must be preceded by Chemistry 223. Quantitative analysis of pure organic compounds using micro and some semi-micro methods. MEMBERS OF THE STAFF.

- 328 Inorganic Micro Analysis (3) w.**  
ARCAND.
- 331 Physico-Chemical Calculations (2-5) f, w.**  
Prerequisite, Chemistry 231. STEARN.
- 332 Chemical Thermodynamics (3) w.**  
Prerequisite, Chemistry 231. The formal application of thermodynamic theory to the solution of chemical problems. STEARN, THOMAS.
- 341 Inorganic Chemistry (3) w.**  
Prerequisite, a minimum of 19 hours in chemistry.
- 342 Inorganic Preparations (2) w.**  
Must be preceded or accompanied by Chemistry 341.
- 410 Seminar (1) f, w.**  
Meetings at which subjects of chemical interest are discussed by students and members of the teaching staff.
- 411 Advanced Organic Chemistry (3) f.**  
The lectures include condensation reactions, hydrocarbons, organo-metallic compounds, etc. NIGHTINGALE.
- 412 Advanced Organic Chemistry (3) f.**  
The structural theory of organic chemistry. The chemical bond, structural isomerism, strain theory and steric effects, stereoisomerism and reaction stereo-specificity, tautomerism, internal electron displacements, absorption spectroscopy, determination of structure by physical methods. DALE.
- 413 Chemistry of High Polymers (3) w.**  
A survey of the field of natural and synthetic organic high polymers. RABJOHN.
- 414 Special Topics of Organic Chemistry (3) f.**  
The alicyclic and heterocyclic compounds. NIGHTINGALE.
- 415 Advanced Organic Chemistry (3) w.**  
Aromatic properties, free radicals, molecular rearrangements, etc. RABJOHN.
- 416 Colloid Chemistry (3-5) w. (Same as Agricultural Chemistry 416.)**
- 417 Applications of the Reactions of Organic Chemistry (2) w.**  
Prerequisite, at least one year of graduate organic chemistry. RABJOHN.
- 418 Advanced Inorganic Chemistry (3)**  
Open to those who have passed or are taking physical chemistry. One of the major objectives of this course is to supply a broad background for those who expect to teach general chemistry. BENT.
- 419 Theoretical Organic Chemistry (3) w.**  
Theoretical principles of ionic organic reactions and applications to individual reactions. DALE.
- 427 Advanced Analytical Chemistry (credit to be arranged).**  
Prerequisite, Chemistry 221. Chiefly laboratory work. The work of the course is varied to meet the needs of the individuals. BRECKENRIDGE.
- 430 Advanced Physical Chemistry (3)**  
THOMAS, STEARN.
- 432 Chemical Kinetics (3) f, w, or s.**  
Application of the results of statistical mechanics to the problem of reaction velocities in homogenous reactions. STEARN.
- 433 Atomic and Molecular Structures (3)**  
An introduction to the fundamental ideas of wave mechanics with special emphasis on chemical applications. STEARN.

- 434 Theory of Solutions (3)**  
STEARNS.
- 435 Nuclear Chemistry (2 or 3)**  
STEARNS.
- 436 Photochemistry and Molecular Excitation (2)**  
The principles and experimental work of photochemistry; photosensitized reactions; inelastic collisions; principles and experimental methods of the field of critical potentials and related subjects. THOMAS.
- 437 Applications of Thermodynamics (3)**  
The stability of chemical compounds will be discussed with particular emphasis on chemical equilibrium involving organic materials. BENT.
- 438 Kinetic Theory (2)**  
THOMAS.
- 450 Research (credit to be arranged) f, w, s.**  
Does not lead to a dissertation. MEMBERS OF THE STAFF.
- 490 Research (credit to be arranged) f, w, s.**  
Arrangements for research should be made by consultation with the professor or instructor with whom the research is elected. MEMBERS OF THE STAFF.

## CIVIL ENGINEERING

- 21 Engineering Surveys (5)**  
Prerequisite, Mathematics 9 or equivalent. Theory and application of horizontal and vertical control in land surveying, topographic mapping, and engineering construction. IRBY, PORTER.
- 50 Statics (3) f, w.**  
Prerequisites, Physics 23; preceded or accompanied by Mathematics 201. Vectors, force systems, friction, centroids, moment of inertia. SANGSTER, WANG, DALLAM, MEMBERS OF THE STAFF.
- 62 Higher Surveying (3)**  
Primarily for students who have completed an elementary course in surveying theory. Application of surveying theory to land surveying, topographic mapping, and engineering construction. IRBY, PORTER.
- 101 Mechanics of Materials (3) f, w, s.**  
Prerequisite, course 50 or M.E. 90. Must be accompanied by course 102. Stresses and strains in elastic materials; riveted joints, torsion, deflection, continuous beams, columns. WANG, DALLAM, HARRIS, MEMBERS OF THE STAFF.
- 102 Mechanics of Materials Laboratory (1) f, w, s.**  
To accompany course 101. DALLAM, MEMBERS OF THE STAFF.
- 156 Dynamics (3) f, w.**  
Prerequisite, course 50. Motion of a particle, kinetics of rigid bodies, work and energy, impulse and momentum, impact. SANGSTER, WANG, MEMBERS OF THE STAFF.
- 182 Engineering Materials (2) f, w.**  
Prerequisites, Chemistry I and preceded or accompanied by Physics 23. Chemical and physical properties of materials used in engineering. Controls and reactions involved in the manufacture of materials. MURPHY, PORTER, MEMBERS OF THE STAFF.
- 212 Routes (4) f.**  
Prerequisites, course 21 and junior standing. Curves and earthwork. The design of location of engineering routes including cost estimates. RUBEY, IRBY.
- 220 Structural Stresses (3) f, w.**  
Prerequisites, registration in courses 101 and 102. Analysis of stresses in statically determinate structures. EVANS, SAMI, BREEN.

- 222 Reinforced Concrete (3) f, w.**  
Prerequisites, courses 101 and 102. Elements of reinforced concrete theory. EVANS, IRBY, DALLAM, MEMBERS OF THE STAFF.
- 223 Structural Design I (4)**  
Prerequisites, courses 101, 102, and 220. Design of steel members in tension, compression, and bending; riveted and welded connections, simple plate girders, and roof trusses. HARRIS, DALLAM.
- 235 Highway Engineering I (3) f, w.**  
Prerequisites, course 21 and preceded or accompanied by 182. Construction of roads and pavements. Location and design of highways. Fundamentals of soil mechanics and concrete mixtures. IRBY, HARRIS.
- 240 Fluid Mechanics (3) f, w, s.**  
Prerequisite, course 155 or M.E. 90. Fundamental principles of the mechanics of fluids including hydrostatics and hydrodynamics. Elementary principle of hydraulic motors. WOOD, SANGSTER, SMERDON.
- 241 Fluid Mechanics Laboratory (1) f, w.**  
Prerequisite, or accompanied by, course 240. Use and calibration of flow measuring devices. Tests of hydraulic machines. WOOD, SANGSTER, SMERDON.
- 274 Structural Design II (4)**  
Prerequisites, courses 222 and 223 and accompanied or preceded by 372. Simple structures in reinforced concrete, steel, and timber; bridges and buildings. HARRIS, DALLAM.
- 292 Water Supply (2) f, s.**  
Prerequisites, course 240 and preceded or accompanied by 341. The design of water supply systems, consumption, sources, collection, treatment, distribution, and their relation to public health. MURPHY, WOOD.
- 293 Waste Water Treatment and Disposal (3) w.**  
Prerequisites, course 240 and preceded or accompanied by 341. The design and construction of sewer systems; principles of waste water treatment and their relations to public health. MURPHY, PORTER.
- 300 Problems (2-4) f, w, s.**  
Directed investigation of problems in the field of civil engineering. MEMBERS OF THE STAFF.
- 333 Plain Concrete (3) f.**  
Theory of concrete mix design; concrete placing and curing practices; specifications, inspection, and testing. Laboratory included. PAUW, BREEN.
- 341 Hydrology (3) f, w.**  
Prerequisite, or accompanied by, course 240. Fundamentals of hydrology and their applications to typical problems in sanitary and hydraulic engineering design and operation. WOOD, SANGSTER.
- 342 Hydraulics of Open Channels (3) f.**  
Prerequisite, course 240. Nonuniform flow, flow at critical depth, hydraulic jump, backwater, transition structures. WOOD, SANGSTER.
- 343 Hydraulic Machinery (3) f, w.**  
Prerequisite, course 240 or M.E. 230. Theory of design and operation of the principal types of hydraulic machines, including laboratory. WOOD, SMERDON.
- 344 Flood Control Engineering (3) w.**  
Prerequisite, course 341. Flood hydrology and control; including channel improvements, reservoirs, levees, river walls, and related subjects. SANGSTER.
- 348 Municipal and Rural Sanitation (3) w.**  
Prerequisite, junior standing. Principles of environmental sanitation as applied to community and rural problems of water supply, sewerage, housing, waste disposal, food sanitation, etc. MURPHY, PORTER.

- 349 Sanitary Analysis (3) f.**  
Prerequisites, analytical chemistry, general bacteriology. Standard methods of water and sewage analysis. MURPHY, PORTER.
- 351 Experimental Stress Analysis (3) f or w.**  
Prerequisites, courses 101 and 102. Photoelastic, electric strain gage, and brittle lacquer methods of experimental stress analysis for static loads. Strain gage work includes strain rosettes. PAUW, MEMBERS OF THE STAFF.
- 352 Advanced Mechanics of Materials (3) f.**  
Prerequisites, courses 101 and 102. Continuation of 101 involving analysis of more complicated problems in stresses and strains. WANG, MEMBERS OF THE STAFF.
- 355 Soil Mechanics (3) w.**  
Prerequisites, courses 101 and 102. A detailed study of those physical and mechanical properties of soil which govern its behavior as an engineering material. EVANS.
- 365 Engineering Administration (3) f, w.**  
Prerequisite, senior standing. The engineer's relation to management in connection with the promotion, design, construction, operation, and administration of industries and public works. Engineering economy. RUBEY.
- 367 Construction and Contracting (3) w.**  
Prerequisite, senior standing or equivalent. Construction methods, estimating, bidding, organization, management, contracts, and specifications. RUBEY.
- 372 Foundations and Masonry Construction (3) f, w.**  
Prerequisite, course 222. Dams, retaining walls, bridge piers and abutments, shallow bins, deep bins, foundations. EVANS, PAUW, MEMBERS OF THE STAFF.
- 375 Statically Indeterminate Structures (3) f.**  
Prerequisite, course 220. The analysis of rigid frames by the slope-deflection and moment-distribution methods. PAUW, SAMI.
- 376 Statically Indeterminate Structures (3) w.**  
Prerequisite, course 375 or permission of instructor. The elastic theory and its application to statically indeterminate trusses and miscellaneous structures. PAUW, SAMI.
- 377 Structural Design III (3).**  
Prerequisites, courses 274 and 375. Design of continuous spans and rigid frames for bridges and buildings. HARRIS.
- 384 Road Materials (3) f or w.**  
Prerequisite, course 235. Properties of materials used in highway construction with particular attention to the bituminous materials. Laboratory tests. IRBY.
- 387 Transportation (2) f or w.**  
Prerequisite, or accompanied by, course 212. Relation of highway, railway, airway, pipe line, and waterway transportation with emphasis on railways; construction, operation, and maintenance. RUBEY.
- 396 Highway Engineering II (3) f or w.**  
Prerequisite, course 235. Administration, management, and financing of highway programs. Maintenance and operation of highways. Studies of traffic and safety. IRBY.
- 400 Problems (2-5) f, w, s.**  
Independent study of some problem in the field of civil engineering. MEMBERS OF THE STAFF.
- 403 Theory of Elasticity (3) f or w.**  
Prerequisite, Mathematics 301. Stress and strain in three dimensions; ellipsoids of stress and strain; theorems of compatibility; thermal stresses; the general torsion problem; stresses in plates and shells; special three-dimensional problems; analogies for stress analysis. WANG.

- 404 Theory of Plates and Shells (3) f or w.**  
Prerequisites, course 101 and registration in Mathematics 301. Bending. Small-and-large-deflection theories. Deformations and stress in shells. WANG.
- 405 Theory of Elastic Stability (3) f or w.**  
Prerequisites, course 101 and registration in Mathematics 301 or 310. Buckling of columns, beams, rings, curved bars, thin plates, and shells. WANG.
- 407 Numerical Methods in Engineering (3) w.**  
Accompanied or preceded by Mathematics 301 or 303. Introduction to elementary techniques used in the numerical solution of engineering problems. Solution of algebraic equations of high degree. Theory of finite differences and their applications. Solution of initial value and boundary and characteristics value problems. Numerical solution of partial differential equations. PAUW, SANGSTER.
- 410 Seminar (1) f, w, s.**  
Reviews of recent investigations and projects of major importance in the field of civil engineering. PAUW, MEMBERS OF THE STAFF.
- 427 Structural Theory and Design I (5) f.**  
General theory of continuity, moment distribution, the column analogy, rigid frame bridges and buildings, fixed arches. PAUW, SAMI.
- 428 Structural Theory and Design II (3) w.**  
Statically indeterminate trusses, continuous trusses; steel and concrete arches, secondary stresses. PAUW, SAMI.
- 430 Reinforced Concrete Theory and Design (3) f or w.**  
Advanced design of reinforced concrete structures; review of standard codes and specifications and their influence on design. PAUW, SAMI.
- 431 Prestressed Concrete (3) f or w.**  
Prerequisite, course 222. Theory and practice of prestressed concrete design. Linear and circular prestressing. Pretensioning and posttensioning. Anchorage of steel. Material and design specifications. PAUW.
- 434 Methods of Investigation (2) f or w.**  
Methods and instruments used in investigating engineering materials.
- 436 Soil Mechanics (3) f.**  
The theoretical substance of soil mechanics as applied to the solution of specific engineering problems. EVANS.
- 438 Highway Transportation (3) f or w.**  
Prerequisites, courses 235 and 396. Economics of transportation on highways. Comparison of costs of vehicle operation. Project studies of the highway problem in general. IRBY.
- 441 Advanced Hydraulic Engineering (3) f or w.**  
Prerequisite, course 341. Problems in design and construction relating to reservoirs, dams, conduits, waterways, and general hydraulic engineering. WOOD, SANGSTER.
- 442 Advanced Fluid Mechanics (3) f or w.**  
Prerequisites, course 240 and accompanied or preceded by Mathematics 301 or 303. Use of the flow net. Velocity potentials and stream functions. Acceleration, momentum, energy, and continuity equations. Fluid turbulence. The boundary layer. SANGSTER.
- 446 Advanced Water Supply (3) f.**  
Prerequisite, course 292. Sources of supply, yield of drainage areas, storage reservoirs, dams, spillways, ground water, distribution systems, treatment plants, and purification processes. MURPHY.
- 447 Public Health Engineering (3) f.**  
Prerequisites, courses 292 and 293. Sanitary problems of the human environment. Reports, lectures, and reading. MURPHY, SPECIAL LECTURERS.

- 448 Advanced Waste Water Treatment (3) w.**  
Prerequisite, course 293. The collection, treatment, and disposal of domestic and industrial wastes; drainage systems, sewage flow, and waste water treatment plants and processes. MURPHY.
- 450 Research (credit to be arranged) f, w, s.**  
An independent investigation of some problem or design in the field of civil engineering to be presented without thesis. MEMBERS OF THE STAFF.
- 451 Construction Practices (3) w.**  
Prerequisite, C.E. 367 or permission of instructor. A study and review of current practices and trends in construction and contracting. RUBEY, MURPHY.
- 472 Behavior of Reinforced Concrete Members (3) f.**  
Prerequisite, or accompanied by, 430. Studies of the actual behavior and strength of reinforced concrete members by critically reviewing experimental and analytical investigations. Beams subjected to pure flexure, columns subjected to axial compression, combined flexure and axial compression, combined flexure and shear and bond. SAMI.
- 473 Behavior of Reinforced Concrete Structures (3) w.**  
Continuation of C.E. 472. Studies of behavior and strength of statically indeterminate reinforced concrete structures. Comparison with reinforced concrete codes and specifications. SAMI.
- 490 Research (credit to be arranged) f, w, s.**  
An independent investigation of some problem or design in the field of civil engineering to be presented in the form of a thesis. MEMBERS OF THE STAFF.
- 496 Sanitary Engineering Laboratory (3) w.**  
Prerequisite, course 349. Interpretation of analytical results, microscopy of water, application of analytical procedure to experimental projects. Field work in stream pollution and plant operation. MURPHY.

## CLASSICAL LANGUAGES AND ARCHAEOLOGY

### Greek

*Courses in the Greek language*

- 3 Elementary Course (5) f.**  
The essentials of Attic Greek forms and constructions with reading of easy selections of Attic Greek and portions of Xenophon's *Anabasis*. WEINBERG.
- 5 Intermediate Course (5) w.**  
For students who have completed course 3. Continued reading of Xenophon's *Anabasis* and portions of the first books of Homer's *Iliad*. WEINBERG.
- 205-206 Advanced Greek (2-5) f, (2-5) w.**  
For students who have completed course 5. Grammar and reading adapted to the needs of the class. GWATKIN, BENJAMIN.
- 305 Greek Drama (3) w.**  
Prerequisites, courses 3, 5, and 205, or the equivalent. Reading and literary interpretation of selected plays of Aeschylus, Sophocles, Euripides, Aristophanes. Offered in alternate years. Not offered in 1958-59.
- 307 Greek Philosophers (3) w.**  
Prerequisites, courses 3, 5, and 205, or the equivalent. Plato's *Apology* and *Crito* and other Greek philosophical works. Offered in 1958-59 and in alternate years. BENJAMIN.
- 311 Greek Historians (3) f.**  
Prerequisites, courses 3, 5, and 205, or the equivalent. Study of selected books of Herodotus and Thucydides. Offered in 1958-59 and in alternate years. GWATKIN.



**347 Greek Orators (3) f.**

Prerequisites, courses 3, 5, and 205, or the equivalent. Study of selected orations of Lysias and Demosthenes' *On the Crown*. Offered in alternate years. Not offered in 1958-59.

**350 Special Readings (2-3).**

Prerequisites, courses 3, 5, and 205, or the equivalent. Intended for upperclassmen who desire to study some aspect of Greek literature not covered by other courses. BENJAMIN, GWATKIN.

**Latin***Courses in the Latin language*

Students entering with no high school units in Latin should take course 1; students entering with two high school units should take course 2; students entering with three or four high school units should take course 103, course 107, course 150, or course 151.

**1 Beginning Latin (5) f.**

For students who have not previously studied Latin. Training in the elements of the language with easy reading GWATKIN.

**2 Intermediate Latin (5) f, w.**

Prerequisite, course 1 or two entrance units in Latin. Selected readings from Latin prose authors with intensive review of forms and constructions. BENJAMIN.

**103 Reading (3) w.**

Prerequisites, courses 1 and 2 or three entrance units in Latin. Reading and interpretation of Vergil's *Aeneid*. BENJAMIN.

**107 Advanced Prose Reading (3) f.**

Prerequisites, courses 1 and 2 or three entrance units in Latin. Readings in Latin prose, especially Cicero's philosophical essays. BENJAMIN.

**150 Pliny: Selected Letters (2) f.**

Prerequisite, course 103 or 107 or four entrance units in Latin. Reading and interpretation of selected letters with discussion of Roman society of the period. GWATKIN.

**151 Ovid: Selected Poems (3) w.**

Prerequisite, course 103 or 107 or four entrance units in Latin. Reading and literary interpretation of selected poems of Ovid, including the *Metamorphoses*. GWATKIN.

**175 Latin Prose Composition (1) f.**

Study of the vocabulary and idiom of the Latin language through the translation of English sentences into Latin. BENJAMIN.

**306 Latin Prose Composition (1-2) w.**

Prerequisite, course 175. Connected writing of Latin; comparative study of Latin prose style. BENJAMIN.

**310 Horace: Selections (3) f.**

Prerequisites, courses 150 and 151 or equivalent. Reading and literary interpretation of the poems of Horace chosen from the *Odes*, *Epodes*, *Satires*, and *Epistles*. GWATKIN.

**314 Cicero's Letters (3) f.**

Prerequisite, course 310, or equivalent. Selected letters of Cicero, with attention to his life, his style as a letterwriter, and his characteristics as a man. Not offered in 1958-59.

**315-316 Rapid Reading (2) f, (2) w.**

Prerequisite, course 310 or equivalent. Reading from authors of comparative ease with a view toward the development of the ability to read rapidly. GWATKIN.

- 317 Catullus: Selected Poems (3) w.**  
Prerequisite, course 310 or equivalent. Reading of the poems of Catullus and a study of his position and influence in Latin literature. Not offered in 1958-59.
- 319 Vergil's Aeneid: VI-XII (3) f.**  
Prerequisite, course 310, or equivalent. Translation of the later books of the *Aeneid* with metrical reading and literary interpretation. GWATKIN.
- 320 Latin Comedy (3) f.**  
Prerequisite, course 310 or equivalent. Reading of Plautus and Terence with attention to their dependence upon Greek originals and later influence. Not offered in 1958-59.
- 321 Juvenal's Satires (3) w.**  
Prerequisite, course 310 or equivalent. Reading and literary interpretation with emphasis on the history of satire and Juvenal's influence upon English writers. GWATKIN.
- 351 Tacitus (3) w.**  
Prerequisite, course 310 or equivalent. Reading and literary interpretation with emphasis upon the history of Rome from Augustus to Nero. Not offered in 1958-59.
- 375 Vulgar Latin (3) w.**  
Prerequisite, four high school units or the equivalent in college. The Latin of the common people and its development into the Romance languages. GWATKIN.
- 376 Mediaeval Latin (2) w.**  
Prerequisite, three high school units, or equivalent in college Latin, or the consent of the instructor. Readings in the source material of the Middle Ages and Early Renaissance with emphasis on giving students outside the field of Latin a facility in dealing with the Latin sources in their fields. BENJAMIN.
- 409 Introduction to Graduate Study in Classics (3) f.**  
Systematic study of the history of Greek and Latin literature, translation of an author to be studied later in the seminar, and other topics. GWATKIN, WEINBERG, BENJAMIN.
- 410 Seminar (3) w.**  
Reports and discussion by the members of the seminar upon problems presented by the subject assigned for study. GWATKIN, BENJAMIN.
- 490 Research and Thesis (1-8) f, w.**  
Independent investigation, under direction, of some chosen or assigned topic to result in a thesis presented for the degree of Master of Arts. GWATKIN, WEINBERG, BENJAMIN.

For *The Teaching of Latin*, see Education D125.

## Classical Archaeology, Civilization, and Literature in Translation

*Courses requiring no knowledge of Latin or Greek*

- 60 Classical Mythology (2) f, w.**  
The myths of Greece and Rome as an aid to the interpretation of literature and art. WEINBERG, GWATKIN.
- 75 Greek for Students in the Sciences (1) w.**  
Study of derivation and meaning of scientific nomenclature. GWATKIN.
- 112 Greek Literature in English Translation (2) f.**  
A general view of Greek literature intended primarily for nonclassical students. BENJAMIN.
- 113 Latin Literature in English Translation (2) w.**  
A general view of Latin literature intended primarily for nonclassical students. BENJAMIN.

- 225 Classical Drama in Translation (2) f.**  
Reading and interpretation of Greek and Roman tragedies and comedies in translation. Designed for nonclassical students and those interested in speech and dramatics. GWATKIN.
- 227 Classical Oratory in Translation (2) w.**  
Reading and interpretation of orations from the Attic Orators and Cicero in translation. Designed for nonclassical students and those interested in speech and dramatics. GWATKIN.
- 240 Greek Art and Archaeology (3) f.**  
A general survey of the development of material culture in Greece from earliest times to the Hellenistic period, designed for both classical and nonclassical students. WEINBERG.
- 245 Roman Art and Archaeology (3) w.**  
A general survey of the development of material culture in the Roman world from earliest times through the early Empire, designed for both classical and nonclassical students. WEINBERG.
- 352 Ancient Painting (2) f.**  
Survey of the art of painting in the Near East, the Aegean, and the classical world. For students of art history and classical civilization. Offered in 1958-59 and in alternate years. WEINBERG.
- 353 Ancient Sculpture (2) w.**  
Survey of the sculptor's art in the Near East, the Aegean, and the classical world. For students of art history and classical civilization. Offered in 1958-59 and in alternate years. WEINBERG.
- 354 Ancient Architecture (2) f.**  
Survey of the art of building in the Near East, the Aegean, and the classical world. For students of art history and classical civilization. Offered in alternate years. Not offered in 1958-59.
- 355 Archaeological Methods (2) w.**  
The methods of excavating various types of sites, illustrated largely from the Mediterranean region, and of recording and preserving materials produced by such excavation. Admission by consent of the instructor. Offered in alternate years. Not offered in 1958-59.
- 361 Ancient Near Eastern Art and Archaeology (3) w.**  
Prerequisite, course 240 or 245 or consent of the instructor. A general survey of the development of material culture in the Near East from earliest times to the fifth century B. C. Offered in alternate years. Not offered in 1958-59.
- 365 Aegean Archaeology (3) w.**  
Prerequisite, course 240 or 245 or consent of the instructor. The study of Greek prehistoric civilizations of the Neolithic period and the Bronze Age about 4000 to 1000 B. C. Offered in 1958-59 and in alternate years. WEINBERG.
- 420 Seminar in Classical Archaeology (3) f, w.**  
Special subjects of study assigned for individual research and discussion of reports by members of the seminar. WEINBERG.

## DAIRY HUSBANDRY

- 1 Dairy Husbandry (3) f, w.**  
Fundamentals of the dairy industry including selection of animals, herd improvement, milk and milk products, and common dairy tests. Prerequisite to all other courses in dairy husbandry. MERILAN, MEMBERS OF THE STAFF.
- 100 Dairy Products (3) f.**  
Principles and practices in the processing and manufacture of butter, cheese, ice cream, concentrated and dry milks and by-products. REID.

- 110 Dairy Cattle Judging (2) f.**  
Dairy and breed types, comparative judging, selection fitting for show and sales. SIKES.
- 120 Dairy Products Judging (2) f.**  
Physical properties and factors affecting flavor, body, and texture of milk, butter, cheese, ice cream, concentrated and dry milks and by-products. SMITH.
- 130 Dairy Products Testing (2) w.**  
Prerequisite, course 100. Methods of commercial testing and analysis of dairy products. SMITH.
- 200 Problems (credit to be arranged) f, w, s.**  
For further studies in some phase of dairy husbandry or to supplement studies of graduates in other fields. MEMBERS OF THE STAFF.
- 210 Advanced Dairy Cattle Judging (2) w.**  
A continuation of the comparative judging in course 110 including excursions to leading herds and shows. SIKES.
- 220 Advanced Dairy Products Judging (1) w.**  
A continuation of the comparative judging in course 120 including excursions to commercial markets. SMITH.
- 300 Problems (credit to be arranged) f, w, s.**  
Advanced problems in a selected field leading to an understanding of scientific problems and research methods. MEMBERS OF THE STAFF.
- 310 Dairy Production (3) f.**  
Prerequisite, Animal Husbandry 202 or equivalent. Milk production and herd management problems. RAGSDALE, MEMBERS OF THE STAFF.
- 320 Dairy Bacteriology (3) w.**  
Prerequisite, Botany 202, General Bacteriology. An applied course teaching the relationship of microorganisms to milk, milk production, processing and manufacturing, and public health aspects. EDMONDSON, SMITH.
- 325 Market Milk (3) f.**  
Prerequisite, course 100. Problems of the market milk producer, processor, and distributor. SMITH.
- 330 Butter and Cheese (3) f.**  
Prerequisite, course 100. An advanced study of principles and commercial practices in the manufacture and marketing of butter and cheeses. REID.
- 335 Ice Cream, Concentrated and Dried Milks and By-Products (3) w.**  
Prerequisite, course 100. Advanced problems and factors involved in the processing, manufacture, and marketing of these products. REID.
- 340 Dairy Plant Equipment (3) w.**  
Prerequisite, course 100. It is recommended that courses 325, 330, and 335 precede or accompany this course. A study of equipment commonly used in dairy manufacturing plants. Special attention will be given to the basic principles involved in design, operation, and maintenance. SMITH.
- 345 Dairy Plant Management (2) w.**  
Prerequisite, course 100. It is recommended that courses 325, 330, and 335 precede or accompany this course. The management of market milk plants, creameries, cheese factories, ice cream plants, condensaries, dry milk and dairy by-products plants. REID.
- 350 Special Readings (credit to be arranged) f, w, s.**  
Scientific publications in a chosen field are studied to acquaint the student with technical literature and research methods. MEMBERS OF THE STAFF.
- 360 Farm and Plant Inspection (2) w.**  
Prerequisites, courses 320 and 310 or 325. The principles, methods, and practices of city milk control including farm and plant inspection. EDMONDSON, SMITH.

- 380 Dairy Cattle Breeding (3) w.**  
Prerequisite, Dairy Husbandry 310 or Animal Husbandry 203 or equivalent. Principles of breeding dairy cattle. Breeding program. MERILAN, SIKES, BOWER.
- 385 Artificial Breeding of Dairy Cattle (3) f.**  
Prerequisite, Animal Husbandry 203 or Dairy Husbandry 380. The collection, evaluation, and storage of semen, insemination techniques. Artificial breeding associations. MERILAN, BOWER.
- 390 Field Training in Dairy Husbandry—sub-field of study to be indicated. (credit to be arranged).**  
Prerequisites, junior standing and two or more of the following courses: 310, 320, 325, 330, 335, 360, 380, and 385. A combination of study, observation, and employment in selected fields. A planned study program, written reports and final examination required. Enrollment by permission only. MEMBERS OF THE STAFF.
- 400 Problems (credit to be arranged) f, w, s.**  
Advanced studies, individual in character, including a minor research problem. MEMBERS OF THE STAFF.
- 405 Bacteriology of Dairy Products (2) f.**  
Prerequisites, courses 100 and 320. The bacteriology of butter cultures, butter, cheeses, ice cream, concentrated milks, dry milk, fermented milks, and dairy by-products. EDMONDSON, SMITH.
- 408 Dairy Chemistry (3) w (Same as Agricultural Chemistry 408).**  
Prerequisite, Agricultural Chemistry 210 or equivalent. Dairy Technology is recommended. The colloidal and physico-chemical properties of the constituents of milk. GEHRKE.
- 410 Seminar (1) f, w.**  
Critical reviews of scientific literature and current research in the general field of manufacturing (processing, quality control, marketing) or production (breeding, endocrinology, environmental physiology, nutrition). MEMBERS OF THE STAFF.
- 415 Dairy Technology (3) f.**  
The chemical and physical properties of milk and its constituents. EDMONDSON.
- 417 Bacterial Physiology (3) w.**  
Prerequisites, Dairy Husbandry 320 and Agricultural Chemistry 210, or Chemistry 210. It is recommended that D. H. 405 (Bacteriology of Dairy Products) or 415 (Dairy Technology) precede or accompany this course. Advanced study of microorganisms as may be influenced by chemical and physical environment, nutrition, metabolism; function of intermediary catalyst and important industrial fermentations. EDMONDSON.
- 419 Rumen Bacteriology (3) w (Same as Agricultural Chemistry 419).**  
Prerequisites, Botany 202, General Bacteriology; Agricultural Chemistry 210, General Agricultural Chemistry, or equivalent. Lectures and laboratory study of rumen microorganisms. Emphasis will be placed on bacteriological methods, functions of rumen bacteria, and factors which modify the rumen environment. Offered in 1958-59 and alternate years. MERILAN, EDMONDSON.
- 420 Endocrinology (3) f.**  
The hormones of the pituitary and the endocrine glands with special reference to their influence upon growth, reproduction, and milk secretion. TURNER.
- 421 Recent Advances in Endocrinology (1) f, w.**  
A study of current endocrine literature. TURNER.
- 425 Anatomy of the Mammary Gland (2) f.**  
The comparative anatomy of the mammary gland with special reference to the dairy cow. TURNER.
- 430 Physiology of Milk Secretion (3) w.**  
The physiology and biochemistry of milk secretion. TURNER.

- 435 Nutritional Properties of Dairy Products (2) f.**  
Nutritional problems with special reference to milk and its products. EDMONDSON.
- 437 Environmental Physiology (3) f.**  
Lectures, discussions, and laboratory studies on the direct and indirect effects of climatic factors on the physiology and productivity of animals with special reference to cattle. JOHNSON AND MEMBERS OF THE STAFF.
- 440 Bioenergetics and Growth (3) w (Same as Agricultural Chemistry 440).**  
Energy transformation and time relations of growth, senescence, and related processes. JOHNSON AND MEMBERS OF THE STAFF.
- 441 Recent Advances in Environmental Physiology (1) f, w.**  
Reviews of literature and current research with special reference to environmental physiology in relation to climatology of domestic animals. JOHNSON.
- 445 Advanced Dairy Production (2) w.**  
Prerequisite, Dairy Husbandry 310 or equivalent. Advanced phases of milk production. RAGSDALE, MEMBERS OF THE STAFF.
- 450 Research (credit to be arranged) f, w, s.**  
Original investigations, usually in connection with one of the research projects of the Agricultural Experiment Station. MEMBERS OF THE STAFF.
- 490 Research (credit to be arranged) f, w, s.**  
Same as course 450 with the results presented as a dissertation in the Graduate School. MEMBERS OF THE STAFF.

## DRAMATIC ART (See SPEECH)

## ECONOMICS AND BUSINESS

- 41 Industrial Economics (3) f, w.**  
Prerequisite, sophomore standing. Open only to students in the College of Engineering. An introduction to the study of economics designed for engineers. WALKER.
- 51 \*General Economics (5) f, w.**  
Prerequisite, thirty honor points. An introduction to the subject of economics with emphasis on certain fundamental principles and their application to questions of policy. WALKER.
- 104 \*Principles of Marketing (3) f, w.**  
Prerequisites, course 51 and junior standing. A study of institutions, processes, and problems involved in transferring goods from producers to consumers with emphasis on economic and social aspects. SHAWVER, EDWARDS.
- 199 \*Distinction (credit to be arranged) f, w.**
- 202 Industrial Management (3) f, w.**  
Prerequisites, course 41 or 51, and junior standing. A study of the principles of industrial organization and management and their application to such fundamental matters as production, materials, and personnel. MANHART, HOLM, OREY.
- 203 \*Corporation Finance (3) f, w.**  
Prerequisites, course 51 or 41, 6 hours of accounting, and junior standing. The methods, policy, and institutions involved in financing the business corporation; financial analysis of corporations. TRACY, PETERSON, STUBBS.
- 206 \*Transportation (3) f, w.**  
Prerequisites, course 51 and junior standing. The development, operation, and regulation of railroads and other agencies of transportation with special emphasis upon transportation costs and rates. EDWARDS.

- 207 Principles of Selling (2) f, w.**  
Prerequisites, course 104 and junior standing. Principles of salesmanship with particular emphasis on retail selling. LANSFORD.
- 210 \*Labor Problems (3) f, w.**  
Prerequisites, course 51 and junior standing. A survey of the labor force, wages, unemployment, accidents, trade unionism, and collective bargaining from the standpoint of public policy. BAUDER.
- 218 \*General Insurance (4) f, w.**  
Prerequisite, junior standing. A study of the fundamentals of insurance including fire and marine, casualty and surety, and life. BRAY, TRACY.
- 229 \*Money, Credit, and Banking (3) f, w.**  
Prerequisites, course 51 and junior standing. The American monetary and banking systems and their influence upon economic activities. WOOD, LEEMAN, MURDOCK, SAMUELS, STUBBS.
- 254 \*Business Law A (3) f, w.**  
Prerequisite, junior standing. Discussion of business relations in their legal aspects; an introduction to the law and the courts; cases and problems on the law of contracts, personal property and bailments, and sales. PATTERSON.
- 255 Business Law B (3) f, w.**  
Prerequisite, course 254. Cases and problems dealing with the law of agency, partnerships, corporations, and negotiable instruments. PATTERSON.
- 263 Savings and Loan Institutions (3) w.**  
A survey and comparison of the organization, operation, and functions of savings and loan associations, savings banks, credit unions, and other thrift institutions and their relation to the economic structure. STUBBS.
- 300 \*Problems (credit to be arranged) f, w.**
- 311 \*Collective Bargaining (3) f.**  
Prerequisite, course 210. The content, negotiation, and administration of collective labor agreements and settlement of disputes. BAUDER.
- 312 Marketing Management (4) f, w.**  
Prerequisites, course 104 and junior standing. A study of the problems of marketing from the point of view of the executives of a business enterprise. WENNBERG, SHAWVER.
- 313 Personal Insurance (3) f.**  
Prerequisites, course 218 and Mathematics 155. Programming the personal life insurance estate; use of life insurance for business purposes; preparation for C.L.U. examinations. BRAY.
- 314 Retailing (4) f, w.**  
Prerequisites, Accounting 36, course 104, and junior standing. A study of the principles underlying operation of retail stores. SHAWVER, LANSFORD.
- 315 \*Public Revenues (4) f, w.**  
Prerequisite, 8 hours of economics. A study of alternative methods of financing governments. The economic consequences of various government revenue and expenditure programs are analyzed. WALKER, MURDOCK.
- 316 Credits and Collections (2) f, w.**  
Prerequisite, senior standing. The organization and operation of credit departments including credit information and collection methods. PETERSON.
- 318 Property Insurance (3) w.**  
Prerequisite, course 218. Problems in property and casualty underwriting on a professional level. Attention is directed to preparation for C. P. C. U. examinations. BRAY.

- 320 \*Government and Labor (3) f, w.**  
Prerequisite, course 210. Analysis and evaluation of legal regulations of the terms of the employment contract and of the law of labor relations. HOLM.
- 323 Small Business Finance (3) f.**  
Prerequisite, course 203. Formation, finance, and income management of small concerns. Examination of case histories and analysis of problems concerning small businesses. STUBBS.
- 325 \*Foreign Trade (3) f, w.**  
Prerequisites, course 51 and junior standing. A survey of the theory of foreign trade; foreign exchange; export and import practices. WENBERG.
- 329 \*The Banking System and the Money Market (3) w.**  
Prerequisites, course 229 and senior standing. Organization of the money market; credit control procedures and aims; effect of bank expansion and contraction on the money market and on the national income. WOOD.
- 333 \*Investments (3) f, w.**  
Prerequisite, course 203. A study of the investment area, media, and institutional aids, formulation of broad personal investment programs. PETERSON.
- 336 Personnel Management (3) f, w.**  
Prerequisite, course 202 or senior standing. Labor policies and procedures of business enterprises. HOLM.
- 340 \*Real Estate (3) f, w.**  
Prerequisite, senior standing. The real estate field with emphasis on its economic aspects. Principles underlying real estate value, the real estate market, appraisal, financing, taxation. OREY.
- 345 Industrial Organization and Control (3) f, w.**  
Prerequisite, course 202. A study of the principles of organization and control from the point of view of the management of an industrial enterprise. MANHART.
- 347 Wage and Salary Administration (3) f, w.**  
Prerequisites, courses 202 and 210 or 336. Principles underlying the development and administration of wage and salary payment plans. MANHART.
- 351 \*Intermediate Economic Theory (3) f, w.**  
Prerequisites, course 51 and junior standing. An analysis of the influences underlying economic value. The pricing process under various market conditions is considered and the functioning of the enterprise system is evaluated. MURDOCK.
- 353 \*Security Analysis (3) w.**  
Prerequisite, course 333. Classification and analysis of securities, markets, and industries. Formulation of investment policy for institutions and for aggressive personal investors. TRACY.
- 356 Business Security Devices (2) f, w.**  
Prerequisite, course 254. A discussion of the law relating to various security transactions: conditional sales, consignments, pledges, trust receipts, real and chattel mortgages, mechanics' and artisans' liens, and suretyship. PATTERSON.
- 358 Purchasing (2) w.**  
Prerequisites, course 202 and 6 hours of marketing. A study of the organization and functions of purchasing departments with particular emphasis on industrial purchasing. LANSFORD.
- 361 \*Comparative Economic Systems (3) f.**  
Prerequisites, senior standing and 10 hours in economics. Consideration of the enterprise system, socialism, directed economies, and economic planning. LEEMAN.
- 363 Management of Financial Institutions (3) w.**  
Prerequisites, courses 218 and 229. Management of commercial banks, life insurance companies, and other financial institutions with emphasis on their investment and loan portfolios. STUBBS.



- 368 \*Business Fluctuations (3) w.**  
Prerequisite, course 229. The factual background together with an analysis of the causes of economic fluctuations. LEEMAN.
- 370 Market Analysis (3) f, w.**  
Prerequisites, course 312, Accounting and Statistics 234, and senior standing. The use of scientific method in the solution of marketing problems. Roundtable discussions and practice in field investigations. WENNBERG, SHAWVER.
- 372 Sales Control (2) f.**  
Prerequisites, course 312 and senior standing. Marketing costs and the techniques available for controlling selling activities, increasing marketing efficiency, and reducing distribution costs. WENNBERG, SHAWVER.
- 381 Traffic Management (3) w.**  
Prerequisite, course 206. Organization and functions of carrier and industrial traffic departments. Consideration of services; rate making; and I.C.C. procedure. EDWARDS.
- 400 Problems (credit to be arranged) f, w.**  
Graduate students may select topics for study and investigation from the fields suggested by the undergraduate courses listed above. MEMBERS OF THE STAFF.
- 401 Seminar in Marketing I (3) f.**  
Readings, independent investigations, and reports in advanced marketing. Required of all candidates for the M.S. in B.A. degree who elect marketing as their field of concentration. WENNBERG.
- 402 Seminar in Marketing II (3) w.**  
Continuation of 401. WENNBERG.
- 403 Seminar in Business Finance I (3) f.**  
Readings, independent investigations, and reports in advanced business finance. Required of all candidates for the M.S. in B.A. degree who elect business finance as their field of concentration. TRACY.
- 404 Seminar in Business Finance II (3) w.**  
Continuation of 403. TRACY.
- 405 Seminar in Industrial Personnel Management I (3) f.**  
Readings, independent investigations, and reports in advanced industrial and personnel management. Required of all candidates for the M.S. in B.A. degree who elect industrial and personnel management as their field of concentration. BAUDER, MANHART.
- 406 Seminar in Industrial and Personnel Management II (3) w.**  
Continuation of 405. BAUDER, MANHART.
- 411 Advanced Economic Theory I (3) f.**  
An intensive study of selected writings of modern economists in the fields of production theory and value theory. WALKER.
- 412 Advanced Economic Theory II (3) w.**  
A critical examination of the economic literature dealing with resource allocation, factor pricing, and functional distribution. WALKER.
- 413 Current Economic Problems (3)**  
An intensive study of selected current controversial issues in economic theory and policy. MEMBERS OF THE STAFF.
- 420 History of Economic Thought (3) f.**  
Prerequisite, course 351. An analysis of the development of economic theory with emphasis on the evaluation of classical doctrine. MURDOCK.
- 430 Advanced Money and Banking (4-5) w.**  
Prerequisite, course 229. Recent writings and government reports on monetary control. Special attention will be given to the problem of maintaining economic stability. WOOD.

- 431 Central Banking Policies (4) f.**  
Prerequisite, course 329. Examination of central banking procedures and policies and the part they may play in maintaining economic stability. Special attention is given to the connection of the Federal Reserve System with the money and capital markets. WOOD.
- 444 The Entrepreneur (3) f.**  
Prerequisite, course 351 or 412. An analysis of the concept of the entrepreneur and his return as manager, combiner of productive factors, risktaker, and innovator. HOLM.
- 446 Advanced Industrial Management (2) w.**  
Study of the literature in the field of industrial organization and management in order to discover and evaluate trends in the development of a theory and philosophy for performing the management function. MANHART.
- 453 Advanced Financial Management (3) f.**  
Prerequisite, course 203. A study of the organization, goals, and tools of financial management. Examination of the adjustment of financial policies of business to changing conditions. TRACY.
- 479 International Finance (3) w.**  
Prerequisite, course 229 or equivalent. Balance of international payments; international lending; and the problem of international monetary equilibrium. WOOD, LEEMAN.
- 485 Industrial Relations (3) w.**  
Interpretations of trade unionism and of industrial relations. Controversies concerning economic effects of collective bargaining. BAUDER.
- 489 Price and Price Policies (3) f.**  
An intensive study of the theory and practice of price determination in our present economic system. WENNBERG.
- 490 Research (credit to be arranged) f, w.**  
Research in connection with the thesis offered for the degree of Master of Arts or Doctor of Philosophy. MEMBERS OF THE STAFF.  
*The following courses in public 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.*
- 427 Federal Taxation (3) f.**  
HOWARD.
- 447 Labor Law (3) w.**  
HOWARD.

*\*Courses accepted in the College of Arts and Science.*

## EDUCATION

### (A) Educational Psychology

- A102 Educational Psychology (3) f, w, s.**  
Prerequisite, 45 hours of college work. A general elementary course designed to acquaint the student with the scientific psychological principles underlying education. CARTER, POLMANTIER.
- A140 Diagnostic Testing and Remedial Teaching (3) f, w, s.**  
Prerequisites, A102, E121. Technique of using educational and mental tests in the improvement of instruction. Primarily for elementary school teachers. CARTER.
- A302 Group Intelligence Testing (3) f, s.**  
Prerequisites, A102 and C370 or equivalent training. A study of the principles of psychometrics and a critical examination of various group tests of ability. CARTER.

- A303 Individual Intelligence Testing (3) w, s.**  
Prerequisite, A302 or equivalent training. Study of the Stanford-Binet Scale and other individual tests of intelligence. Practice in administering and interpreting the tests. CARTER.
- A339 The Psychology of Exceptional Children (3) f, s.**  
Prerequisite, A102. A study of the special psychological and educational problems of the child who deviates from the normal. FERGEN.
- A400 Problems (credit to be arranged) f, w.**  
ARTLEY, CARTER, POLMANTIER.
- A405 The Psychology of Education (2½-3) f, s.**  
An advanced course covering the entire field of educational psychology. POLMANTIER.
- A407 Psychology of the Elementary School Child (3) w, s.**  
Prerequisite, A405. The application of educational psychology to problems of teaching in the elementary school. ARTLEY.
- A408 The Psychology of Adolescence (2-3) w, s.**  
A critical psychological analysis of studies and investigations of the various aspects of adolescence. POLMANTIER.
- A410 Seminar in Educational Psychology (1-3) f, w.**  
ARTLEY, CARTER, POLMANTIER.
- A490 Research in Educational Psychology (credit to be arranged) f, w.**  
ARTLEY, CARTER, POLMANTIER.

## (B) History and Philosophy of Education

- B125 History of American Education (3) f, w, s.**  
Prerequisite, a course in American history. A comprehensive study of the development of American education. Stresses American educational ideas, the American school system, and the social forces affecting American education. JORGENSEN.
- B390 Comparative Education (2½-3) w.**  
A comparative study of representative systems of education in South America, Europe, and Asia in contrast to the American system. JORGENSEN.
- B397 The Origins of Modern Education (2-3) f.**  
Prerequisite, B125. A study of education practices and theory from ancient times to the present. Emphasizes the historical setting of present-day education. JORGENSEN.
- B400 Problems (credit to be arranged) f, w.**  
JORGENSEN.
- B410 Seminar in the History and Philosophy of Education (1-3) f, w.**  
JORGENSEN.
- B471 Philosophy of Education (2½-3) f, s.**  
A study of the fundamentals of education in the light of modern science and philosophy. JORGENSEN.
- B473 Philosophy of Higher Education in the United States (3) s.**  
A study of the main issues confronting higher education in America today. JORGENSEN.
- B481 Evolution of Educational Thought (2½-3) w.**  
Prerequisite, B397 or B471. A study of the great historic movements and ideas which have affected modern educational practices. JORGENSEN.
- B490 Research in the History and Philosophy of Education (credit to be arranged) f, w.**  
JORGENSEN.

**(C) Educational Administration**

- C370 Educational Statistics (2½-3) f, w, s.**  
Statistical methods for teachers, supervisors, superintendents, and beginning graduate students. DOOLITTLE.
- C390 Introduction to Educational Administration (2-3) f.**  
A survey of the field of educational administration designed to introduce the student to a more critical study of the field. CARPENTER.
- C400 Problems (credit to be arranged) f, w.**  
CAPPS, CARPENTER, MAXWELL.
- C401 Methods of Educational Research (2) f, w, s.**  
Prerequisite, course C370 or equivalent. Principles and techniques of attacking problems in education. Preparation of manuscript for theses, dissertations, and printed reports. CAPPS.
- C410 Seminar in Educational Administration (½-3) f, w, s.**  
CAPPS, CARPENTER, MAXWELL.
- C411 State and National School Administration (2-3) f, s.**  
A fundamental course in the principles and practices of national, state, and county educational administration. CARPENTER.
- C412 City School Administration (2-3) w, s.**  
The principles and problems growing out of the relationships between the local board of education, the employed personnel, and the community. CARPENTER.
- C413 Administration of Pupil Personnel (2) f.**  
Prerequisite, E120 or D140 or equivalent. Problems of pupil-progress in the public school system. CARPENTER.
- C414 School Building Problems (2-3) f, s.**  
The responsibility of the school administrator for the construction, operation, and maintenance of school buildings. CARPENTER, MAXWELL.
- C435 Advanced Educational Statistics (2½-3) f, w, s.**  
Prerequisites, courses C370 and E405 or D407 or their equivalent. Advanced problems in partial correlation, reliability, index numbers, and test and scale construction. CAPPS.
- C440 School Finance (2-3) w, s.**  
Fundamental principles and techniques of public school finance. CARPENTER, MAXWELL.
- C441 Problems in School Finance (2-3) w.**  
Prerequisite, C440. Advanced problems in public school finance. CARPENTER.
- C442 The School Audit (2) s.**  
A study of the principles of school audits including methods of improving financial management. Actual experience in making audits and in preparing school budgets. MAXWELL.
- C446 School Surveys (2-3) w.**  
Prerequisites, C411 and either C412 or C414. The technique of the school survey and its use as an instrument of self-appraisal. CAPPS.
- C451 Problems in State and National School Administration (2-3) f.**  
Prerequisite, C411. CARPENTER.
- C452 Problems in Public Relations (2-3) s.**  
Prerequisite, C412. CARPENTER, TOWNSEND.
- C453 Advanced School Building Problems (2-3) f.**  
Prerequisite, C414. CARPENTER, MAXWELL.

**C454 Problems of School Law Revision (2-3) w.**

Prerequisite, C411. CARPENTER.

**C470 In-Service Course in Educational Administration (credit to be arranged) f, w.**

CAPPS, CARPENTER.

**C473 College Administration (2-3) f.**

A consideration of problems in college organization and administration. CARPENTER.

**C490 Research in Educational Administration (credit to be arranged) f, w.**

MEMBERS OF THE STAFF.

**(D) Secondary Education****D110 Technique of Secondary School Teaching (3) f, w, s.**

Prerequisite, A102. This course deals with the activities of teachers and pupils in the development of learning in various courses in the secondary school. DOOLITTLE, HART, WATKINS.

**D111 Teaching of English (2) f, s.**

Prerequisite, A102. The teaching of language and composition. ROBERTS.

**D112 Teaching of English (2) w.**

Prerequisite, A102. The teaching of reading and literature. ROBERTS.

**D113 Teaching of Speech (2).**

Prerequisite, A102. Aims, standards, problems, and methods in the conduct of high school courses in speech improvement, oral interpretation, dramatics, public speaking, and debating. REID.

**D115 Teaching of Art (2 or 3) f.**

Deals with art education as related to elementary and secondary school curriculum. Art experiences are considered from the standpoint of the child's interest and development. WULFEKAMMER.

**D118 Teaching of Modern Languages (2) f, w.**

Prerequisite, A102. JESSE, NAGEL, BRENT.

**D120 Teaching of Commercial Subjects (2) f.**

Teaching techniques, materials of instruction, current problems, and trends in the major high school commercial courses. WILLIAMS.

**D121 Teaching of Social Studies in the Secondary School (2) f, s.**

Prerequisite, A102. Required of social studies majors and elective for minors. Fundamental problems of teaching social studies on the high school level are considered. HARTWIG.

**D122 Organization of Social Studies in the Secondary School (2) w.**

Prerequisite, A102. Elective for majors and minors in social studies. Theory and practice in organizing social studies courses into units. HARTWIG.

**D124 The Teaching of Science in the Secondary School (2) w, s.**

Prerequisite, A102. McDONALD.

**D125 The Teaching of Latin (2) f.**

Prerequisite, A102. Study of the content of the high school course in Latin and the methods of attaining objectives in the teaching of the language. GWATKIN.

**D128 Teaching of Mathematics in the Secondary School (2) f.**

Prerequisite, A102. DOOLITTLE.

**D132 Elementary Typewriting (2) f.**

A fundamental course in touch typewriting for the purpose of mastering the keyboard and operative parts of the machine. LANG.

- D133 Intermediate Typewriting (2) w.**  
Instruction and practice directed toward improvement of speed and accuracy.  
LANG.
- D134 Advanced Typewriting I (2) f.**  
Preparation of various personal, business, and professional papers and forms with intensive practice in the development of high standards of speed and accuracy. WILLIAMS.
- D135 Advanced Typewriting II (3) w.**  
Typewriting problems representative of various procedures in business offices: training in use of office machines; mimeograph, carbon, duplicator, dictating, and transcribing machines; adding-calculator, etc. WILLIAMS.
- D136 Elementary Stenography (4) f.**  
An elementary study of the theory of Gregg shorthand and the development of shorthand reading and writing techniques. WILLIAMS.
- D137 Intermediate Stenography (3) w.**  
Completion of the study of the theory of shorthand writing correlated with dictation and transcription practice. WILLIAMS.
- D138 Advanced Stenography (2) f.**  
Review of the principles of shorthand theory; intensive practice in dictation, reading, and transcription; study of filing procedure and practices. LANG.
- D139 Secretarial Practice (2) w.**  
Difficult reading and dictation matter and a study of the nature of secretarial work. LANG.
- D140 Secondary School Administration for Teachers (2) f, w, s.**  
Prerequisite, A102. Problems of effective methods of school management from the standpoint of teachers in secondary schools. RUFF.
- D141 Accounting for Teachers (3) f.**  
Introductory subject matter course to give the teacher a basic knowledge of accounting principles as a foundation for high school courses in bookkeeping and accounting. WILLIAMS.
- D150 Student Teaching in the Secondary School (credit to be arranged) f, w, s.**  
Prerequisite, D110. Hours and credit must be arranged with instructor before registration. Application should be made in the term preceding registration. FERGEN, HART, MAXWELL.
- D365 Problems of Teaching Reading in the Secondary School (2-3) w.**  
Prerequisites, A102 and E121 or D110. Study of the fundamental problems of reading in the secondary school. ARTLEY.
- D371 Problems in Visual Education (3) f, s.**  
Prerequisites, A102 and E121 or D110. For classroom teachers. Evaluation of visual education procedures and classroom instruction including the preparation of visual education materials. BALLEW.
- D372 Selection and Utilization of Audio-Visual Materials in Teaching (3) w, s.**  
Prerequisite, E121 or D110. D371 is advisable. BALLEW.
- D373 The Administration of School Libraries (2-3) s (Same as Library Science 373).**
- D374 Acquisition and Preparation of Library Materials (3) (Same as Library Science 374).**
- D375 Use of Library Materials (3) (Same as Library Science 375).**
- D400 Problems (credit to be arranged) f, w.**  
MEMBERS OF THE STAFF.
- D401 Extracurricular Activities (2½-3) w, s.**  
RUFF.

- D403 Problems of Teaching History in College (2) f, s (Same as History 403).**  
Emphasis upon teaching the general courses. Some attention to work in related fields. Required for all Ph.D. candidates in history and recommended for A.M. candidates. ATHERTON, MEMBERS OF THE STAFF.
- D404 Problems in College Composition and Grammar (2) f.**  
MEMBERS OF THE STAFF.
- D406 Secondary School Administration (2½-3) f, w, s.**  
Prerequisite, D140 or its equivalent. Deals with the problems of administration from the point of view of the high school principal. RUFF.
- D407 Tests and Measurements for Secondary Schools (3) f, w.**  
Study of educational tests and measurements for purposes of classification of students and for improvement of instruction in various subject matter fields in secondary schools. DOOLITTLE.
- D409 Principles of Commercial Education (2½-3) s.**  
Prerequisite, D120. A study of basic principles, problems, and trends of commercial education with emphasis on the meaning, purpose, and scope of commercial education in secondary schools. WILLIAMS.
- D410 Seminar in Secondary Education (1-3) f, w.**  
MEMBERS OF THE STAFF.
- D412 Problems in the Teaching of General Science (2) w.**  
For teachers and supervisors of science. Problems of organization, content, and teaching. Includes a summary of the investigations on teaching of science. WATKINS.
- D413 Methods in English Literature in Secondary Schools (2) s.**
- D414 Methods in English Composition in Secondary Schools (2) s.**
- D415 Secondary School Supervision (3) w, s.**  
Methods of improving instruction in junior and senior high school. RUFF.
- D420 Problems in the Teaching of Social Studies (3) w, s.**  
A graduate course for majors and minors in social studies dealing with objectives, methods, curriculum, and other problems in junior and senior high school. ENGLISH.
- D421 Improvement of Instruction in Commercial Subjects (2½-3) s.**  
Prerequisite, D120. A study of the aims and content of commercial courses with emphasis on the securing, evaluating, and organizing of instructional materials. WILLIAMS.
- D430 The Junior High School (2) w, s.**  
A survey of the progress of the junior high school including a study of the more important problems of organization and administration. RUFF.
- D440 The Improvement of Secondary School Teaching (2) f, s.**  
For secondary school teachers, principals, and superintendents with considerable training in education and experience in teaching. Deals with recent developments in secondary school teaching. WATKINS.
- D444 Selected Problems in Secondary School Administration (3) w.**  
Prerequisite, D406, or equivalent. This course will emphasize major problems encountered in the organization and management of the modern secondary school. RUFF.
- D445 The Secondary School Curriculum (3) f, s.**  
For secondary school principals, teachers, and superintendents. Deals with present trends in curricular change and methods of curricular investigation. WATKINS.

- D446 Curriculum Construction for Secondary Schools (3) w, s.**  
Prerequisite, D445 or permission of the instructor. Designed for those engaged in curriculum revision work in the construction of new secondary school courses. WATKINS.
- D470 In-Service Course in Secondary Education (credit to be arranged) f, w.**  
MEMBERS OF THE STAFF.
- D473 College Teaching (2) f, s.**  
Primarily for students who expect to teach in junior or senior colleges or in teachers colleges. Important practical matters in college teaching will be considered. WATKINS.
- D490 Research in Secondary Education (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.
- D491 Research in College Teaching (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.

### (E) Elementary Education

- E90 The Elementary School (2-3) f.**  
A beginning class in school management for students preparing for the sixty-hour certificate.
- E91 Teaching in the Elementary School (4-6) w.**  
A beginning course in techniques and methods of teaching for students preparing for the sixty-hour certificate. May include supervised student teaching.
- E96 Children's Literature (2) f, s.**  
SMITH.
- E97 Conservation for Elementary School Teachers (2-3) s.**
- E98 Introduction to Science for Elementary School Teachers (2-3) s.**  
WATKINS.
- E99 Arithmetic for Teachers (2) f, s.**  
DAVIS, KNOWLES.
- E107 Teaching of Geography in the Elementary School (2) f.**  
Prerequisite, Geography 6 or 60 hours of college credit. A study of the methods involved and the geographic knowledge needed in the teaching of geography.
- E118 Art Activities in the Kindergarten and Primary Grades (3) f, s.**  
Consideration of art activities as related to the interests and experiences of children. Stresses integration of art activities. Provides laboratory experience with various media. WULFEKAMMER.
- E119 Art Activities in the Intermediate Grades (3) w, s.**  
Consideration of art and handwork activities as a part of the regular school program. Provides laboratory experience with various media and study of art principles. WULFEKAMMER.
- E120 Elementary School Organization and Management (3) f, w, s.**  
A study of the major problems of organization and management from the point of view of the teacher in the elementary school. HART.
- E121 Technique of Teaching in Elementary Schools (2-3) f, w, s.**  
Prerequisite, A102. A study of current principles and practices relating to the instructional activities of the elementary classroom teacher. KNOWLES, FITZGERALD.
- E122 Child Study (3) f, s.**  
Prerequisite, A102. Presents the physical, mental, social, and emotional growth of the child from the prenatal period to the sixth year. TAYLOR.



- E123 Kindergarten Methods and Management (3) w, s.**  
A course in kindergarten theory and practice. TAYLOR.
- E131 Field Work in Improvement of Teaching (2-6).**
- E135 Methods of Teaching Home Economics in Elementary and Junior High School (2) f, w, s.**  
Prerequisites, A102 and E121. A study of organization of materials and teaching procedures for prospective elementary and junior high school teachers of home economics and for elementary teachers who are planning to give emphasis to homemaking education as a part of their regular classroom responsibilities.
- E141 Readiness for the Language Arts (2) f.**  
Prerequisites, A102, E121. A study of school readiness, particularly in the language arts. Designed for kindergarten and primary teachers. ARTLEY.
- E151 Student Teaching in the Elementary School (credit to be arranged) f, w, s.**  
Prerequisites, A102 and E121. Hours and credit must be arranged with the instructor before registration. Application should be made in term preceding registration. FERGEN, HART, MAXWELL.
- E325 Teaching Reading in the Elementary School (3) f, s.**  
Prerequisites, A102 and E121. A study of the materials and methods used in teaching reading in the elementary grades. ARTLEY.
- E330 Problems in Teaching Mentally Retarded Children (2).**  
Prerequisite, A102. FERGEN.
- E335 Problems in Teaching the Orthopedically Handicapped (2) s.**  
Prerequisite, A102. FERGEN.
- E338 Problems of Teaching Mentally Superior Children (2).**  
Prerequisite, A102. FERGEN.
- E340 Supervision of Art Activities (2) w.**  
Consideration of the purposes and practices of art experiences in the elementary and secondary schools. Designed for teachers, supervisors, and administrators. WULFEKAMMER.
- E366 Problems of Teaching the Language Arts (3) f.**  
Prerequisites, A102 and E121. A study of procedures used in teaching the integrated language arts in the elementary grades. ARTLEY.
- E367 Problems of Teaching Arithmetic in the Elementary Schools (2½-3) w, s.**  
Prerequisites, A102 and E121. Presents purposes, techniques, and materials. Observation and study of arithmetic classes in the laboratory school. KNOWLES.
- E368 Problems of Teaching the Social Studies in the Elementary School (2) w.**  
Prerequisites, A102 and E121. Problems in the preparation and teaching of units with suitable materials and techniques. HARTWIG, PHILLIPS.
- E369 The Analysis and Correction of Reading Disabilities (2-3) s.**  
Prerequisites, A102 and D110 or E121. A study of causes of reading disabilities and of the procedures that may be used to diagnose and correct them. ARTLEY, HARDIN.
- E370 Elementary School Curriculum (2) f.**  
Prerequisites, A102 and E121. A survey of modern educational thought with regard to objectives, content, and methods in the elementary school curriculum. TOWNSEND.
- E375 Rural School Supervision (2).**  
A course intended primarily for country school superintendents. A critical examination of some of the important problems of rural school supervision will be included. PHILLIPS.

- E400 Problems (credit to be arranged) f, w, s.**  
Selected problems to meet the needs of individual students. MEMBERS OF THE STAFF.
- E404 Elementary School Supervision (3) f, s.**  
The course is organized to study such problems in the field of supervision as will meet the needs of superintendents, principals, and special supervisors. PHILLIPS.
- E405 Tests and Measurements for Elementary Schools (3) w, s.**  
Study of educational tests and measurements for the elementary schools from the points of view of the teacher, the supervisor, and the administrator. DOOLITTLE.
- E406 Curriculum Construction in Elementary Schools (3) w, s.**  
Prerequisites, A102 and E121. PHILLIPS.
- E408 Elementary School Administration (3) w, s.**  
A specialized course in elementary school administration for school administrators, supervisors, and teachers. TOWNSEND.
- E410 Seminar in Elementary Education (1-3) f, w, s.**  
MEMBERS OF THE STAFF.
- E415 Clinical Problems in Child Study I (3).**  
Prerequisites, A303, E325 or E365, and E369. A course providing clinical experience in diagnosing educational and related psychological learning problems of school children. ARTLEY, HARDIN.
- E416 Clinical Problems in Child Study II (3).**  
Prerequisites, A303, E365, E369, and E415. A course providing clinical experience in applying remedial procedures to children having educational and related learning problems. ARTLEY, HARDIN.
- E470 In-Service Course in Elementary Education (credit to be arranged) f, w.**  
MEMBERS OF THE STAFF.
- E490 Research in Elementary Education (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.

## **(F) Vocational Education**

### *Agricultural Education*

- F100 Foundations of Vocational Agriculture (3) f, w.**  
An orientation course for students majoring in agricultural education. Prerequisite to other professional courses in agricultural education. RODERICK.
- F105 Special Methods in Teaching Vocational Agriculture (3) f, w.**  
The methods of teaching vocational agriculture in secondary schools. EKSTROM.
- F107 Programs for Out-of-School Groups in Vocational Agriculture (2) f, w.**  
A study of programs in vocational agriculture for out-of-school groups with particular emphasis on young farmer and adult farmer classes. RODERICK.
- F120 Facilities and Departmental Programs in Vocational Agriculture (2) f, w.**  
A study of buildings and equipment and the planning of programs for departments of vocational agriculture. EKSTROM, RODERICK.
- F158 Student Teaching in Vocational Agriculture (credit to be arranged) f, w, s.**  
Supervised observations of vocational agriculture teaching and actual participation in teaching activities together with conferences as provided. EKSTROM, RODERICK.
- F300 Problems (credit to be arranged) f, w, s.**  
Individual study of special phases of agricultural education. MEMBERS OF THE STAFF.

- F305 Off-Campus Instruction in Agricultural Education (2) f.**  
Prerequisite, F156. Course designed for beginning teachers. Campus meetings at beginning and at close of semester. EKSTROM, RODERICK.
- F310 Vocational Agriculture in the Secondary School (2-3) f, w.**  
Prerequisites, F100, F105. Problems pertaining to the high school program of vocational agriculture with emphasis upon organization of courses and application of instruction. EKSTROM, RODERICK.
- F320 Adult Education Problems in Vocational Agriculture (2-3) f, w.**  
Prerequisites, F100, F120. Objectives, organization, and procedures for conducting classes in vocational agriculture for out-of-school groups. EKSTROM, RODERICK.
- F400 Problems (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.
- F410 Seminar in Agricultural Education (1-3) f, w, s.**  
MEMBERS OF THE STAFF.
- F440 Analyzing Needs and Planning Programs of Supervised Farming (2-4) f, w, s.**  
Surveying farming situations. Developing activities which lead to establishing classes. Evaluating programs with different groups. EKSTROM, RODERICK.
- F451 Evaluation and Program Planning in Agricultural Education (2-4) f, w.**  
Prerequisite, F310. Surveying needs and establishing goals and objectives. Developing programs with suggestions as to means of accomplishment and evaluation of outcomes. EKSTROM.
- F470 In-Service Course in Agricultural Education (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.
- F490 Research in Agricultural Education (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.  
*Industrial Education*
- F5 Mechanical Drawing for Teachers (3) s.**  
Sketching, lettering, pictorial drawing, orthographic projection, dimensioning, developments, working drawings, and blueprint reading.  
*For Engineering Drawing, see Mechanical Engineering.*
- F8 General Shop (3) f, s.**  
An introductory course in industrial arts, involving a study of the common tools, materials, processes, and products of industry. DORY.
- F10 Fundamentals of Woodwork (3) w, s.**  
Hand tool processes, machine operation, wood and wood products, assembling and fastening, simple finishing. DORY.
- F12 General Metal Work (3) w, s.**  
A study of the tools, materials, and processes involved in sheet metal, ornamental iron work, welding, forging, casting, bench work, and the machining of metals. DORY.
- F14 Applied Electricity (3) f, s.**  
Projects and related studies involving principles of electricity, electrical construction, repair, and maintenance. DORY.
- F106 Advanced Woodwork (3) w, s.**  
Design, construction, and finish of original projects in wood involving machine operations, spray gun finishing, inlaying, and upholstering. DORY.
- F115 Tools and Materials (2) w, s.**  
Sources, manufacture, supply, and cost of shop materials and equipment; sharpening, care, and repair of hand and machine tools. DORY.
- F125 Art Metal Work (2) w, s.**  
Forming, heat treating, soldering, spinning, etching, electro-plating, polishing, and finishing of projects in brass, copper, aluminum, pewter, and silver. DORY.

- F150 Industrial Art Design (3) w, s.**  
Principles of structural design, contour, and surface enrichment applied to three-dimensional objects; sketches, details, and working drawings of shop projects. DOTY.
- F160 Architectural Drawing and Home Design (3) f, s.**  
Problems and procedures in planning and constructing a home. The student will draw and write the specifications for a complete set of house plans. DOTY.
- F301 Problems in Industrial Education (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.
- F321 Vocational Guidance (2-3) f, s.**  
Problems, methods, and procedures involved in assisting individuals in choosing, preparing for, entering upon, and progressing in their vocation. For teachers, counselors, school administrators. LONDON.
- F365 Occupational Analysis (2) f, s.**  
Techniques and procedures of analyzing occupations into their basic elements. Required of trade teachers and coordinators. BROWN.
- F375 Selection and Organization of Subject Matter (3) f, s.**  
Objectives, content selection and arrangements, preparation of job and informational assignments, course making. For shop teachers and coordinators. LONDON, BROWN.
- F390 Principles of Trade and Industrial Teaching (2-3) f, s.**  
The shop teacher's job; learning in the school shop; discipline and shop management; teaching devices and procedures; measurement of achievement; inter-school and community relations. LONDON, BROWN.
- F392 Problems of the Coordinator (2) s.**  
Problems and procedures in the operation of cooperative part-time and evening school programs. Restricted to those who can qualify as coordinators. BROWN.
- F396 Organization and Administration of Industrial Education (2-3) w, s.**  
Problems and procedures in organizing and administering all-day, part-time, and evening industrial programs. Federal laws, state plans, local practices. For teachers, supervisors, administrators. LONDON, BROWN.
- F401 Problems (credit to be arranged) f, w.**  
MEMBERS OF THE STAFF.
- F404 History of Industrial Education (2) s.**  
Development of industrial education in America with special attention to European influences, philosophical concepts, issues, motivating factors, leaders, movements, and current trends. LONDON, BROWN.
- F406 Problems of Adult Education (2-3) s.**  
Rise of adult education movement; learning abilities, educational interests, and needs of adults; problems and procedures in organizing and operating adult education programs. BROWN.
- F411 Philosophy of the Practical Arts and Vocational Education (2½ or 3) f, s.**  
Nature and purpose of the practical arts and vocational education in the modern school. For teachers of agriculture, business, home economics, industrial subjects, and administrators. LONDON.
- F412 Seminar in Industrial Education (1-3) f, w.**  
MEMBERS OF THE STAFF.
- F415 Occupational Surveys (3) s.**  
Problems, methods, and procedures in planning and conducting community occupational surveys. For counselors, teachers, supervisors of vocational education, school administrators, and employment service personnel. BROWN.

- F471 In-Service Course in Industrial Education (credit to be arranged) f, w.**  
MEMBERS OF THE STAFF.
- F491 Research in Industrial Education (credit to be arranged) f, w.**  
MEMBERS OF THE STAFF.  
*Home Economics Education*  
Student Teaching of Vocational Home Economics. See D150.
- F175 Organization of Vocational Home Economics (2-3) f, w.**  
The vocational course, preparation of units and lesson plans, methods of teaching, books, illustrative material, and equipment are studied in this course. MOTTER.
- F180 Methods of Teaching Vocational Home Economics and Related Subjects (3-4) f, w, s.**  
Prerequisite, F175. Methods of teaching home economics and related subjects on the elementary, secondary, and adult level. MOTTER, GARRETT.
- F376 Homemaking Education for Adults (2-3) f, w, s.**  
Prerequisites, D150 and F180. A study of the problems in organization and presentation of programs in homemaking education for adults. Includes laboratory experiences. GARRETT.
- F402 Problems (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.
- F413 Seminar in Home Economics Education (1-3) f, w, s.**  
GARRETT.
- F430 Supervision of Student Teaching of Vocational Home Economics (credit to be arranged) f, w, s.**  
Prerequisites, D150, F175, F180. Planned for those who are preparing to become supervisors of students teaching in vocational training centers. MOTTER.
- F446 Curriculum Construction in Home Economics (credit to be arranged) f, w, s.**  
Planned for home economics teachers who are engaged in curriculum revision work, or for those who are interested in construction of a new course. MOTTER.
- F472 In-Service Course in Home Economics Education (credit to be arranged) f, w.**  
GARRETT.
- F473 Trends in Home Economics Education (3) f, s.**  
This course furnishes opportunities for experienced teachers to study problems of teaching, supervision, critic teaching, or administration of home economics and related subjects. MOTTER, GARRETT.
- F492 Research in Home Economics Education (credit to be arranged) f, w.**  
MEMBERS OF THE STAFF.

## (G) Guidance and Counseling

- G75 Introduction to Education (2) f, w.**  
A study of education as a profession. Description of training programs required to reach various educational objectives. Analysis of the individual's aptitude for teaching. EUBANK.
- G395 Principles and Procedures of Student Personnel Work (2½-3) f, w, s.**  
A study of student personnel work in educational institutions—the objectives of student personnel work and certain pertinent techniques. FERGUSON, POL-MANTIER.
- G397 Occupational and Educational Information (2½-3) f, s.**  
Prerequisite, G395 (or F321). The nature and use of occupational and educational information. Characteristics and requirements of occupations and training opportunities. The process of vocational choice. FERGUSON.

- G400 Problems (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.
- G404 Individual Inventory (2½-3) f, w, s.**  
Prerequisites, G395 (or F321) and C370. Interpretation of educational and psychological test data and data in personnel records with particular emphasis on the use of the data in counseling. FERGUSON, CALLIS, MCGOWAN.
- G406 Mental Hygiene (2½-3) w, s.**  
Prerequisite, A405 or equivalent. The psychology of mental health. Emphasis on normal personality and improved self-management. POLMANTIER.
- G407 Counseling Methods (2½-3) f, w, s.**  
Prerequisites, G395 (or F321) and A405 or equivalent. Study of counseling as a professional field; the process of counseling; counseling *re* educational, occupational, social, and personal adjustment. FERGUSON, CALLIS, MCGOWAN.
- G408 Student Personnel Administration (2-3) f, s.**  
Prerequisites, G395 (or F321) and A405 or equivalent. The organization and the administration of student personnel services in elementary, secondary, and higher educational institutions. CALLIS, FERGUSON.
- G410 Seminar (½-1) f, w, s.**  
MEMBERS OF THE STAFF.
- G411 Vocational Rehabilitation I (2) f.**  
Vocational handicaps and methods of rehabilitating the vocationally handicapped. State and national provisions for vocational rehabilitation services. MCGOWAN.
- G412 Vocational Rehabilitation II (2) w.**  
Continuation of G411. MCGOWAN.
- G415 Supervised Practice in Counseling (3-6) f, w, s.**  
Prerequisites, G397, G404, G406, G407 or equivalent and consent of the instructor. Supervised practice of counseling in an approved counseling agency. CALLIS, FERGUSON, MCGOWAN.
- G422 Advanced Counseling Theories (2) w.**  
Prerequisite, G415 or equivalent. Study of historical and contemporary theories of counseling. Advanced study of techniques and research finding. CALLIS.
- G470 In-Service Course in Counseling (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.
- G490 Research (credit to be arranged) f, w, s.**  
Independent research leading to the presentation of a thesis. MEMBERS OF THE STAFF.

## (H) Physical Education

- H65 Elements of Health Education (2) f, w, s.**  
For elementary and high school teachers. The organization of the school health program, the adaptation of health materials to elementary and high school levels. MCKEE, CLINE.
- H119 Teaching of Physical Education (2) w.**  
Prerequisite, A102. Required of physical education majors and minors. Teaching methods, selection of activities, program planning for elementary, secondary, college physical education. KELLER, CLINE, MCKEE.
- H124 Rhythmic Activities for Elementary Schools (2) w, s.**  
A study of the basic philosophy of children's rhythms as well as practical suggestions for its application with singing games and selected folk dances. TAYLOR.

- H126 Physical Education Programs for Secondary Schools (3) s.**  
Theoretical and practical work with programs and activities suitable for use in the high school physical education program. MCKEE.
- H127 Physical Education Activities for the Elementary School (2) f, w, s.**  
Objectives of physical education for the elementary school child with application of choice of activities and organization of program. Theory and practice in rhythms and games. MCKEE.
- H152 History and Principles of Physical Education (3) f, w.**  
Prerequisites, anatomy and physiology. A historical survey of the aims and content of previous physical educational systems combined with an analysis of prevailing conditions which influence modern American programs. EDWARDS, KELLER.
- H364 Problems of Physical Education for Elementary Schools (2) s.**  
Prerequisite, H127. MCKEE, KELLER.
- H365 The Secondary School Curriculum in Physical Education (2) f, s.**  
Prerequisite, H152. A critical examination of physical education activities and programs leading to the construction of general and special curricula for secondary schools. HINDMAN, BUNKER.
- H366 Intramural Sports (2) w, s.**  
A consideration of the objectives and principles in the administration of intramural sports in high schools and colleges. EDWARDS, STANKOWSKI.
- H370 Tests and Measurements in Physical Education (2½-3) w.**  
Measurement of aptitude and achievement in physical education activities with particular reference to the determination of standards. HINDMAN, BUNKER.
- H380 Kinesiology (3) f, w.**  
Prerequisite, anatomy. A study of joint and muscular mechanisms of the body and the relationships of muscular activity to bodily development and efficiency. KELLY.
- H381 Theory and Practice of Remedial Gymnastics, Women (2) w.**  
Prerequisites, elementary anatomy, elements of physiology, and H380. Analysis of postural problems and application of corrective measures. KELLY.
- H390 Administration of Physical Education (3) w, s.**  
Prerequisites, H119 and sports technique courses. Problems of administrators and supervisors; finances, construction, equipment, care of physical education plant, selection of staff. MCKEE, EDWARDS, BUNKER.
- H391 Problems of Health Education (3) w, s.**  
Prerequisite, a course in hygiene or preventive medicine. Principles and methods of health supervision, health service, and health instruction. CLINE.
- H400 Problems (1-6) f, w, s.**  
HINDMAN, MEMBERS OF THE STAFF.
- H410 Seminar in Physical Education (1-2) f, w, s.**  
Reports on selected topics are presented by students and instructors and criticized by the group. EDWARDS, HINDMAN, BUNKER.
- H420 Administration of Interschool Athletics (3) w, s.**  
The organization and management of interscholastic and intercollegiate athletics. EDWARDS, BUNKER.
- H440 Scientific Studies in Physical Education (3) f, s.**  
A survey and critical evaluation of reports of research in the field of physical education. Does not include the carrying on of research. HINDMAN, BUNKER.
- H490 Research in Physical Education (credit to be arranged).**  
HINDMAN.

**(J) Music Education**

- J127 Song Literature for Children (1) f, s.**  
Prerequisite, Introduction to Music or equivalent training. Surveys of song literature used in the elementary school with some attention given to the fundamentals of singing. MATHEWS.
- J129 Elementary School Music (2) f, w, s.**  
Prerequisite, Fundamentals of Music or its equivalent, or sufficient piano instruction. Music methods and materials for teachers in the elementary school. One recitation and two laboratory periods per week. MATHEWS.
- J130 Teaching of High School Music (3) w, s.**  
A course covering all types of high school music. MATHEWS.
- J131 Teaching Music in the Elementary School (3) f.**  
Intended for students majoring in music education. MATHEWS.
- J132 Teaching of Instrumental Music (2) f, s.**  
Intended for all majors in instrumental music education. MATHEWS.
- J380 Music Supervision (2) w, s.**  
Prerequisite, J131 or equivalent. The philosophy and practice of supervision as applied to the music program of a city or county school system. For music education majors. MATHEWS.
- J381 Problems in School Music Teaching (2-5) s.**  
Prerequisites, teaching experience and permission of the instructor. The student is expected to submit problems which he wishes to work out in the course. MATHEWS.
- J400 Problems (2-5) f.**  
Prerequisite, completion of major in music education. Covers all phases of music education and is arranged to fit the needs of each individual student. MATHEWS.
- J417 Curriculum Materials in Music Education (2-5) w, s.**  
Prerequisites, J130, J131. A study of all types of instructional materials in school music for various grade levels. MATHEWS.
- J418 Problems in Instrumental Music (3) s.**  
Prerequisites, graduate standing and experience in teaching instrumental music. Problems in organization and class teaching with demonstrations by the instructor and members of the class. MATHEWS.
- J419 Problems in High School Vocal Music (3) s.**  
Designed for graduate students with teaching experience. Deals with fundamentals of voice development, materials, and problems met in the vocal ensembles of the high school. MATHEWS.
- J470 In-Service Course in Music Education (credit to be arranged) f, w.**

**ELECTRICAL ENGINEERING**

- 119 Fundamentals of Electrical Circuits Lecture (2) f, w, s.**  
Prerequisites, Physics 24 and accompanied by EE 120. Direct and alternating current circuits. CAPPS, COMBS.
- 120 Fundamentals of Electrical Circuits Laboratory (1) f, w, s.**  
Prerequisite, must be accompanied by EE 119.
- 121 Fundamentals of Electrical Machinery Lecture (2) f, w, s.**  
Prerequisites, EE 119 and accompanied by EE 122. Characteristics of direct and alternating machines; fundamentals of electronics and electron tubes. CALABRESE, COMBS.



**122 Fundamentals of Electrical Machinery Laboratory (1) f, w, s.**

Prerequisite, must be accompanied by EE 121.

Note: Courses 119, 120, 121, 122 are not open to students enrolled in electrical engineering.

**150 Elements of Electrical Engineering (5) f, w, s.**

Prerequisites, Physics 23 and accompanied by Mathematics 201. Direct-current circuits; fundamentals of electrostatics and electromagnets. (Lect. and lab.) TUDOR, CALABRESE.

**210 Alternating Current Circuits (4) f, w.**

Prerequisites, EE 150 and Mathematics 201. Fundamental relationships in single and polyphase networks with sinusoidal and nonsinusoidal voltages and currents. (Lect. and lab.) LAGO, BENNINGFIELD.

**240 Electrical Machinery I (4) f, w.**

Prerequisites, EE 150 and accompanied by EE 210. Direct-current machinery including generators and motors. (Lect. and lab.) TUDOR, CALABRESE.

**249 Electrical Machinery II (5) f, w.**

Prerequisites, EE 210 and EE 240. Power frequency transformers, polyphase transformer connections. Introductory study of polyphase induction motors and synchronous machines. (Lect. and lab.) LAMB.

**275 Transmission Lines and Circuits (3) f, w.**

Prerequisite, EE 210. Electric transmission lines at low and high frequencies; network theorems; four-terminal network filters. (Lect. and lab.) LAGO, CHENG.

**280 Electronics and Electron Tubes (3) f, w.**

Prerequisite, EE 210. Electron ballistics, thermionic and photoelectric emission; semiconductors; gaseous conduction; characteristics of high vacuum and gas-filled tubes. (Lect. and lab.) VREDENBURGH, CAPPS.

**300 Problems (2-4) f, w.**

Prerequisite, consent of instructor. Analytical or experimental problems pertaining to electrical circuits, machines, or electronics. MEMBERS OF THE STAFF.

**305 Illumination (3) f.**

Prerequisite, EE 280. Laws of radiation; characteristics of point and surface sources of light; illumination calculations; lighting design. (Lect. and lab.) HOGAN.

**315 Transients in Electric Circuits (3) f, w.**

Prerequisite, EE 210. Transient and steady-state behavior of circuits with constant, sinusoidal, and pulse voltages. (Lect. and lab.) LAGO, BENNINGFIELD.

**320 Vacuum Tube Circuits (4) f, w.**

Prerequisite, EE 280. Rectifier circuits and power supplies; small signal amplifiers; oscillators; power amplifiers. (Lect. and lab.) VREDENBURGH, BENNINGFIELD.

**325 Fundamentals of Acoustical Engineering (3) w.**

Prerequisite, EE 275. A study of fundamental concepts of sound, sound production, electroacoustic devices, and sound control. (Lect. and lab.) WADELICH.

**330 Radio Circuit Analysis (3) w.**

Prerequisite, EE 320. Types of modulation systems; theory of detection; triggering and wave-shaping circuits; transistor circuit analysis. (Lect. and lab.) WALLIS.

**335 Television Engineering (3) w.**

Prerequisite, EE 320. Electronic and radio engineering fundamentals as applied to the special problems of television. (Lecture)

**340 Ultra High Frequency Techniques (3) f.**

Prerequisites, EE 275 and accompanied by 320. Ultra high frequency generation and propagation; wave guides and resonant chambers. (Lect. and lab.) WADELICH.

- 355 Electrical Machinery III (3) f.**  
Prerequisite, EE 249. Additional topics on transformers and the steady-state performance of synchronous machines not covered in EE 249. Parallel operation of generators; double reaction theory as applied to salient pole synchronous machines. (Lect. and lab.) LAMB.
- 356 Induction Machinery (3) w.**  
Prerequisite, EE 249. Polyphase induction motor performance computations; starting and speed control; single-phase motor theory and performance computations. (Lect. and lab.) HOGAN.
- 360 Control Systems (3) w.**  
Prerequisites, EE 315 and accompanied by EE 249 and EE 320. Introduction to the theory of servomechanisms including transient analysis and design methods based on transfer functions. HOGAN.
- 370 Power Transmission and Distribution (3) w.**  
Prerequisites, EE 275 and EE 249. Transmission power systems and analysis of their operation. TUDOR.
- 380 Circuit Analysis of Power Systems (3) w.**  
Prerequisites, EE 249 and EE 275. Symmetrical component theory, short circuit calculations, unsymmetrical faults on balanced three-phase systems, transmission lines with distributed constants, unsymmetrical components. (Lecture) HOGAN.
- 400 Problems (2-4) f, w, s.**  
Prerequisite, graduate standing. Original investigation of problems pertaining to electric circuits, machinery, electronics, or communication. MEMBERS OF THE STAFF.
- 410 Seminar (1) f, w.**  
Prerequisite, graduate standing. Reviews of recent investigations and projects of major importance. MEMBERS OF THE STAFF.
- 411 Advanced Electrical Machinery Theory (3) f.**  
Prerequisite, equivalent of EE 355. Study of electrical machinery fundamentals necessary for understanding the advanced literature. Applications of symmetrical components to machinery analysis. LAMB.
- 415 Tensor Analysis of Electric Circuits and Machines (3) w.**  
Theory of the application of matrices and tensors to the analysis of electric circuits. Introduction to the analysis of electrical machines. HOGAN.
- 430 Power-System Stability (3) w.**  
Performance of synchronous machines under transient conditions; power-system stability; system fault computations using symmetrical components. HOGAN.
- 435 Power-System Relaying (3) w.**  
Prerequisite, EE 380 or equivalent. Theory of relaying systems for power-system protection and improvement of power-system stability. Relay coordination. Performance of relays during transient swings and out-of-step conditions. TUDOR.
- 440 High Vacuum Electron Tubes (3) f.**  
Study of the fundamental relationships governing the design of conventional types of high vacuum tubes and electron beam focusing systems. WALLIS.
- 441 High Frequency Tubes (3) w.**  
Prerequisite, EE 440. Study of high frequency effects in electron tubes. Theory and operation of ultra high frequency tubes including klystrons, magnetrons, and traveling wave tubes. WALLIS.
- 445 Electrical Conduction in Gases and Semiconductors (3) f.**  
Study of the basic concepts and theories pertaining to electrical conduction in gases and solid-state semiconductors with special attention to gas discharge tubes, semiconductor rectifiers, and transistors. WALLIS.

- 450 Research (credit to be arranged) f, w, s.**  
Independent investigation and report on some problem in the field of electrical engineering. Maximum credit for courses 400 and 450 limited to 7 hours. MEMBERS OF THE STAFF.
- 455 Analog and Digital Computer Theory (3) f.**  
Discussion of circuit theory and operating techniques of digital and electronic analog computers. VREDENBURGH.
- 458 Static Electromagnetic Fields (3) f.**  
A study of the properties of static electric and magnetic fields with application to problems encountered in electrical engineering. Includes mathematical and graphical methods for mapping such fields. LAMB.
- 460 Advanced Electric Circuit Analysis (3) f.**  
Specialized study of mathematical analysis as applied to the solution of circuit networks with fixed and variable parameters. LAGO.
- 461 Network Synthesis (3) w.**  
Prerequisite, EE 460. Study of two-terminal and two-terminal-pair network synthesis including realizability conditions and synthesis procedures such as: Foster's, Cauer's, Darlington's, and Dasher's. LAGO.
- 465 Feedback Theory and Applications (3) w.**  
Study of such topics as stability criteria, complex-plane plots, attenuation-phase diagrams, root-locus methods, synthesis through pole-zero configurations. LAGO.
- 470 Operational Circuit Analysis (3) f.**  
Application of the operational calculus to the solution of linear electrical circuits with lumped or distributed parameters and under steady-state and transient conditions. WADELICH.
- 471 Frequency Analysis and Circuit Noise (3) w.**  
Frequency spectra of waves; types of noise voltages; effect of noise in linear and nonlinear electric circuits. WADELICH.
- 480 High Frequency Transmission and Radiation (3) f.**  
Study of skin effect; theory of transmission lines, wave guides, and antennas. WADELICH.
- 481 Antennas (3) w.**  
Point and aperture sources; simple antennas; antenna arrays; slot, horn, and lens antennas. WADELICH.
- 490 Research (credit to be arranged) f, w, s.**  
Independent investigation of some problem or design in the field of electrical engineering to be presented in the form of a thesis. MEMBERS OF THE STAFF.

## ENGLISH

### Composition and Creative Writing

- 1 Composition (3) f, w, s.**  
Detailed study and practice in construction and the kinds of composition. MEMBERS OF THE STAFF.
- 2 Composition (3) f, w, s.**  
A continuation of course 1. MEMBERS OF THE STAFF.
- 3 Composition (3) f.**  
For freshmen showing unusual ability in placement tests. If passed with E or S grade, fulfills freshman English requirement. MEMBERS OF THE STAFF.
- 50 Narration (3) f, w.**  
Prerequisite, six hours of Composition, or the equivalent, and one semester of any course in literature. PEDEN, MEMBERS OF THE STAFF.

- 60 Exposition (3) f, w, s.**  
Prerequisite, six hours of Composition or the equivalent. Study and practice of expository writing including original essays. JOHNSON, MEMBERS OF THE STAFF.
- 61 Technical Writing (3) f, w.**  
Prerequisite, junior standing except Forestry, second semester sophomore. For students in such professional fields as engineering, forestry, and geology. Emphasis on technical papers, reports, and correspondence. MEMBERS OF THE STAFF.
- 302-303 The Writing of Fiction (3) f, w; (3) w.**  
An advanced course in fiction writing with group discussions and individual conferences. Admission determined by consent of instructor. PEDEN, DRUMMOND.
- 304 The Critical Essay (3) w (Same as Library Science 304).**  
A workshop course for advanced students in writing. Discussion, in essay form, of ideas and literary values. Admission determined by consent of instructor. NEIHARDT.
- 305 Book Reviewing (2) f, w, s (Same as Library Science 305 and Journalism 305).**  
Prerequisite for journalism students, Journalism 105. Analysis of professional book reviewing with frequent written reviews. Student reviews published in *The Columbia Missourian* and other papers. PEDEN.
- 313-314 The Writing of Poetry (3) f; (3) w.**  
Poetry regarded as a mode of understanding. Poetic values related to our whole scale of values. Practical consideration of verse techniques. NEIHARDT, DRUMMOND.

## Literature and Languages

- 5-6 Masterpieces (2) f, w; (2) f, w.**  
The great writings of modern English and American authors read and examined with a view to increasing the student's appreciation of literature. JOHNSON.
- 30-40 English Life and Literature (3) f, w, s; (3) f, w, s.**  
A general survey course in English literature. Not open to freshmen. These courses or their equivalent are required for all upperclass English courses except General Literature, World Literature, The English Language (Part I), The English Novel, and The American Novel. CLARK, MEMBERS OF THE STAFF.
- 102-103 General Literature (2) f; (2) w.**  
General reading in American and European literature. Designed primarily for students not specializing in literature. JOHNSON.
- 317-318 Introduction to Criticism (3) f; (3) w.**  
First semester: the principles of literary criticism and a study of their history from Plato to Croce. Second semester: twentieth century criticism in its relation to modern poetry and prose. CLARK.
- 319 The English Language, Part One (3) f.**  
A study of Modern English as a language: sounds, structure, meaning. PACE.
- 320 The English Language, Part Two (3) w.**  
A historical study of the English language focusing on three periods in its development: Old, Middle, and Early Modern English. PACE.
- 321-322 World Literature (3) f; (3) w, s (Same as Library Science 321-322).**  
Prerequisite, junior standing. A study of selected masterpieces of world literature. WEATHERLY, GWATKIN.
- 325 Chaucer and His Time (3) f, s.**  
A study of the *Canterbury Tales* and certain other parts of Chaucer's work; social background of Chaucer's England; introduction to Middle English. MORFETT.
- 326 Middle English Literature (3) w.**  
Representative works in the original, largely from the literature of the fourteenth century exclusive of Chaucer. Includes the whole of *Sir Gawain and the Green Knight*. Alternates with English 420. PACE.

- 331 Elizabethan Literature (3) w.**  
A survey of nondramatic poetry and prose of the sixteenth century from Sir Thomas More to John Donne. CRAIG.
- 332 Renaissance Literature in Translation (3) w.**  
Chief continental writers from Petrarch to Cervantes. Knowledge of Latin or a romance language is desirable but not essential. HOSLEY.
- 333 Elizabethan Drama (3) f.**  
Chief plays from *Gorboduc* to the closing of the theaters. HOSLEY.
- 335-336 Shakespeare (3) f, s; (3) w.**  
A chronological study of the plays. The first course extends through the comedies and histories of the late 1590's; the second course deals with the tragedies and comedies of the later period. CRAIG, HOSLEY.
- 345 Milton (3) w.**  
A study of the poet's life and work. CLARK.
- 355 The Age of Reason (3) f.**  
English literature from 1660 to 1740 with major emphasis on Dryden, the Restoration dramatists, Swift, Pope and the early eighteenth century essayists. CLARK.
- 356 Johnson and His Time (3) w.**  
English literature from 1740 to 1790, with major emphasis on the works of Dr. Johnson and his circle. WEATHERLY.
- 361-362 The English Novel (2) f, s; (2) w.**  
Prerequisite, junior standing. The novel from Defoe to the twentieth century. PEDEN, WEATHERLY.
- 364 English Drama (3) w.**  
A rapid survey and extensive reading of English drama from its beginning to the twentieth century. CLARK.
- 365 The Romantic Period (3) f.**  
A study of literary tendencies and representative authors. HUDSON.
- 366 The Victorian Period (3) w, s.**  
A study of literary tendencies and representative authors. MOFFETT, HUDSON.
- 371 Nineteenth Century Prose (3) f.**  
A selective study of British prose writers (nonfiction) in the nineteenth century. HUDSON.
- 375-376 American Literature (3) f; (3) w, s.**  
Colonial and Revolutionary Periods and beginnings of Romanticism; Romantic Period and beginnings of realism. MOFFETT, DICKINSON.
- 377 The American Novel (3) w.**  
A study of representative American novels of the nineteenth and twentieth centuries. DICKINSON.
- 378 The Rise of Realism (3) f, s.**  
American literature from the Civil War to 1900 with emphasis on major figures. DICKINSON.
- 379 Epic America (3) f.**  
A study of the epic period of American life beginning in 1822, ending in 1890. Based on Neihardt's *A Cycle of the West*. NEIHARDT.
- 390 The Language of Literature (3) w.**  
A study of the specifically linguistic aspects of poetic and prose style. Some training in phonetics desirable but not required. PACE.
- 391-392 Twentieth Century Literature, Parts I and II (3) f; (3) w.**  
A period course in modern British and American poetry, fiction, and drama. Part I considers literature from 1890 to 1920 and Part II from 1920 to the present. DRUMMOND.

**396-397 Distinction (3) f; (3) w.**

A study of the development of English literature. Open to students who are approved for Honors studies. MEMBERS OF THE STAFF.

**398-399 Distinction (3) f; (3) w.**

Second year of course described above. MEMBERS OF THE STAFF.

**400 Problems (credit to be arranged) f, w, s.**

Individual work which does not lead to a dissertation. Students registering in this course must obtain departmental approval. MEMBERS OF THE STAFF.

**404 Problems in College Composition (2-3) f.**

Prerequisite, consent of instructor. Study of problems of instruction and of current usage and grammar. JOHNSON, PACE.

**413 Methods in English Literature in Secondary Schools (2) s (Same as Education D413).**

DRUMMOND.

**414 Methods in English Composition in Secondary Schools (2) s (Same as Education D414).**

DRUMMOND.

**419 Problems in Modern English (3) f.**

Concentrated study of a selected problem. Offered on sufficient demand. PACE.

**420 Old English Literature (3) w.**

Representative works in the original, limited to poetry. Includes an abridgement of *Beowulf*. Alternates with English 326. PACE.

**423 The Medieval Metrical Romance (3) f.**

The reading of selected Middle English romances with the establishment of origins and interconnections. CRAIG.

**424 Rise of the Drama (3) w.**

The beginnings of English drama in the medieval church and its development in the mystery plays, the moralities, and the interludes. CRAIG.

**425 Chaucer's *Troilus* and Minor Poems (3) w.**

Intensive study of Chaucer's greatest narrative poem and a number of his shorter works; training in the major areas of Chaucer scholarship, especially interpretation, sources, and editing. PACE.

**430 Spenser (3) w.**

*The Faerie Queene* and selected minor works. HOSLEY.

**433 Studies in Elizabethan Drama (3) f.**

A study of some twenty plays, exclusive of those read in English 333. HOSLEY.

**435-436 Studies in Shakespeare (3) f; (3) w.**

Problems of modern scholarship and criticism. CRAIG, HOSLEY.

**451 Early Seventeenth Century Literature (3) w.**

A study of English literature from 1600-1660: the metaphysical and Cavalier poets, Bacon, Burton, Browne, and prose writers of the Puritan Commonwealth. CLARK.

**453 The Age of Dryden (3) f.**

A study of the major writings of Dryden and his contemporaries with emphasis on Restoration drama. CLARK.

**455 Swift (3) f.**

An examination of Swift's work and career in the light of the religious, political, and literary ideas of his time. WEATHERLY.

**456 Age of Johnson (3) f.**

An examination of Johnson's work and career in the light of the religious, political, and literary ideas of his time. WEATHERLY.

- 460 Introduction to Research in English (3) f.**  
A course in the methods of research and the discovery, limitations, and mode of attack on graduate problems illustrated by recent articles and studies. PACE.
- 464 The Earlier Romantics (3) f.**  
Selected problems in Wordsworth and Coleridge. HUDSON.
- 465 The Later Romantics (3) w.**  
Selected problems in Byron, Shelley, Keats. HUDSON.
- 471-472 Studies in Nineteenth Century American Literature (3) f; (3) w, s.**  
A study of selected American writers of the nineteenth century. DICKINSON, MOFFETT, PEDEN.
- 473 Colonial American Literature (3) f.**  
American literature to 1800 with emphasis on religious and political thought and expression. DICKINSON.
- 474 Poe and Hawthorne (3) f.**  
A study of the major writings of Poe and Hawthorne. PEDEN.
- 476 New England Transcendentalists and Abolitionists (3) w.**  
Problems for special investigation. MOFFETT.
- 477 Melville and Whitman (3) w.**  
A study of the major writings of Melville and Whitman. DICKINSON.
- 478 Browning (3) w.**  
The poet as artist; as thinker; as a Victorian. HUDSON, WEATHERLY.
- 479 Mark Twain (3) w.**  
A study of Mark Twain's artistry, ideas, and reputation. DICKINSON.
- 490 Research (credit to be arranged) f, w, s.**  
This course leads to the preparation of a dissertation. MEMBERS OF THE STAFF.
- 491 Studies in Modern Poetry (3) f.**  
A comparative study of a few significant contemporary poets. DRUMMOND.
- 492 Studies in Modern Criticism (3) w.**  
A comparative study of a few significant contemporary critics. CLARK.
- 493 Studies in Modern Fiction (3) f.**  
A comparative study of a few significant contemporary novelists. DICKINSON, PEDEN.
- 495 Studies in Modern Drama (3) w.**  
A comparative study of a few significant contemporary dramatists. CLARK.

## ENTOMOLOGY

- 1 Applied Entomology (3) f, w, s.**  
Fundamental principles of insect life with special references to its economic importance. A prerequisite to all courses except 5, 109, and 210. MEMBERS OF THE STAFF.
- 5 Insects and Nature Study (2) f.**  
An illustrated lecture course for students, with or without previous biological training, who desire a general knowledge of the myriads of interesting insects and other creatures. Cannot be used by students in agriculture as a substitute for course 1. JENKINS.
- 109 Beekeeping (2) w.**  
A study of the honeybee and the science of beekeeping supplemented by practical work in the apiary. WINGO.

- 210 Forest Entomology (3) w.**  
Primarily for forestry students but open to others by arrangement. The life history, habits, injuries, and methods of controlling the more important insect pests of forests and forest products. STONE.
- 215 Veterinary Entomology (3) f.**  
Prerequisite, Entomology 1 or the equivalent. A study of the insect and related arthropod pests of livestock, poultry, and pets. For first-year students in the School of Veterinary Medicine. WINGO.
- 222 Systematic Entomology (3) f.**  
Prerequisite, Entomology 1 or 10 hours in zoology. A general introduction to entomology with special emphasis on the classification of the orders and major families of insects. WINGO, ENNS, AND BROWN.
- 300 Problems (credit to be arranged) f, w, s.**  
Prerequisite, a minimum of 10 hours of course work in entomology and zoology. By arrangement students may take special problems in the different fields of entomology as preparation for research. MEMBERS OF THE STAFF.
- 305 Taxonomy of Immature Insects (3) f.**  
Prerequisite, Entomology 222 or the equivalent. A study of the specific characters and the literature used in determining families, genera, and species of immature stages of insects. ENNS.
- 306 Aquatic Entomology (3) w.**  
Prerequisites, Entomology 1, Zoology 1, Entomology 222 or equivalent. The identification, life histories, and ecology of aquatic arthropods with emphasis on fresh water insects. Designed particularly for students of wildlife, fisheries management, aquatic biology, and advanced entomology. ENNS.
- 310 Insect Pests of the Household (2) f.**  
Prerequisites, Entomology 1 and Zoology 1 or the equivalent. For men and women who desire information about the common household pests and for those who plan to take up commercial pest control work. Recognition of the insects and allied pests in and about the home, their habits and control will be stressed. STONE.
- 311 Field Crop Insects (2) w.**  
Prerequisites, Entomology 1 and Field Crops 1 or the equivalent. A study of the life histories, injuries, and control of insect pests of field crops. PETERS, BROWN.
- 312 Orchard, Garden, and Greenhouse Insects (3) f.**  
Prerequisite, Entomology 1. A study of the major insect pests of horticultural crops and the injuries they cause and methods of controlling them. JENKINS.
- 315 Medical and Veterinary Entomology (3) f.**  
Prerequisites, Entomology 1 and 222 or the equivalent in medicine or sanitary engineering. A study of the insects and related pests of man and animals with special attention paid to those transmitting diseases. Primarily for advanced students in entomology, medicine, and sanitary engineering. STONE.
- 316 Insect Morphology (3) f.**  
Prerequisites, Entomology 1 and Zoology 1 or the equivalent. The external and internal anatomy of insects. STONE.
- 317 Physiology of Insects (3) f.**  
Prerequisites, Entomology 1 and 316 or the equivalent. A study of the general physiology of insects. BROWN.
- 318 Acarology—Mites and Ticks (3) w.**  
Prerequisites, Entomology 1 and Zoology 1 or the equivalent. The taxonomy, biology, collecting, rearing, and slide preparation of mites and ticks. ENNS, STONE.
- 319 Insect Ecology (3) w.**  
Prerequisites, Entomology 1, Entomology 222, and Zoology 1 or the equivalent. A study of the general field of insect ecology and biological control. STONE.



- 321 Entomological Literature and History of Entomology (2) f.**  
Prerequisite, 10 hours of entomology. A survey of entomological literature from early to modern times. History of development of the science with special emphasis on prominent entomologists and their contributions. Primarily for advanced students in entomology. WINGO.
- 322 Advanced Systematic Entomology (3) w.**  
Prerequisites, Entomology 222 and 316. In addition, Entomology 321 or 6 hours of systematics in biological science. An advanced course in the taxonomy of the major terrestrial orders of insects with emphasis on the identification at the generic and specific levels. BROWN.
- 410 Seminar (1) f, w.**  
Prerequisite, a minimum of 10 hours of course work in entomology and zoology. Reviews of current literature and reports on original investigations. MEMBERS OF THE STAFF.
- 414 Research Techniques in Entomology (3) w.**  
Prerequisite, a minimum of 10 hours in entomology. An advanced course for students intending to enter the field of economic entomology. Practical problems in greenhouse, field, and laboratory. BROWN.
- 420 Insect Toxicology (3) w.**  
Prerequisites, Entomology 316 and 317. The nature, action, and evaluation of insect poisons. Recent advances in insecticides, attractants, and repellents. Primarily for advanced students in entomology. WINGO.
- 490 Research (credit to be arranged) f, w, s.**  
Prerequisite, a minimum of 20 hours in entomology and zoology or the equivalent. Original research in economic entomology, insect taxonomy, insect toxicology, morphology, physiology, ecology, acarology, and beekeeping. A reading knowledge of French and German is desirable. MEMBERS OF THE STAFF.

## FIELD CROPS

- 1 Field Crops (3) f, w.**  
The nature and importance of crop plants together with elementary principles of production and management. PINNELL, HAYWARD, SECHLER.
- 100 Field Crops Management (2) f, w.**  
Prerequisites, Field Crops 1 and Soils 100. Enrollment restricted to juniors and seniors. Crop rotations and the management of crops for Missouri. FLETCHALL.
- 101 Seed Analysis (2) f, s.**  
Prerequisites, Field Crops 1 and General Botany. Study of structure and behavior of agricultural and vegetable seeds. Procedures in analyzing seeds as to purity and germination according to legal standards. STANWAY.
- 102 Grading and Examination of Grain and Seeds (2) w.**  
Prerequisite, Field Crops 1. Method and practice in the grading of commercial grains; identification of crop seeds and study of their quality. CAVANAH.
- 300 Problems (credit to be arranged) f, w, s.**  
For graduates or specially prepared seniors. Problems assigned. Not accepted as a substitute for any regularly scheduled course. MEMBERS OF THE STAFF.
- 301 Field Crops Improvement (3) f.**  
Prerequisites, Field Crops 1 and Botany 1. Summary of the principles underlying the economic breeding of crop plants. Studies in methods of plant improvement. POEHLMAN.
- 302 Cotton Farming (2) w.**  
Prerequisite, Field Crops 1. Studies of cotton farming in Missouri. BROWN.
- 303 Forage Crops Production (3) f, w.**  
Prerequisite, Field Crops 1. Advanced study of the principal forage crops, pasture production, and forage preservation. BALDRIDGE.

- 304 Grain Crops Production (3) f, w.**  
Prerequisite, Field Crops 1. Advanced study of the production of corn and other important grains based upon the results of research. CAVANAH.
- 306 Weed Control (3) f.**  
Prerequisites, Field Crops 1 and Chemistry 15. Study of identification of weeds; cultural and chemical methods of control; influence on production and management. FLETCHALL.
- 400 Problems (credit to be arranged) f, w, s.**  
Advanced studies not expected to terminate in a thesis. MEMBERS OF THE STAFF.
- 401 Crop Experimentation (2) w.**  
The methods of research with crops in laboratory, greenhouse, and field; problem, procedural technique, analysis and interpretation of evidence, principal sources of error, reviewing literature. POEHLMAN.
- 402 Advanced Field Crops Improvement (3) w.**  
Advanced study of the theories and practices underlying the economic breeding of crop plants. For graduate students and specially prepared seniors. Offered in alternate years. Offered in 1957-58. POEHLMAN.
- 403 Diseases of Field Crops (3) w.**  
Prerequisites, Field Crops 1, Botany 301 or Botany 307. Detailed study of diseases of field crops, their symptoms and control measures. For graduate students and specially prepared seniors. WHITEHEAD.
- 410 Seminar (1) f, w.**  
Discussion of research problems in field crops. Abstracts of literature on special topics. Required of graduate students majoring in field crops. Seniors may receive credit. MEMBERS OF THE STAFF.
- 412 Seminar in Genetics (1) f, w (Same as Zoology 412).**  
Discussion of current investigation in genetics. A reading knowledge of German and French is desirable.
- 452 Advanced Genetics (3) f, w (Same as Zoology 452).**  
Prerequisite, Zoology 340 or the equivalent. Readings and discussion of the nature of the gene and its relation to development.
- 462 Gene Structure and Function (3) f.**  
Prerequisites, Botany 140, 141, and 380. Readings and discussion of systems of mutation and of the structure and function of the gene. For graduate students only. (Offered alternate years; offered in 1957-58.)
- 490 Research (credit to be arranged) f, w, s.**  
Original research in problems in the production, management, improvement, and genetics of field crops. MEMBERS OF THE STAFF.

## FORESTRY

- 100 General Forestry (3) f, w.**  
An introduction to the entire field of forestry.
- 105 Forest Cartography (2) w.**  
Lettering, use of drafting instruments, preparation and interpretation of forest and topographic maps.
- 110 Dendrology (3) w.**  
A systematic approach to the classification, nomenclature, and identification of North American gymnosperms with emphasis on the more important tree forms.
- 115 Dendrology (2) f.**  
A continuation of Forestry 110 but dealing with angiosperm tree forms.

- 120 Foundations of Silviculture (2) w.**  
The influence of site factors on the reproduction, growth, development, and characteristics of forest vegetation; the effect of forest cover on the site. The classification of forest vegetation.
- 136 Wood in Light Construction (2) s.**  
Materials of light construction; proper species and grades for specific purposes; approved methods of wood construction.
- 155 Forest Nursery Management (3) w.**  
Principles of seed collection and treatment, seeding, and nursery practice. Field trip required.
- 156 Forest Mensuration (4) f.**  
Prerequisite, Forestry 130. Elementary statistical methods and problems. Presentation of data. Methods of measuring contents of trees, stands of timber, and wood products. Application of yield tables.
- 157 Forest Fire Control (2) w.**  
Principles of forest fire control including prevention, preparedness, and suppression. Effects of forest fires, both harmful and beneficial. Field trip required.
- 158 Forestry Policy (1) w.**  
History of United States forestry and forest land legislation. Forestry programs of federal, state, and local governments. Trends in forestry legislation and policy. Professional ethics for foresters.
- 160 Wood Technology (3) w.**  
Prerequisites, Forestry 110 and 115. Anatomy and variations in properties of wood. Microscopic examination and identification of wood specimens. Wood properties in relation to use.
- 161 Forest Economics (5) w.**  
Prerequisites, Economics 51 or Agricultural Economics 1. Factors of production in forestry including timber resources, demand for forest products and services, risks in timber growing, taxation; cost control, accounting considerations, appraisal of forest values, problems in pricing and marketing timber products.
- 163 Logging and Milling (3) f.**  
Prerequisite, Forestry 134. Methods and costs of harvesting and transporting primary wood products. Lumber manufacture by portable and permanent saw-mills.
- 164 Timber Seasoning and Preservation (2) w.**  
Prerequisite, Forestry 160. Air seasoning, kiln drying, and chemical conditioning of lumber. Pressure and nonpressure methods of wood preservation. Field trip required.
- 165 Wood Deterioration (2) w.**  
Agencies of wood deterioration in lumber yards and in buildings; types of damage; controls. Not open to students in Wood Products Merchandising.
- 190 Forest Recreation (2) f.**  
Analysis of forest recreational possibilities and needs; relation to other forest uses; forest recreation plans.
- 191 Forest Products (3) w.**  
Prerequisite, Forestry 134. Construction materials, chemically derived products, wood containers, mechanically produced products, fuel and miscellaneous products from the forest, and the industries producing these products.
- 193 Estimating (2) f.**  
Prerequisite, junior standing. Computing by various methods the unit and total quantities and costs of materials for structures from blueprints and specifications.
- 201 Practice of Silviculture (3) f.**  
Prerequisites, Forestry 131 and 133. The principles and application of intermediate and reproduction methods of cutting. Planting as a phase of forest regeneration. Silvicultural plans.

- 203 Forest Resources Management (3) f.**  
Prerequisite, junior standing. Management principles for developing, integrating, and sustaining wildlife, range, water, and recreation resources on forest lands.
- 290 Field Training (arr.) s.**  
Prerequisite, junior standing. On-the-job training in wood products merchandising. Reports required.
- 300 Problems (credit to be arranged) f, w.**  
Topics in silviculture, forest management, forest economics, and wood utilization.
- 303 Range Management (2) w.**  
Prerequisite, Forestry 201. Ecological considerations and range management practices in the United States by grazing regions, vegetative types, and class of grazing animal. Basic principles and their application in the sustained management of a forage resource. Benefits and damage from grazing in forests.
- 304 Applied Silviculture (3) w.**  
Prerequisite, Forestry 201. The ecological and economic factors affecting the application of silviculture in each of the eighteen forest regions in the United States.
- 305 Forest Pathology (3) f.**  
A study of diseases of forest trees and decay of forest products with special emphasis on their nature, cause, identification, and control.
- 311 Forest Photogrammetry (3) f.**  
Prerequisite, Forestry 156. The use of aerial photographs in forest mapping, inventory, and administration. Field trip required.
- 312 Forest Products Marketing (2) f.**  
Prerequisite, Forestry 161. Economics of the timber industry; wholesaling and retailing of forest products; exports and imports; lumbermen's associations.
- 315 Forest Management (3) w.**  
Prerequisites, Forestry 156 and 301. Organizing forest properties for systematic management, regulation of annual cut, rotation, and cutting cycles to achieve sustained yield.
- 316 Forest Management Plans (3) w.**  
Prerequisite, Forestry 315. Application of principles of forest regulation in preparation of a management plan for a forest in southern Missouri including plans for orderly cutting, utilization, and administration of the area.
- 317 Management Utilization Field Trip (2) w.**  
Prerequisites, Forestry 163 and 315. Two-weeks field trip to study utilization and management practices of large operations.
- 350 Special Readings (credit to be arranged).**  
A critical review of current literature and research in forestry and methods of presenting research results.
- 351 Forest Conservation (3) f.**  
The forest resources of the United States; forest economics; methods of conserving forest resources. Not open to students in School of Forestry.
- 352 Farm Forestry (3) f.**  
The place of farm forests in agriculture. The application of forestry principles to the problems of the farm woodland, especially as they relate to Missouri conditions. Not open to students in School of Forestry.
- 401 Research Methods in Silviculture (3) f.**  
History of forest research. Methods of studying silvical and silvicultural interrelationships between forest vegetation and site factors. Techniques of experimental procedure, experimental design, analysis, and presentation of data. Field trip required.

**402 Forest Valuation (3) f.**

Prerequisites, Forestry 156, 161, 315. Appraisal of forest land and standing timber. Determination of profits in forest enterprises. Appraisal of damages to forest property; financial aspects of sustained yield management compared with terminating operations.

**403 Nutrition of Forest Trees (3) w.**

Prerequisites, Forestry 301, Soils 101. Nutrient requirements of forest trees in nurseries and in forests; soil, physiographic, and climatic conditions which influence forest growth and yield.

**410 Seminar (1) f, w.**

Discussion of current developments in forestry and critical study of research programs.

**413 Forest Influences (2) f.**

Prerequisites, Forestry 301, Soils 101. The influence of forests on local climate, soil productivity, soil erosion, soil moisture, streamflow, and floods, emphasizing water as a product of wildland areas. Field trip required.

**414 Advanced Forest Mensuration (3) f.**

Prerequisite, Forestry 156. Principles of sampling; estimation by method of least squares; anamorphosis; techniques of volume table and yield table construction; methods of growth prediction.

**415 Cost Control (2) w.**

Prerequisites, Forestry 156 and 163. Principles of determining most economical costs of forest administration and woods operations; time and cost studies; operating methods and equipment for harvesting timber; analysis of factors governing the relations of tree size to net stumpage value.

**490 Research (credit to be arranged) f, w.****Forestry Summer Camp**

Prerequisite, an average grade of 2.00 for all courses completed prior to attending summer camp.

**130 Forest Measurements (3) s.**

Field studies in methods of measuring content and growth of trees and forest stands. Practice in timber estimating, log scaling, and collection of basic data.

**131 Silvics (2) s.**

Field studies of forest soils, sites, and types. Forest type mapping and ecological studies.

**132 Field Dendrology (1) s.**

Field training in the identification of woody vegetation.

**133 Silviculture (2) s.**

Practice in the application of intermediate and regeneration cutting methods to various types of stands.

**134 Forest Utilization (2) s.**

A field study of logging equipment and methods and of wood-using industries.

**135 Forest Engineering (2) s.**

Surveying, establishment of land boundary lines, topographic mapping, planning and construction of roads.

**FRENCH (See ROMANCE LANGUAGES)****GENETICS**

For courses in Genetics and Applied Genetics, see Animal Husbandry 203, 403; Botany 140, 141, 412, 452, 461; Dairy Husbandry 380; Field Crops 301, 402, 452, 462; Horticulture 315, 404; Zoology 140, 141, 150, 302, 380, 412.

## GEOGRAPHY

### Regional Geography

**6 Regions and Nations of the World (5) f, w, s.**

An introductory survey of world geography specifically designed for general education. Emphasizing both human and physical geography, the course presents essential characteristics and major problems of the following regions: Europe, the Soviet Union, the Orient, the Pacific World, the Middle East, Africa, Latin America, Anglo-America. WHEELER.

**52 Africa (3) w.**

A broad geographical survey of the African continent—its countries, regions, peoples, resources, economies, landscapes, and problems. Designed for general education, this course provides background for an understanding of Africa as an area of increasing importance in world affairs. WHEELER.

**101 Missouri (2) f, w, s.**

A systematic and regional survey of the geography of Missouri. COLLIER.

**210 United States and Canada (3) f, w, s.**

Regional geography of Anglo-America. COLLIER.

**212 Europe (3) f.**

An introduction to the peoples, environments, economies, and cities of the countries of Europe west of the Soviet Union. HIRT.

**272 Rimlands of Asia (3) w.**

The physical, cultural, and regional geography of Asia (excluding Siberia) emphasizing the factors that make it an area of international tension and cultural change. HIRT.

**296 The Soviet Union (2) f.**

The physical, cultural, and regional geography of the Soviet Union with special attention to its strengths and weaknesses as a world power. HIRT.

**360 Latin America (3) f.**

A systematic survey of Latin America's human and natural resources together with a study of individual countries and their position in current economic and political world affairs. GROTEWOLD.

**412 Studies in the Geography of Europe (2) w.**

Prerequisite, course 212 or equivalent. Study of selected problems and areas of Europe. HIRT.

**460 Studies in the Geography of Latin America (2) w.**

Prerequisite, course 360 or equivalent. Study and analysis of geographically valuable literature. Compiling of bibliographies, selection of source material. GROTEWOLD.

**472 Studies in the Geography of Asia (2) f.**

Prerequisite, course 272 or equivalent. Intensive investigation of selected aspects of the geography of Asia or of individual Asian countries or regions. HIRT.

### Systematic Geography

**10 Introduction to Physical Geography (3) f, w, s.**

A beginning study of the natural features of the human habitat designed for general education. The course provides a basic knowledge of universally important elements of physical geography, such as landforms, climate, soils, natural vegetation, and water bodies. Exercises, map problems, and visual aids are used extensively. HIRT.

**Meteorology and Climatology****142 Introductory Meteorology (3 or 5) f (Same as Soils 142).**

A study of the physical processes of the atmosphere in relation to day to day changes of weather; weather instruments and the interpretation of daily weather maps. Three hours lecture, or three hours lecture and two hours laboratory credit. DECKER.

**265 Climates of the World (3) w (Same as Soils 265).**

Prerequisite, course 142 or equivalent. Study of the climatic elements, climatic classifications, and climatic regions of the world. Special attention is given to the ecological and pedological aspects of climate. Offered in 1958-59 and alternate years. DECKER.

**365 Agricultural Climatology (3) w (Same as Soils 365).**

Prerequisite, course 142 or equivalent. A description of the weather factors influencing crop production. A study of the methods of analysis of climatological data and the use of micro-climatic data. Offered in alternate years. Not offered in 1958-59. DECKER.

**391 Climatological Problems (2) w, s (Same as Soils 391).**

Prerequisite, course 265 or 365 or equivalent. Practical applications of weather investigations relating to the effects of weather on selected activities. DECKER.

**Economic Geography and Resource Conservation****25 Economic Geography (3) f, w, s.**

A regional survey of present and potential economic development in different parts of the world and a systematic survey of trade relations among different countries. GROTEWOLD.

**319 Conservation of Natural Resources (3) w.**

Major problems of conservation in the United States and efforts being directed toward their solution. COLLIER.

**325 World Resources and Industries (3) w.**

A geographical and historical approach to the development and utilization of human and natural resources. GROTEWOLD.

**Geography of Settlement****395 Urban Geography (2) w.**

A study of cities: their growth, distribution, form, and social and economic importance in the Ancient, Medieval, and Modern Worlds. HIRT.

**Political Geography****380 Political Geography (3) f.**

A study of the political world from a geographical point of view. WHEELER.

**480 Studies in Political Geography (2) w.**

Prerequisite, course 380 or equivalent. A bibliographical survey of the available writings in political geography and an analysis of the methods and results of research in this field. WHEELER.

**Geographic Philosophy, Techniques, and Research****15 Maps and Man (1) f.**

A nontechnical course in the understanding and appreciation of maps, particularly with regard to the role which they play in human affairs. The student becomes acquainted with a wide variety of maps ranging from simple newspaper illustrations to elaborate maps in color.

**135 Cartography (2) f (Same as Library Science 135).**

An introduction to the types, properties, uses, and construction of maps. COLLIER.

- 335 Advanced Cartography (2) w.**  
Prerequisite, course 135 or equivalent. Principles and practices in map construction; evaluation of source materials; techniques of map compilation; mapping from statistical data and from aerial photographs. Methods of map reproduction. COLLIER.
- 336 Cartographic Design (2) f, w.**  
Prerequisite, course 335 or equivalent. Problems in cartographic representation and design for specific purposes. COLLIER.
- 390 Geographic Problems (1-3) f, w, s.**  
Individual problems for students prepared to do semi-independent work in systematic or regional geography. MEMBERS OF THE STAFF.
- 401 Research Methods (3) f.**  
Prerequisite, 20 hours in geography. Primarily for graduate students. Source materials and field and library research techniques and practices. Analysis of selected research papers and problems. COLLIER.
- 410 Seminar (1-3) w.**
- 415 Contemporary Geographic Thought (1-3) f.**  
Prerequisite, graduate standing. Concepts of modern geography as expressed in the literature of the field. GROTEWOLD.
- 450 Research (1-8) f, w, s.**  
Independent research not leading to the preparation of a thesis. MEMBERS OF THE STAFF.
- 490 Research (1-8) f, w, s.**  
Independent research leading to the preparation of a thesis. MEMBERS OF THE STAFF.

## GEOLOGY

Students enrolling in any advanced course in geology are required to have shown proficiency in the course or courses specifically listed as prerequisites. *Normally this is interpreted to mean attainment of a grade of M or higher.*

- 1 Principles of Geology (5) f, w, s.**  
A study of earth materials, geologic processes, and earth history. MEMBERS OF THE STAFF.
- 2 Physical Geology (3) f, w.**  
Similar to course 1 but omits earth history. KELLER.
- 25 Advanced General Geology (4) f, w.**  
Prerequisite, grade M or better in course 1 or 2. A further study of geologic principles and processes. PECK.
- 30 Common Rocks and Minerals (3) f, w.**  
Prerequisites, grade M or better in course 1 or 2, and elementary chemistry. The identification of common minerals by their physical properties, and the study and classification of rocks in hand specimens. JOHNSON, KELLER.
- 50 Life of the Geologic Past (2) f, w.**  
Prerequisite, course 1. A nontechnical study of selected events in the development of life on the earth. MEHL.
- 118 Field Methods (2) w.**  
Prerequisite, course 25. Practice with the instruments commonly used in making geologic observations with emphasis on the telescopic alidade. MEHL.
- 205 Field Course (1-8) s.**  
Offered at Camp Branson, Lander, Wyoming.  
Prerequisites, grade M or better in courses 25 and 30, or equivalent. MEMBERS OF THE STAFF.



- 221 Geology and Man (3) w.**  
Prerequisite, course 1 or 2 or upperclass standing. A nonprofessional course stressing earth resources, aspects of conservation and recreation, and the influence of geology in other fields of thought. HOLMES.
- 302 Structural Geology (4) f.**  
Prerequisites, Mathematics 9, Physics 12, Geology 320. Application of fundamental principles of geology, physics, and mathematics in determining attitudes of strata and interpreting deformational features in the earth's crust. BELL.
- 303 Interpretation of Geologic Maps and Aerial Photographs (1) w.**  
Prerequisite, course 302. Interpretation of geologic features using published data and aerial photographs. BELL.
- 307 Mineralogy (5) f.**  
Prerequisites, grade M or better in course 30, and Qualitative Analysis. An introduction to crystallography and a systematic study of mineral groups, including the identification of minerals based on their physical and chemical properties. JOHNSON, RAY.
- 320 Historical Geology (3) w.**  
Prerequisite, grade M or better in course 25. Methods and principles of historical geology and the interpretation of the physical history of North America. UNKLESBAY.
- 321 Introduction to Paleontology (3) w.**  
Prerequisites, Geology 1, elementary biology or zoology, and upperclass standing. An introduction to the principles of paleontology and to the most important invertebrate fossil groups. UPSHAW.
- 325 Geology of Ground Water (3) w.**  
Prerequisites, course 320 and either 205 or 302. An analysis of the geologic factors related to the occurrence, distribution, recovery, and use of ground water. UNKLESBAY.
- 332 Introduction to Micropaleontology (3) f, w.**  
Prerequisite, course 321. Introductory work on all types of microfossils. MEHL.
- 336 Field Course (1-8) s.**  
Offered at Camp Branson, Lander, Wyoming.  
Prerequisites, courses 30 and 302, or equivalent. MEMBERS OF THE STAFF.
- 345 Economic Geology (3) w.**  
Prerequisite, course 307. A study of the factors related to the origin, occurrence, recovery, and use of mineral resources. JOHNSON.
- 400 Problems (1-8) f, w, s.**  
Prerequisites, graduate standing and permission of the instructor. MEMBERS OF THE STAFF.
- 403 Glacial Geology (3) w.**  
Prerequisite, graduate status in geology. A critical examination of accepted interpretations and current thought regarding glacial processes and Pleistocene glacial history. HOLMES.
- 405 History of Geology (2) w.**  
Prerequisite, completion of undergraduate major in geology. Review of the development of geologic thought from the Early Greeks to about 1900. Offered in 1958-59 and alternate years. UNKLESBAY.
- 407 Advanced Physiography (3) f.**  
Prerequisite, course 320. Physiographic processes in relation to the broader aspects of geology. HOLMES.
- 410 Seminar (1-2) f, w.**
- 412 Advanced Structural Geology (3) w.**  
Prerequisites, courses 302 and 424. Advanced structural analysis and tectonics. BELL.

- 417 Optical Mineralogy (3-5) f.**  
Prerequisite, course 307. Graduate students from other departments, who have not taken course 307, may be admitted under special arrangements. The identification of nonopaque solids by determination of their optical constants and the principles underlying the determinative methods. KELLER.
- 418 Petrography (3) f.**  
Prerequisite, course 417. The description of igneous and metamorphic rocks and a consideration of the physical and chemical conditions under which they form. JOHNSON.
- 419 Determination of Minerals by Means of the X-ray Diffractometer (1) f.**  
Prerequisite, course 417. Graduate students from other departments, who have not had course 417, may be admitted with the permission of the instructor. KELLER.
- 420 Sedimentology (3-5) w.**  
Prerequisite, course 417. The petrography of sedimentary rocks and consideration of the effects of various chemical, physical, and tectonic environments on the origin, mineralogy, and texture of sedimentary rocks. KELLER.
- 421 Vulcanism and Metamorphism (2-5) w.**  
Prerequisite, course 418. A study of the origin, history, and alteration of the igneous and metamorphic rocks. JOHNSON.
- 424 Paleozoic Stratigraphy (5) f.**  
Prerequisites, courses 320 and 321. Principles and methods of stratigraphy and regional studies of the sediments and stratigraphic problems of the Paleozoic era. UNKLESBAY.
- 425 Mesozoic and Cenozoic Stratigraphy (3-5) w.**  
Prerequisite, course 424. A regional study of the sediments and stratigraphic problems of the Mesozoic and Cenozoic eras. PECK.
- 429 Subsurface Geology (3) w.**  
Prerequisites, courses 302 and 424. Interpretation of geologic structure and stratigraphy from subsurface data with particular emphasis on methods used in petroleum geology. BELL.
- 432 Invertebrate Paleontology (5) f.**  
Prerequisites, courses 320, 321. Systematic and paleoecological treatment of the invertebrate phyla. UNKLESBAY.
- 433 The Geologic History of the Vertebrates (2-5).**  
Prerequisites, courses 320, 321. Offered on demand. MEHL.
- 441 Micropaleontology I (2-4) w.**  
Prerequisite, course 332. Advanced work on Paleozoic microfossils with emphasis on conodonts and ostracods. MEHL.
- 442 Micropaleontology II (2-4) f.**  
Prerequisite, course 332. Advanced work on Mesozoic and Cenozoic microfossils with emphasis on foraminifera, ostracods, and charophytes. Offered in 1958-59 and alternate years. PECK.
- 445 Clay Mineralogy (3) w.**  
Prerequisite, course 417. The mineralogy, including identification, of clays. KELLER.
- 450 Research (1-8) f, w, s.**  
Does not lead to a dissertation.
- 490 Research (1-8) f, w, s.**  
Prerequisite, successful completion of a qualifying examination given by the department. Leads to preparation of a dissertation.

**GERMANIC AND SLAVIC LANGUAGES****German**

- 1 Beginning German (5).**
- 2 Intermediate German (5).**  
Prerequisite, course 1 or equivalent high school German.
- 103 Advanced Reading (3).**  
Prerequisites, courses 1 and 2 or equivalent high school German. Recommended to be taken concurrently with course 106.
- 106 Intermediate German Composition and Conversation (2).**  
Prerequisites, courses 1 and 2 or equivalent. May be taken concurrently with course 103.
- 150 Intermediate Special Readings (1-2).**  
Prerequisites, courses 1 and 2 or equivalent. Designed for students who wish to broaden their reading knowledge in some particular field of science or study.
- 154 Masterpieces in German Literature (3).**  
Study of selected modern German dramas, lyrical poems, and novels. BARNSTORFF.
- 199 Distinction (6)**
- 206 Advanced German Composition and Conversation (2).**  
Discussion of grammar and theme writing in German. NAGEL.
- 307 Lessing (3).**  
Lectures on Lessing's life and works. Study of Lessing's dramas and critical writings. BARNSTORFF.
- 308-309 Schiller (3).**  
Lectures on Schiller's life and works. Study of Schiller's dramas and poetry. BARNSTORFF, NAGEL.
- 310-311 Goethe (3).**  
Study of Goethe's life, poetry, and dramas. BARNSTORFF.
- 312 German Dramatists of the Nineteenth Century (3).**  
BARNSTORFF.
- 313 German Novelle (3).**  
Study of the types of shorter fiction from the age of Goethe to the present time. BARNSTORFF.
- 314 Outline of German Literature (3).**  
Study of the periods, movements, and most important works in German literary life. BARNSTORFF.
- 315 Outline of German Language (3).**  
Study of the history of the German language. BARNSTORFF.
- 350 Special Readings (1-2).**  
In this course advanced students will do special work for specific subjects under supervision of a staff member. Admission only upon conference with the chairman.
- 351 Romanticism (3).**  
BARNSTORFF.
- 360 Recent Movements in German Literature (3).**  
Study of naturalism, neoromanticism, expressionism, and the postexpressionistic period. BARNSTORFF.
- 375 Middle High German (3).**  
Introductory course. BARNSTORFF.

- 376 Walter Von Der Vogelweide (3).**  
Continuation of course 375. BARNSTORFF.
- 400 Problems (1-3).**  
Graduate students will be given an opportunity to do special investigation. Admission only upon conference with the chairman.
- 401 Beginning German for Graduates (no credit) s.**  
Aim: To prepare graduate students for the Ph.D. reading test.
- 403-404 Periods and Personalities in German Literature (2).**  
Work in these courses varies from semester to semester. Lectures, reports, and themes on specific epochs and individuals selected by the instructor.
- 406 Old High German (3).**  
BARNSTORFF.
- 407-408 Gothic (3), (3).**  
BARNSTORFF.
- 410 Seminar (1-2).**  
BARNSTORFF.
- 411-412 Sanskrit (2), (2).**
- 490 Research (1-8).**  
The integral part of this course is work on thesis. Admission only upon conference with the chairman.  
*For teaching of German, see Education D118*  
Other courses in Germanic languages and German literature will be arranged if the needs of the students so require.

## Russian

- 1 Beginning Russian (5).**  
FISCHER.
- 2 Intermediate Russian (5).**  
Prerequisite, course 1 or its equivalent. FISCHER.
- 150 Intermediate Special Readings (1-2).**  
Prerequisites, courses 1 and 2 or equivalent. Designed for students who wish to broaden their reading knowledge in some particular field of science or study.
- 153 Advanced Reading (1-2).**  
Prerequisites, courses 1 and 2 or equivalent. FISCHER.
- 304 Masterpieces in Russian Literature (1-2).**  
FISCHER.
- 323 Russian Literature in English Translation (3).**  
The course is given in English. Study of the outstanding writers of the nineteenth century (Pushkin, Turgenev, Dostoevsky, and others). Courses in world literature and in the history of Russia are desirable.

## HISTORY

- 1 Western Civilization I: Man and Society from Earliest to Modern Times (5) f, w.**
- 2 Western Civilization II: Man and Society in the Modern World (5) w.**  
A survey of the evolution of Western civilization emphasizing the continuity of history, the important elements in the Western political and cultural tradition, and the relationship of ideas and institutions to their historical background. It provides a foundation for further study of history, the social sciences, and the humanities. Either course may be taken separately. SPITZ, PINKNEY.

- 20 American History (5) f, w.**  
A survey of American history and institutions with attention to state and national constitutional development. BUGG, MEMBERS OF THE STAFF.
- 112 Latin-American History (3) f, w.**  
A survey from the earliest times to the present day. SCHOLES.
- 198 Distinction (6) f, w.**  
Special work for candidates for graduation with distinction in history. MEMBERS OF THE STAFF.
- 201 History of Missouri (3) f.**  
A general course in the history of the state from the beginning of settlement to the present.
- 202 The Hellenistic Age (2) w.**  
The history of the Greek world from Alexander to the death of Cleopatra. BRADY.
- 231 Contemporary Europe (3) f, w.**  
A survey of European nations since the late nineteenth century. MCGREW.
- 251 Recent United States History (3) f, w.**  
A study of the United States since 1898.
- 301 Greek History (3) f.**  
A study of the political and social institutions and the intellectual life of the Greek city-states to the time of Alexander. BRADY.
- 303 The Far East (3) w.**  
Recent history of the Far East with special reference to its diplomatic relations with Europe and the United States. MCGREW.
- 304 The Near East (3) f.**  
The history and relationships of the Eastern Mediterranean countries in modern times.
- 306 Roman History (3) w.**  
The origin and development of Roman institutions and of Rome's expansion and culture through the reign of Marcus Aurelius. BRADY.
- 312 American Constitutional History (4) f.**  
The development of the American political and constitutional system from the Revolution to the present with special emphasis on federal and state constitutional theories and interpretations as they relate to American ideals, institutions, interests, and politics. BUGG.
- 315 Europe in the Middle Ages (3) f.**  
A survey of European history during the Medieval period. SPITZ.
- 316 Medieval Social and Economic History (3) f.**  
A study of social and economic institutions from the fifth to the sixteenth century. SPITZ.
- 317 Church and State in the Middle Ages (3) f.**  
A study of the development of medieval ecclesiastical and political institutions and their dynamic interaction. SPITZ.
- 318 Medieval Intellectual History (3) w.**  
A survey of the development of medieval thought and learning. SPITZ.
- 321 Tudor and Stuart England (3) f.**  
A treatment of the period covering social, political, religious, and imperial developments. MULLETT.
- 322 Modern England (3) w.**  
A survey of English evolution in the eighteenth and nineteenth centuries emphasizing political and economic developments. MULLETT.

- 323 English Legal and Constitutional History (4) f.**  
The development of English institutions, chief emphasis being placed on their relation to the general social and economic background. MULLETT.
- 324 Age of Jefferson and Jackson (3) w.**  
A comprehensive survey of the economic, cultural, political, and constitutional development of the United States during the formative period of the Republic with special attention to the ideals and philosophy of its leaders. BUGG.
- 327 The Age of the Renaissance (3) f.**  
The significant changes in European thought and institutions in early modern times emphasizing the age of discovery, capitalism, national monarchies, city-state culture, and the world of humanism. SPITZ.
- 328 The Age of the Reformation (3) w.**  
The significant changes in European thought and institutions in early modern times emphasizing the condition of Christendom, the rise of Protestantism, the Catholic Reformation, and the development of the modern state system. SPITZ.
- 329 Europe from Reformation to Revolution (3) w.**  
The interplay of intellectual, political, and economic forces in Europe from 1543 to 1789. MULLETT.
- 331 The French Revolution and Napoleon (3) f.**  
A study of the French Revolution and its impact on the European world. PINKNEY.
- 335 France since 1815 (3) w.**  
Political and social history of France in the nineteenth and twentieth centuries. PINKNEY.
- 336 Modern Germany (3) w.**  
Political and social history of Germany from the Reformation to the present, centered on the rise of Brandenburg-Prussia. PINKNEY.
- 338 Russia and Eastern Europe to the Seventeenth Century (3) f.**  
A survey of Eastern Europe from the ninth to the seventeenth century emphasizing Russia's growth as a part of a complex of Eastern states including the Byzantine Empire. MCGREW.
- 339 Imperial and Soviet Russia (3) w.**  
A survey of Russian development from Peter the Great to the present. MCGREW.
- 350 Special Readings (credit to be arranged) f, w.**  
Individual work with conferences adjusted to the needs of the student. Students registering in this course must obtain departmental approval. MEMBERS OF THE STAFF.
- 351 Social Forces in American History (3) f.**  
The development of the principal social institutions and their intellectual framework in America from the founding of the colonies to the Civil War. OSTRANDER.
- 352 Social Forces in American History (3) w.**  
A continuation of course 351 from the Civil War to the present day. OSTRANDER.
- 354 Foundations of Twentieth Century America (3) w.**  
The economic, cultural, and political development of the United States from the end of the Civil War to the opening of the twentieth century. OSTRANDER.
- 335 Economic History of the United States (3) w.**  
A survey of the structure and tendencies of American economic life from the colonial period to the present.
- 361 The History of the West (4) w.**  
A study of the frontier and the West and their influence on national development. ATHERTON.

- 362 History of the South (5) f.**  
A survey of the economic, intellectual, political, and social development of the South from the colonial period to the present. **ATHERTON.**
- 363 American Colonial History (3) f.**  
A study of the origins and development of American political, economic, and cultural institutions in the Colonial and Revolutionary periods. **OSTRANDER.**
- 364 Civil War and Reconstruction (2) w.**  
A study of the nature and significance of the American Civil War and the Reconstruction Period. **ATHERTON.**
- 365 Mexican History (3) f.**  
A survey of Mexico's political, social, and economic development. **SCHOLES.**
- 367 The History of Argentina, Brazil, and Chile (3) w.**  
A survey of the political, social, and economic development of the three nations. **SCHOLES.**
- 369 History of Spain (3) w.**  
A survey of Spain's political, social, and economic development. **SCHOLES.**
- 370 American Diplomatic History (3) f.**  
A survey of the nineteenth century diplomatic relations of the United States. **SCHOLES.**
- 371 American Diplomatic History (3) w.**  
A survey of the twentieth century diplomatic relations of the United States. **SCHOLES.**
- 372 European Diplomatic History (3) f.**  
A survey of European diplomatic relations since 1815. **McGREW.**
- 380 Economic History of Modern Europe (3) w.**  
A study of major developments in industry, agriculture, transportation, and governmental economic policies since 1700. **PINKNEY.**
- 389 American Historiography (2) f.**  
Prerequisite, eight hours of American history or graduate standing. Lectures and reports on the methods and contributions of major American historians. **ATHERTON.**
- 390 European Historiography (2) w.**  
Prerequisite, eleven hours of European history or graduate standing. Analysis of the art of history and historical writings as revealed by the leading European historians and the major European schools of historical interpretation. **MULLETT.**
- 391 Modern Intellectual History (3) w.**  
A survey of the predominant ideas of the intellectual classes since the seventeenth century. **MULLETT.**
- 400 Problems (credit to be arranged) f, w.**  
Individual work which does not lead to a dissertation. Students registering in this course must obtain departmental approval. **MEMBERS OF THE STAFF.**
- 401 Introduction to Historical Research (3) f.**  
Introduction to historical methods, source problems, bibliographical aids, source criticism, and use of related techniques. Required of graduate students in history. **PINKNEY, OSTRANDER.**
- 403 Problems of Teaching History in College (2) f (Same as Education D403).**  
Emphasis upon teaching the general courses. Some attention to work in related fields. Required of all A.M. and Ph.D. candidates in history who are preparing for college teaching. **ATHERTON, MEMBERS OF THE STAFF.**
- 404 Studies in Missouri History (3) w.**  
Use and analysis of source material in the history of the state. **ENGLISH.**

- 405 Readings in Russian History (3) f.**  
Readings in Russian historical materials which will be directed toward evaluating basic problems in the development of Imperial and Soviet Russia. MCGREW.
- 406 Greek and Roman Political Institutions (2) f.**  
Lectures and reports on problems in Greek and Roman constitutional history. BRADY.
- 407 Greek and Roman Political Institutions (2) w.**  
Continuation of course 406. BRADY.
- 411 Readings in Medieval History (2) w.**  
Readings in recent research material with critical discussion of reports on special topics. SPITZ.
- 421 Studies in British History (3) f.**  
Group investigations of the social and intellectual problems of modern England. MULLETT.
- 422 Church and State in England (3) w.**  
With particular reference to religious minorities, public law, social reform, and the development of toleration. MULLETT.
- 427 Studies in the Renaissance and Reformation (3) w.**  
The course will be concerned with analysis of problems of the period from 1300-1600 with emphasis on intellectual history. SPITZ.
- 431 Readings in Modern European History (3) w.**  
Readings in recent research material with class periods given over to the critical discussion of reports on special topics. PINKNEY, MCGREW.
- 432 Studies in Modern European History (3) w.**  
Group investigation of problems of modern Europe. A reading knowledge of either French or German required. PINKNEY, MCGREW.
- 435 Readings in French History (2) w.**  
Readings on selected problems in the history of France since 1789. PINKNEY.
- 440 Readings in the Age of Jefferson and Jackson, 1789-1865 (3) f.**  
Readings in American history from the Constitution to the Civil War with class meetings devoted to critical evaluations of reports. BUGG.
- 441 Studies in the National Period of United States History.**
- 450 Research (credit to be arranged) f, w.**  
Work equal to research done for a dissertation but not leading to preparation of a thesis. MEMBERS OF THE STAFF.
- 451 Studies in Social Forces (3).**
- 452 Readings in Social Forces (2) f.**  
Readings in American social and intellectual history with meetings devoted to critical evaluation of writings in the field. OSTRANDER.
- 455 Studies in Western History (3) w.**  
Directed research in American regional and sectional history. ATHERTON.
- 456 Readings in Recent United States History (3) f.**  
A course devoted to critical evaluation of writings in American history for the period 1865 to the present.
- 457 Readings in American Economic History (3) f.**  
A course of readings in the evolution of American capitalism with class periods given over to critical discussion of reports.
- 460 Readings in the History of the South (3) f.**  
Group readings and appraisal of controversial interpretations in southern history. ATHERTON.



- 466 Studies in the History of American Politics (3) w.**  
Directed research in American political history since 1875.
- 470 Readings in Latin-American History (3) w.**  
Readings in recent research material with class periods given over to critical discussion of reports on special topics. SCHOLERS
- 480 Studies in Nineteenth Century Diplomatic Problems (3) f.**  
Directed research in problems of nineteenth century American diplomacy. SCHOLERS.
- 481 Studies in Recent American Diplomatic Problems (3) f.**  
Directed research in problems of twentieth century American diplomacy. SCHOLERS.
- 490 Research (credit to be arranged) f, w.**  
This course leads to the preparation of a dissertation. MEMBERS OF THE STAFF.

## HOME ECONOMICS

- 10 Introduction to Home Economics (2) f.**  
Open to freshmen only. Adjustment to college living including introduction to college study and vocational opportunities in home economics.

## Child Development and Family Life

- 60 Home Nursing and Health (2) f, w.**  
A study of the home care of the sick and of family health including prenatal, natal, and postnatal care of the mother and baby.
- 160 Early Childhood (3) f, w.**  
Study of the development and guidance of the child under six. Observation in the child development laboratory is an integral part of this course.
- 161 Child Development Laboratory (2-3½ years) (3) f, w.**  
Prerequisite, Home Economics 160 or equivalent. Experience of working with children in accordance with general guidance principles.
- 162 Child Development Laboratory (3½-5 years) (3) f, w.**  
Prerequisite, Home Economics 160 or equivalent. Experience of working with children in accordance with general guidance principles.
- 163 Family Relations (3) f, w, s.**  
Prerequisite, psychology or sociology and sophomore standing, or consent of instructor. A study of present day family life with emphasis on activities in the home as they relate to the development of the family and its individual members.
- 263 The Child from Six Through Adolescence (3) f, w.**  
Prerequisite, Home Economics 160 or equivalent. Study of the development and guidance of the child from six through adolescence.
- 300 Problems (credit to be arranged) f, w, s.**  
Prerequisites, Home Economics 160, 263, and approval of instructor. Work independently on special problems in child development.
- 360 Community Participation in Youth Programs (3) w.**  
Prerequisite, Home Economics 263. Study of group dynamics together with experience in community youth programs.
- 361 Parent Education (2) w.**  
Prerequisites, Home Economics 161 or 162, and 260. Understanding of parents' needs. Discussion of conference and group meeting techniques.
- 362 Physical Growth (3) w, s.**  
Prerequisite, physiology. Study of physical growth from birth to maturity. Discussion of current methods of measurement will be included.

- 400 Problems (credit to be arranged) f, w, s.**  
Prerequisites, 300 level course in field of the problem and consent of instructor.
- 410 Seminar (2) f, w.**  
Reports and discussion of recent work in the fields of child development and family life.
- 460 Nursery School Administration (3) w, s.**  
Prerequisite, approval of instructor is required. Study of current nursery school practices with emphasis on programing, record keeping, staff, and equipment.
- 490 Research (credit to be arranged) f, w, s.**

## Food and Nutrition

- 31 Basic Concepts of Food and Nutrition (3) f, w.**  
An introductory course designed to relate foods and nutrition to other factors affecting man's development.
- 32 Elementary Food Preparation (3) f, w.**  
A laboratory course emphasizing the principles of selection, preparation, and combination of foods.
- 34 Meal Management (3) f, w.**  
Prerequisite, Home Economics 32. (Lecture and laboratory). Planning palatable and nutritious meals with consideration of time, energy, and money.
- 130 Nutrition and Health (3) f, w.**  
A study of food as it functions to meet body needs with emphasis on utilization, food sources, and selection of adequate diets. Meets requirements for nurses. (Not open to freshmen.)
- 131 Selection and Preparation of Foods (5) f, w.**  
Prerequisite, inorganic chemistry. (Lecture and laboratory). Principles underlying the selection and preparation of food.
- 132 Food Buying and Meal Service (3) f, w.**  
Prerequisite, Home Economics 131. (Lecture and laboratory). Study of economic aspects of food including production, distribution, and buying for consumption. Application of principles of food buying and food preparation to menu planning, meal preparation, and service.
- 133 Nutrition of the Family (3) f, w.**  
Prerequisites, organic chemistry, physiology, and Home Economics 131. Principles of nutrition with emphasis on problems involved in maintaining optimum health for family members. Nine week course—blocked for home economics education students.
- 135 Food Demonstrations (2) f, w.**  
Prerequisites, Home Economics 131, 132, and Speech 175. Fundamental principles of demonstration: discussions, professional and student demonstrations.
- 136 Institutional Food Preparation (3) f, w.**  
Prerequisite, Home Economics 132. Standard methods of quantity food production; operation of power equipment, costs, menus, and service.
- 224 Meat Selection and Identification (3) f, w (Same as Animal Husbandry 224).**  
Prerequisites, Home Economics 131 or consent of instructor. A study of meat with reference to selection, identification, utilization, wholesale and retail buying. Includes field trip to major processing plant.
- 231 Chemistry of Foods (3) f, w.**  
Prerequisites, organic chemistry and Home Economics 131. (Lecture and laboratory). Chemical properties of food components including carbohydrates, fats, proteins, minerals, vitamins, pigments, and flavor compounds.

- 232 Principles of Human Nutrition (4) f, w.**  
Prerequisites, physiology and Home Economics 231. (Lecture and laboratory). Food requirements throughout life; evaluation of nutritional status; selection of adequate diets with varying food patterns and economic conditions at individual, family, and community levels.
- 300 Problems (credit to be arranged) f, w, s.**  
Prerequisites, 200 level course in the field of the problem, senior standing, and approval of instructor. Library or laboratory problems selected for study by the student with the guidance of staff member. Report required.
- 330 Institution Organization and Administration (3) w.**  
Prerequisite, or concurrent, Home Economics 136. The problem of the management of food service units in institutions with emphasis on personnel management; fundamentals in the selection, arrangement, and care of the different types of equipment.
- 331 Modern Methods of Food Preservation (3) f, w, s.**  
Prerequisites, Home Economics 131, bacteriology, and organic chemistry. (Lecture and laboratory). Survey of literature and laboratory work on improvements in traditional methods and new methods of home food preservation.
- 332 Child Nutrition (3) f, w.**  
Prerequisites, Home Economics 160 and 232 or equivalent. (Lecture and laboratory). Application of nutrition principles to the feeding of children from infancy through adolescence.
- 334 Food Science (3) f.**  
Prerequisites, Home Economics 231 and bacteriology. Methods of industrial food processing, microbial and nonmicrobial spoilage mechanisms, chemical and physical food changes; study of meat and plant pigments.
- 336 Experimental Foods (3) f, w.**  
Prerequisites, Home Economics 131 and 231. (Lecture and laboratory). Introduction to the controlled experiment with food. Group and individual experience in standardization and developmental research.
- 337 Advanced Experimental Foods (3) f, w.**  
Prerequisite, Home Economics 336. Further development of the concepts and experience in planning, conducting, interpreting, and reporting food preparation research.
- 338 Advanced Nutrition (3) f, w.**  
Prerequisite, Home Economics 232; biochemistry recommended. Lecture-discussion of current literature and theory in nutrition.
- 339 Diet Therapy (3) w.**  
Prerequisite, Home Economics 232. Adaptation of diet and application of nutrition principles in disease states and under conditions of abnormal stress. Current literature study.
- 390 Field Training (1-4) f, w, s.**  
Food and Nutrition prerequisites, Home Economics 136 and 232; Home Economics 330 recommended. Supervised training in food service center with conference, examination, and written summary.
- 400 Problems (credit to be arranged) f, w, s.**  
Prerequisites, 300 level course in field of the problem and consent of instructor.
- 410 Seminar (2) f, w.**  
Reports and discussion of recent work in the fields of food and nutrition.
- 431 Nutritional Perspectives (3) s.**  
Prerequisites, senior standing and Home Economics 130 or 133 or 232 or equivalent. A survey of various factors related to man's present-day food habits and nutritional status.

- 432 Metabolism (3) f.**  
Prerequisites, Home Economics 232 and analytical chemistry, preceding or concurrent. Various phases of metabolism through calorimetry and human feeding experiments.
- 433 Methods of Nutrition Research (3) f, w.**  
Prerequisites, analytical chemistry, biochemistry, and Home Economics 232. (Reading, discussion, and laboratory). Work in various methods and techniques used in nutrition research.
- 435 Readings in Foods (credit to be arranged) f, w, s.**  
Prerequisite, graduate standing with 20 hours of Food and Nutrition. Critical reading in one or more phases of food research. Report required.
- 437 Food Testing and Analysis (3) w.**  
Prerequisites, Home Economics 336, bacteriology, and analytical chemistry. Biochemistry and physics recommended. Study and application of physical and chemical techniques available for experimental work with foods.
- 438 Readings in Nutrition (credit to be arranged) f, w, s.**  
Prerequisite, graduate standing with 20 hours of Food and Nutrition. Critical reading in one or more phases of nutrition research.
- 490 Research (credit to be arranged) f, w, s.**

## Home Management and Family Economics

- 71 Elementary Home Equipment (3) f, w.**  
Fundamental principles of selection, use, and care of home equipment. Class discussions, demonstrations, field trips, and laboratory experiments.
- 170 Work Simplification in Home Processes (2) f, w.**  
Problems in simplifying work to conserve time and energy in home processes.
- 172 Management in Family Living (2) f, w, s.**  
Not open to freshmen. A study of the management of family resources as a means to a better understanding of the problems of home living.
- 271 Home Management Residence (3) f, w, s.**  
Prerequisites, junior or senior standing and Home Economics 32 or 131, 71 and 172. Residence in the home management house providing experience in applying the principles of home management.
- 300 Problems (credit to be arranged) f, w, s.**  
Prerequisites, a 100 or 200 course in the field of the problem, senior standing, and approval of instructor. Supervised reading or laboratory problems.
- 370 Housing the Family (3) f, w.**  
Prerequisite, general economics or agricultural economics. A study of the market from the family point of view. Consumer problems, merchandising practices, and legislation affecting consumers. Observations of the market.
- 371 Advanced Home Equipment (3) w.**  
Prerequisites, Home Economics 71 and Physics 1. Study of construction and operation of home equipment. Practical experience in performance testing and in making simple repairs.
- 373 Economic Problems of the Family (3) f, w.**  
Prerequisites, general economics or agricultural economics. Individual and family problems involving finance. The influence of national economic conditions on family financial situations. Planning use of income, savings, insurance, investments, and credit.
- 375 The Consumer and the Market (3) f, w.**  
Prerequisite, general economics. Home planning including location, use of space, finance and construction problems; community housing problems and legislation.

- 400 Problems (credit to be arranged) f, w, s.**  
Prerequisites, 300 level course in field of the problem and consent of instructor.
- 410 Seminar (2) f, w.**  
Reports and discussion of recent work in the fields of home management and economic problems of the family.
- 490 Research (credit to be arranged) f, w, s.**

## Interior Design

- 40 Design Fundamentals (3) f, w.**  
Elements and principles of two-dimensional space design as they relate to every-day living.
- 41 Three-Dimensional Design (2) f, w.**  
Prerequisite, Home Economics 40 or its equivalent. Three-dimensional space design. Construction in paper, wood, light metals, clay, wire, as they relate to every-day living.
- 140 Interior Design (3) f, w.**  
Prerequisites, Home Economics 40, 41 or its equivalent. Organization and planning of interior space; new techniques and materials; new concepts in architecture, furnishings, and equipment. Floor plans and elevations.
- 141 Interior Decoration (3) w, s.**  
Prerequisite, Home Economics 140. Continuation of Home Economics 140 with emphasis on furniture, fabrics, decorative accessories. Floor plans, elevations, color renderings, and scale models.
- 142 Practical Problems in Home Furnishings (2) w.**  
Prerequisite, Home Economics 41 or equivalent. Slip covers, upholstery, drapery making, wood finishing, etc.
- 241 Sketching for Interior Designers (3) f.**  
Prerequisites, Home Economics 140 and Mechanical Engineering 1. Color drawing of existing interiors.
- 248 Fabric Design (3) f, w.**  
Prerequisites, Home Economics 41 or its equivalent, and 82. A laboratory course in fabric and paper design (hand processes).
- 300 Problems (credit to be arranged) f, w, s.**  
Prerequisites, 200 level course in the field of the problem, senior standing, and approval of instructor. Supervised independent work.
- 340 History of the House and Its Furnishings (2) f, w.**  
Prerequisites, Home Economics 40 and 41 or its equivalent. A study of the history of home architecture and interior design (furniture and accessories).
- 342 Residential Interiors (4) w, s.**  
Prerequisite, Home Economics 241. Advanced interior design study involving an actual client presentation.
- 343 Decorator's Mediums (3-4) w, f.**  
Prerequisite, Home Economics 140. An investigation in fields of lighting, acoustics, building materials and methods, and wholesale furnishings.
- 344 Display Design (2) f, w.**  
Prerequisite, Home Economics 41 or its equivalent and permission of instructor. Principles, problems, and techniques underlying store counter and window display.
- 345 Historic Textiles (2) w.**  
Prerequisites, Home Economics 40 and 82. Development of textiles from ancient times. Comparison with modern commercial products.

- 348 Advanced Fabric Design (3) w.**  
Prerequisite, Home Economics 248. Continuation of Home Economics 248 with special emphasis on silk screen printing.
- 390 Field Training (1-4) f, w, s.**  
Prerequisites, Home Economics 141, senior standing, and approval of instructor. Field experience in interior design under professional and educational supervision.
- 400 Problems (credit to be arranged) f, w, s.**  
Prerequisites, 300 level course in field of the problem and consent of instructor.
- 410 Seminar (2) f, w.**  
Reports and discussion of recent work in the field of design and interior design.
- 441 Advanced Interior Design (4) w, s.**  
Prerequisites, Home Economics 141 and 340. Design of modern functional interiors; modern adaptations of historic material; design for professional establishments.
- 442 Studio Techniques (4) w.**  
Prerequisites, Home Economics 342 and 344. Problems related to business methods and selling techniques involved in operating an interior design shop.
- 446 History of Accessories in Interior Design (3) f.**  
Prerequisite, Home Economics 140 or its equivalent. Historic study of decorative arts (pottery, china, glass, metalwork, etc.)
- 490 Research (credit to be arranged) f, w, s.**

## Textiles and Clothing

- 80 Elementary Clothing Selection and Construction (3) f, w.**  
Laboratory practice in the selection and construction of garments; checking and altering patterns; the use and care of sewing machines. For students with no experience.
- 81 Clothing Selection and Construction (3) f, w.**  
Laboratory practice in the selection and construction of garments; pattern alteration; the use and care of sewing machines. For students with some experience.
- 82 Textiles (3) f, w.**  
Not open to first semester freshmen. A study of textile fibers and their properties as related to fabrics.
- 83 Introduction to Clothing and Textiles (3) w.**  
The analysis of personal and family needs in relation to clothing. The course aims to develop standards in the selection, purchase, use, and maintenance of the wardrobe.
- 181 Costume Design (2) f, w.**  
Prerequisite, Home Economics 41 or its equivalent. Line, form, color, and texture as applied to dress.
- 183 Fashion Illustration (2) f.**  
Prerequisites, Home Economics 40, 80 or 81, and Art 5. Sketching from the figure and the costumed figure.
- 185 Buying of Clothing and Textiles (2) f, w, s.**  
Prerequisite, Home Economics 82. Problems of buying clothing and textiles including household textiles. Desirable characteristics, methods of identification, uses, availability in various markets, and prices.
- 282 Intermediate Clothing (3) f, w.**  
Prerequisites, Home Economics 80 or 81 and 82. Continuation of Clothing 80 or 81.

- 300 Problems (credit to be arranged) f, w, s.**  
Prerequisites, (a) Clothing—Home Economics 180 and 382; (b) Textiles—Home Economics 82 and 185. Approval of instructor is required.
- 380 Tailoring (3) f, s.**  
Prerequisites, Home Economics 81 and 82. Selection and tailoring of a wool suit or coat; comparison and emphasis of fundamental tailoring techniques.
- 381 History of Costume (3) f.**  
Prerequisite, senior standing. The history of costume as a source of inspiration for modern costume design.
- 382 Applied Costume Design (3) w.**  
Prerequisites, Home Economics 280 and 281. Draping and modeling costumes of original design.
- 383 Advanced Fashion Illustration (3) w.**  
Prerequisites, Home Economics 181, 183. The costumed figure expressed in various media for commercial and other purposes.
- 385 Textile Fibers (3) f, s.**  
Prerequisites, Home Economics 82, Home Economics 185, and Chemistry 15. An advanced study of textile fibers with emphasis upon their structure, composition, physical and chemical properties.
- 386 Experimental Textiles (3) f, w.**  
Prerequisites, Home Economics 80 or 81, 82, and junior standing. Laboratory problems involved in the care and handling of textile fabrics.
- 387 Flat Pattern Design (3) w, s.**  
Prerequisites, Home Economics 81, 82, and 181. Principles of designing by flat pattern methods and the construction of an original design.
- 390 Field Training (1-4) f, w, s.**  
Prerequisites, Home Economics 80 or 81, 82, 181, 185, Economics and Business 314, senior standing, and approval of instructor. Experience in textiles and clothing merchandising under supervision.
- 400 Problems (credit to be arranged) f, w, s.**  
Prerequisites, 300 level course in field of the problem and consent of instructor.
- 410 Seminar (2) f, w.**  
Reports and discussion of recent work in the field of textiles and clothing.
- 480 Textile Fabrics (3) w.**  
Prerequisites, Home Economics 385 and Chemistry 25 or equivalent. An advanced study of textile fabrics with emphasis on finishes.
- 485 Readings in Textiles (credit to be arranged) f, w, s.**  
Prerequisite, graduate standing with 15 hours of Textiles and Clothing. Readings in recent research material.
- 490 Research (credit to be arranged) f, w, s.**

## HORTICULTURE

- 1 General Horticulture (3) f, w.**  
Fruits, vegetables, and ornamentals—a survey of the horticultural industry. Special emphasis on home enterprises. SCHROEDER.
- 101 Plant Propagation (2) f.**  
Prerequisites, Horticulture 1 and Botany 1. The principles and practices of propagation for horticultural crops. A study of seedage, cuttage, layerage, separation, division, budding, and grafting. GOODMAN.

- 110 Landscape Gardening (3) f, w.**  
 Designs for living for future homeowners including planning the home grounds for the farm or town. MOSHER.
- 112 History of Landscape Architecture (2) f.**  
 A study of gardens: mythological, ancient, medieval, Renaissance, and modern. Offered in 1958-59 and in alternate years. MOSHER.
- 114 Ornamental Trees (3) f.**  
 Shade trees and ornamental trees used in landscape architecture; their identification, character, habits, adaptation, and care. Offered in alternate years. Not offered in 1958-59. MOSHER.
- 116 Ornamental Shrubs and Vines (3) w.**  
 The ornamental (native and cultivated) shrubs and vines used in landscape architecture; identification, character, habits, adaptation, and care. Offered in alternate years. Not offered in 1958-59. MOSHER.
- 118 Landscape Drafting (3) f.**  
 Prerequisite, course 110. Theory, principles, and practices of landscape drafting, freehand drawing and landscape art. MOSHER.
- 125 Landscape Sketching (2) w.**  
 Theory, techniques, and practice of freehand sketching in various media as used in landscape art. Offered in alternate years. Not offered in 1958-59. MOSHER.
- 144 Vegetable Gardening (3) w.**  
 Prerequisite, Horticulture 1 or equivalent. The fundamentals in growing, harvesting, and storing of vegetable crops. Vegetables for the family. LAMBETH.
- 160 Garden Flowers (3) w.**  
 Annuals, biennials, perennials, bulbs, and water plants; their identification, nomenclature, classification, and culture. SMITH.
- 162 Flower Arrangement and Home Floriculture (3) f, w.**  
 Cut-flower care and arrangement; basic design principles as applied to floral decorations for all occasions and interior decoration with plants. SMITH.
- 164 Flower Judging (1) w.**  
 Prerequisite, Horticulture 160. Preparing and judging flowers and potted plants for exhibitions. Required of all students trying out for the intercollegiate flower judging team. SMITH.
- 166 Plant Forcing Structures (2) f.**  
 History of plant forcing structures; location and arrangement; structural parts and erection; heating and ventilating; repair and maintenance. Hotbeds, cold-frames, mushroom houses, etc. Offered in 1958-59 and alternate years. SMITH.
- 252 Landscape Construction (3) w.**  
 Prerequisite, course 118. Theory and practice of landscape construction, landscape engineering, and landscape surveys. Offered in 1958-59 and in alternate years. MOSHER.
- 254 Landscape Design (3) w.**  
 Prerequisites, courses 110 and 118. Theory and principles of landscape design for home grounds and gardens. MOSHER.
- 256 Planting Design (3) f.**  
 Prerequisites, courses 114 and 116. Study and use of plant materials in combination for landscape effects. Offered in 1958-59 and in alternate years. MOSHER.
- 260 Greenhouse Management Principles and Practices (3) f.**  
 Prerequisites, Horticulture 166 and Botany 1. The effects of light, temperature, water, gases, nutrition, and pests upon production of greenhouse crops. ROGERS.



- 261 Commercial Floriculture: Cut-Flowers (3) f.**  
Prerequisite, course 260. Greenhouse and cut-flower crops as grown by florists for commercial purposes. Propagation, methods of culture, timing the crop, cost of production. Offered in alternate years. Not offered 1958-59. ROGERS.
- 262 Commercial Floriculture: Pot-Plant Crops (3) w.**  
A continuation of course 261 with special emphasis on commercial potted and bedding plants. Offered in alternate years. Not offered in 1958-59. ROGERS.
- 268 Flower Store Management and Floral Design (3) f.**  
Prerequisites, Horticulture 261 and 262. A study of the principles and practices of marketing flowers and plants. Emphasis is on flower preparation and selling practices of the retail florist. Offered in alternate years. Not offered 1958-59. SMITH.
- 270 Commercial Horticultural Products (3) f.**  
Prerequisites, 5 hours of chemistry and 4 hours of bacteriology or their equivalent. Introduction to the principles and techniques of commercial freezing, canning, dehydrating, preserving, and fermenting of fruits and vegetables. JOHNSTON.
- 271 Horticultural Products Quality (3) w.**  
Prerequisite, course 270. Function of federal and state food regulatory agencies. Subjective and objective quality tests on commercial processed fruit and vegetable products. JOHNSTON.
- 300 Problems (credit to be arranged) f, w, s.**
- 305 Systematic Horticulture (3) f.**  
Prerequisites, Horticulture 1 and Botany 1 or equivalent. Varieties and kinds of fruit and vegetable plants. Description, identification, and judging. SWARTWOUT.
- 313 Spraying (3) w.**  
Prerequisite, general inorganic chemistry. Spray materials, spray machinery, spraying practices and results. SWARTWOUT.
- 314 Commercial Pomology (3) f.**  
The harvesting, grading, packing, storage, and marketing of fruits and manufacture of major fruit products.
- 315 Improvement of Horticultural Plants (3) w.**  
Prerequisites, Horticulture 1 and Botany 1. The principles and practices as applied to selection and breeding of horticultural plants. HIBBARD.
- 322 Fruit Production (3 or 5) f.**  
Prerequisites, Horticulture 1, Botany 1, and Soils 100. The principles and practices followed in the fruit-growing industries. HIBBARD.
- 333 Small-Fruit Culture (3) w.**  
Prerequisite, Horticulture 1. The planting, culture, and harvesting of small fruits. HEMPHILL.
- 344 Commercial Vegetable and Truck Crop Growing (5) f.**  
Prerequisite, Horticulture 144 or its equivalent. The principles involved and the practices recommended for the growing, harvesting, and marketing of vegetables for commercial purposes. LAMBETH.
- 352 Advanced Landscape Design (3) f, w.**  
Prerequisite, course 254. Landscape design of home grounds, estates, and parks. MOSHER.
- 354 Advanced Landscape Architecture (3) w.**  
Prerequisite, course 352. The design, drafting, and rendering of complete landscape plans including grading, construction, and planting plans. MOSHER.
- 356 Civic Design (3) f.**  
Prerequisite, course 352. Study and application of principles of civic design including city planning and land development. MOSHER.

- 360 Advanced Greenhouse Management (3) w.**  
Prerequisites, Horticulture 260, 261, and 262. Assigned problems and readings dealing in the total planning and management of the commercial greenhouse range. Offered in 1958-59 and in alternate years. ROGERS.
- 370 Food Color Technology (3) f.**  
Prerequisites, organic chemistry and 5 hours of physics or their equivalent. A study of the physical and chemical nature of natural food color. Color measurement, notation, evaluation, and preservation as related to commercial food processing. JOHNSTON.
- 401 Chemistry and Physics of Spraying (credit to be arranged) w.**  
Prerequisite, course 313 or its equivalent. The composition, toxicity, compatibility, deterioration, spreading, and adhesion of spray materials. SWARTWOUT.
- 402 Vegetable and Truck Crop Forcing Problems (3) f.**  
Prerequisite, Horticulture 144 or equivalent. Soil sterilization, temperature and humidity, training, pruning, pollination, and fertilizers for vegetables forced in structures. Offered in alternate years. Not offered in 1958-59. LAMBETH.
- 404 Breeding of Horticultural Plants (credit to be arranged) f, w.**  
Prerequisite, course 315 or equivalent. Study of literature and original investigations on breeding and selection of horticultural plants. HIBBARD.
- 405 Physiology of Woody Plants (3) w.**  
Prerequisite, Botany 203 or consent of instructor. The influence of environmental factors, including their modifications through cultural practices, on the growth and reproduction of trees and shrubs. Offered in 1958-59 and in alternate years. HIBBARD.
- 406 Phytohormones and Vitamins (3) w (Same as Agricultural Chemistry 406).**  
Prerequisites, elementary botany, plant physiology, and six hours of organic chemistry. The chemistry, physiology, and practical applications of phytohormones and vitamins in development of plants. Offered in 1958-59 and in alternate years. HEMPHILL.
- 407 Morphology of Horticultural Plants (credit to be arranged) f.**  
Prerequisites, Botany 1 and 305. The morphological and histological structure of horticultural plants of economic importance. Offered in 1958-59 and alternate years.
- 408 Nutrition of Horticultural Plants (3) f.**  
Prerequisites, Horticulture 322, Soils 301, Botany 203, or equivalents. The important nutrient elements, their absorption and utilization. HEMPHILL.
- 410 Seminar (1) f, w.**  
Recent investigations in horticulture and in other fields as they relate to horticulture. MEMBERS OF THE STAFF.
- 414 Plant Chemistry (3-5) w (Same as Agricultural Chemistry 404).**  
Prerequisite, Chemistry 212. The biochemistry of plant growth. Plant constituents, their occurrence, transformation, and metabolism. Offered in alternate years. Not offered in 1958-59. HIBBARD.
- 415 Methods of Horticultural Research (3) f.**  
Methods of procedure in work of investigations: outlining problems, assembling and analyzing data, and presenting results. Offered in alternate years. HIBBARD.
- 420 Root Stocks for Deciduous Fruit Trees and Vines (credit to be arranged) f.**  
Suitable stock for apples, pears, and grapes. GOODMAN.
- 422 Experimental Pomology (3) f.**  
Prerequisite, Horticulture 322 or equivalent. A study of current investigations in the field of fruit growing. Offered in 1958-59 and in alternate years. HEMPHILL.
- 444 Advanced Olericulture (3) w.**  
Prerequisite, Horticulture 144 or equivalent. The physiological factors affecting the growth, harvesting, and storage of vegetable crops. A survey of the fundamental literature is made. LAMBETH.

- 490 Research (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.

## HUMANITIES

Courses 1 and 2 fulfill the general education requirement in humanistic studies. Although it is recommended that both courses be taken, either may be taken separately and course 2 may be taken before course 1. Enrollment restricted to superior students.

- 1 Humanities (5) f.**  
A unified introduction to literature, philosophy, the visual arts, and religion. Selected masterpieces in these fields are studied for their intrinsic values and for their significance in the development of Western civilization.
- 2 Humanities (5) w.**  
A continuation of the work begun in course 1.

## ITALIAN (See ROMANCE LANGUAGES)

## JOURNALISM

### History and Ethics

- 100 History and Principles of Journalism I (3) f.**  
The history of American journalism to about 1860, with lectures supplementing textbook work. Lectures and readings on the functions of the American newspaper. TAFT.
- 101 History and Principles of Journalism II (3) w.**  
Continuation of the preceding course. While it is desirable to take course 100 first, students entering at midyear may begin with this course. TAFT.
- 302 The Foreign Press (2) f, w.**  
The foreign press and worldwide news services and communications. SCROGGINS.
- 304 Communications Law (2) f, w, s.**  
Legal limitations and privileges affecting publishing, advertising, broadcasting, and telecasting. Consideration of the legal philosophy bearing upon the media of communications. FISHER.

### Reporting and Editing

- 105 News (3) f, w, s.**  
Organization of a newspaper office; news and news values and forms. SCROGGINS.
- 106 Reporting (3) f, w, s, ss.**  
Prerequisite, course 105. Assignments on daily newspapers covering the entire range of community news and giving experience in getting and writing all types of local news. SHARP, MEMBERS OF THE STAFF.
- 108 Foreign Correspondence (2) f, w.**  
The work of a foreign correspondent with emphasis on laboratory features. SHARP.
- 110 Copyreading I (2) f, w, s.**  
Prerequisite, course 105. Purposes and methods. TOWNSEND.
- 111 Copyreading II (2-4) f, w, s, ss.**  
Prerequisites, courses 105 and 110. Laboratory work on *The Columbia Missourian*, preparing all types of news copy for publication. BICKLEY, SPENCER, MEMBERS OF THE STAFF.
- 112 Communications Practice (1-4), f, w, s, ss.**  
Special laboratory instruction for seniors in all departments with not over 2 hours credit in any one field. ENGLISH, MEMBERS OF THE STAFF.

**307 Advanced Reporting (3) f, w, s, ss.**

Experience in the more difficult assignments and stories. SHARP, MEMBERS OF THE STAFF.

**Advertising and Production****120 Advertising Principles and Practice (3) f, w, s.**

Prerequisite to all other advertising courses. Advertising fundamentals in relation to modern business activities. GROSS, HAVERFIELD, MEMBERS OF THE STAFF.

**321 Advertising Copy, Layout, and Production (3) f, w, s.**

Prerequisite, course 120. Application of modern merchandising methods to the preparation of copy and layout design. GROSS.

**322 Psychology in Advertising (2) f (alternate fall semesters).**

Application of psychological principles to advertising with research techniques exemplified by means of group projects. ENGLISH.

**323 Advertising Salesmanship (3) f, w, s, ss.**

Prerequisites, courses 120 and 321. Practical application of the principles of copy and layout to the mechanics and psychology of space-selling on *The Columbia Missourian*. BRATEK.

**324 Advertising Campaigns (2) w, s.**

Prerequisite, M grade in course 321. Planning and preparation of copy and layout for complete national advertising campaigns with emphasis on research.

**325 Newspaper Sales Promotion (2) f, w.**

Prerequisite, course 120. Modern newspaper promotion procedures emphasizing techniques, organization, and operation.

**326 Radio-Television Advertising (2) f, w, s.**

Survey of radio and television research, station coverage, government agencies affecting radio and television, networks, representatives. Creative writing for radio and television commercial scenarios. GROSS.

**327 Retail and Direct Advertising (3) f, w.**

Course 321 or 336 recommended to precede this course. Selling and store-management problems encountered in the retail advertising field. HAVERFIELD.

**329 Advanced Advertising Salesmanship (2) f, w, s, ss.**

Prerequisites, courses 321 and 323. Experience in more comprehensive problems of advertising salesmanship. BRATEK.

**330 National Advertising Markets and Media (2) f, w, s.**

Manufacturers' advertising procedures, markets, media, and organization of the advertising function. HAVERFIELD.

**331 Advertising Problems (2) f, w.**

Analysis and solution by the case method of a wide variety of advertising, merchandising, and distribution problems. GROSS.

**332 Public Relations (3) f, w.**

Prerequisites, courses 100 or 101, and 120. Current methods of dissemination of public information as practiced by business, industrial, educational, and social organizations. MORELOCK.

**333 Television Commercial Copy and Promotion (2) f, w, s.**

Prerequisite, course 326. Writing television commercials, preparation of sales promotion, station and program audience research, and promotion. GROSS.

**336 Typography and Printing Processes (2) f, w, s.**

Printing from Gutenberg to Bruce Rogers with opportunity to practice principles governing the effective use of type, rule, and illustration. FISHER.

## Linotype

### 39N Applied Composing Room Practice (0).

Linotype instruction for students regularly enrolled in the University. BELL.

## Photo-Journalism

### 138 Principles of Photoengraving (2) f, w, s, ss.

Prerequisite, course 140. Engraving and printing processes including rotogravure, photogravure, and process color printing. EDM.

### 140 Beginning Press Photography (2) f, w, ss.

Picture-taking techniques and darkroom procedures emphasizing the camera in the modern press. CANNON.

### 141 Advanced Press Photography (2) f, w, s.

Prerequisite, course 140. Work outdoors and indoors with flash equipment, studio portraiture and illustrative photography. EDM.

### 142 Advertising and Free Lance Photography (2) f, w, s.

Free lance and advertising problems with special studio work in advertising photo techniques. EDM.

### 143 Staff Photography (1-3) f, w, s, ss.

Assignments on *The Columbia Missourian*. CANNON.

### 343 Advanced Staff Photography (1-2) f, w, s, ss.

More difficult assignments on *The Columbia Missourian*. CANNON.

### 344 Picture Editing and Transmission (3) f, w, s.

Prerequisite, 5 hours of photo-journalism or consent of instructor. Study of techniques emphasizing use of single picture, sequence, and series. Student liaison between editors and photo staff. Transmission experience. EDM.

## Semantics

### 345 General Semantics in Journalism (2) w.

Linguistic and semantic mechanisms which condition knowledge, activities, and adjustment, applied to the journalist's problems. ENGLISH.

## Editorial Page

### 150 Editorial Writing and Today's Problems (3) f, w, s.

Emphasis upon editorial writing and thinking. Symposium specialists discuss current problems. Three editorials a week for *The Columbia Missourian*. VOTAW.

### 351 Editorial Page Direction (2) f, w, s, ss.

Prerequisite, course 150 or equivalent experience. Experience on *The Columbia Missourian* in editorial page editing. VOTAW.

## Radio-Television Journalism

### 154 Radio-Television Theory and Techniques (2) f, w, s.

Prerequisite to courses in radio-television sequence, except course 326. Basic theory and techniques in radio and television broadcasting. LAMBERT.

### 155 Radio and Television News (2) f, w, s.

Training in processing wire and local news for radio and television with much practice in writing sustaining material for KFRU and KOMU-TV. BERK.

- 156 Radio-Television News Processing (3) f, w, s, ss.**  
Prerequisite, course 155. Practice in processing daily news and writing material; learning to plan, prepare, and edit broadcasts. Two hours work daily preparing radio or television broadcasts. COTTAM.
- 157 Newscasting (3) f, w, s, ss.**  
Prerequisite, course 155. Announcing and newscasting with drill. Problems of presenting radio news. COTTAM.
- 353 Cinematography (3) f, w, s.**  
Prerequisite, course 140 or equivalent experience. Motion picture techniques as applied to television. Advanced theory of cinematography. Practice with professional equipment for use on KOMU-TV. CANNON.
- 356 Television Production (3) f, w, s.**  
Prerequisites, course 154 or equivalent experience, and permission of instructor. Theory and practice in fundamentals of producing and directing "live" television programs. SCOLLAY.
- 358 Television News Laboratory (3) f, w, s, ss.**  
Prerequisites, courses 359, 141, and 307, or equivalent experience, and permission of instructor. Experience in preparing television newscasts for presentation on KOMU-TV. BERK, MEMBERS OF THE STAFF.
- 359 Special Events in Radio and Television (3) f, w, s.**  
Prerequisites, course 157 and permission of instructor. Appraisal of portable equipment. Experience as member of KFRU and KOMU-TV special events crews. BERK.

### Newspaper Features and the Magazine Field

- 266 The Agricultural Press (3) f, w.**  
For students in the College of Agriculture who may be required to prepare material for publication in newspapers or farm journals. Not open to special writing majors. NORMAN.
- 305 Critical Writing (2) f, w, s.**  
Prerequisite for journalism students, Journalism 105. Analysis of professional book reviewing with frequent written reviews. Student reviews published in *The Columbia Missourian* and other papers. PEDEN.
- 360 Feature and Special Articles (3) f, w, s.**  
Prerequisite, course 105 or professional writing experience. Writing and submitting for publication, articles for newspapers, magazines, and syndicates. TOWNSEND.
- 361 Magazine Article Writing (2) f, w, s.**  
Planning and writing articles for sale to periodicals. "Textbooks" of the course are the magazines themselves, more than 1,000 of which are available for the student's study as possible markets. FISHER.
- 362 Magazine Production (2) w, s.**  
Prerequisite, course 336. Tracing the progress of a magazine from copy to bindery. Potentials and limitations of composition methods. Steps in periodical production. Emphasis on principles, factors, and elements involved in layout. FISHER.
- 364 Industrial and Business Periodicals (2) w.**  
Class publications, especially in the field of industry and business. Emphasis on employee papers and magazines. FISHER.

### Weekly and Small Daily Publishing

- 372 Weekly-Small Daily Publishing (3) f, w.**  
Prerequisite, Journalism 120. A required course for newspaper publishing majors. Consideration is given to business operation and advertising problems with an approach to understanding newspaper economics. One hour lecture, one hour conference, and four hours laboratory practice in advertising sales. BRAY, BRATEK.

**373 The Community Newspaper (2) w.**

The role of the editor in community life. Administration and function as social agency. BRAY.

**375 Newspaper Organization and Management (2) f, w, s.**

Organization, field of service, personnel, equipment, production, community relations, labor relations, accounting. RUCKER.

**High School Journalism****380 High School Journalism (2) s.**

Selection of material, editing, production, and school public relations. Function and scope of school publications. ENGLISH.

**Field Investigations****185 Special Field Investigations (1-6) f, w, s.**

Field trips and study of newspaper plants including the daily writing of articles for newspapers. Details of each trip available in advance. Additional fee required. ENGLISH, MEMBERS OF THE STAFF.

**Senior Assembly****189 Senior Assembly (0) f, w, s.**

Prerequisite, senior standing. Required of all majors. Surveying areas for job opportunities, letterwriting, interviewing. Lectures by specialists in various fields. ENGLISH.

**Courses for Graduate Students****400 Problems (1-5) f, w, s, ss.**

Individual work on chosen and specified problems not leading to a thesis. Project must be set up before registration. ENGLISH, MEMBERS OF THE STAFF.

**402 Theory of Communication (3) f, w.**

A study of theoretical formulations, research settings and methods, techniques of measurement, and specific phenomena of human communication.

**403 The Literature of Journalism (2) f, w, s.**

Reading and discussion of books related to journalism. MOTT.

**413 Contemporary Reporting Problems (2) f, w, s.**

A study of current reporting in state and local government and other specialized fields. Study of barriers to access to news, readability, content analysis of news, with practical experience in covering state news in Jefferson City. TAFT.

**414 Contemporary Copyreading Problems (2) f, w, s.**

Individual investigations of techniques, studies in newspaper vocabularies; headline structures and page makeup, especially recent developments. BICKLEY.

**432 Contemporary Problems in Newspaper Publishing (2) f, w, s.**

Current problems important to the newspaper publishing industry. An overall study developing basic data. TAFT.

**435 Contemporary Advertising Problems (2) f, w, s.**

Recently developed and emerging ideas and techniques in advertising, publicity, public relations, promotion.

**458 Advanced Television Laboratory (3) f, w, s.**

Prerequisite, Journalism 359 or equivalent training or experience. LAMBERT, MEMBERS OF THE STAFF.

- 459 Station Management (3) f, s.**  
Prerequisite, course 326. Permission of instructor required. Study of radio and television management problems and procedures. Laboratory work at KFRU or KOMU-TV. LAMBERT.
- 488 Research Methods in Journalism (2) f (alternate fall semesters).**  
Prerequisites, courses 100, 101, 120. Examination of research techniques, readership studies, readability formulas, content analysis, questionnaire interviews. Historiography. ENGLISH.
- 490 Research (credit to be arranged) f, w, s, ss.**  
Guidance for graduate students engaged in investigations looking toward the production of theses. ENGLISH, MEMBERS OF THE STAFF.

## LAW

### First Year\*

- 100 Contracts (3) f, w.**  
Mutual assent and consideration; duty to third parties; interpretation, performance, and discharge of contracts. PITTMAN.
- 101 Criminal Law and Procedure (4) w.**  
The purposes of criminal law; the nature of criminal responsibility; characteristics of particular crimes; procedures in criminal cases. HUNVALD.
- 102 Equity I (3) w.**  
History of equity; powers of courts of equity; decrees and orders; specific performance of contracts. ANDERSON.
- 103 Introduction to Procedure (3) f.**  
Causes of action; jurisdiction and venue; parties; joinder and splitting of causes; pleading; writs and summonses; proceedings after pleading and prior to trial; the trial; proceedings after trial. WHEATON.
- 104 Legal Bibliography (2) f.**  
Federal and state statutory material; reports, official and unofficial; annotated case system; encyclopedias and general reference books; state and national digest systems; citators; legal periodicals, topical services. HOGAN.
- 105A Personal Property (2) f.**  
Property; classification of property; possession; bailment; liens; pledges; finder; adverse possession; bona fide purchaser; gifts; accession and confusion; judicial sale and satisfaction of judgment; fixtures. FRATCHER.
- 105B Rights in Land of Another (excluding covenants) (1) f.**  
Lateral and subjacent support, water rights, nuisance. FRATCHER.
- 106 Real Property (3) w.**  
Estates in land—possessory estates and introduction to future interests; concurrent ownership; common law conveyances. Covenants running with the land; equitable servitudes. ECKHARDT.
- 107 Torts (4) f, (2) w.**  
Assault, battery, false imprisonment, trespass to property, negligence, liability without fault, deceit, defamation, malicious prosecution, misuse of legal process, interests of political and economic advantage. McCLEARY.

### Second Year\*\*

- 120 Administrative Law (3) w.**  
General survey of field of administrative law; nature, procedure, and powers of administrative bodies; validity of administrative regulations, conclusiveness of administrative determinations and judicial review. HOWARD.

\*All first-year courses required.

\*\*All second-year courses are required.



- 121 Business Organizations I (3) f.**  
Creation and characteristics of principal-agent relationship. Agent's power to create for principal contractual rights and liabilities, and liability in torts. Undisclosed principal; ratification; termination. HUNVALD.
- 122 Business Organizations II (4) w.**  
Forms of business organization; corporations, including formation, entity privilege, directors and management, corporate authority, rights, powers, liabilities of shareholders, capital and dividend restrictions, shareholders' actions. PITTMAN.
- 123 Constitutional Law (4) f.**  
Nature and sources of governmental powers; regulation of interstate and foreign commerce; police power; due process of law; equal protection of the laws; freedom of speech, press, religion, and assembly; the contracts clause. HOWARD.
- 124 Conveyances (3) f.**  
Statute of frauds; deeds—execution, content and form, description of premises, covenants for title; estoppel by deed; adverse possession and user; recording system, abstracts of title. ECKHARDT.
- 125 Equity II (including restitution) (3) f.**  
Vendor and purchaser; injunctions against torts; bills of peace; bills *quia timet*; equitable remedies for restitution of benefits obtained or conferred by tort; misrepresentation and mistake, coercion, and other matters. ANDERSON.
- 126 Evidence (2) f, w.**  
Preparing evidence; competency of witnesses; examination of witnesses; admission and exclusion of evidence; demonstrative evidence; privileged evidence; judicial notice; burden of producing evidence; burden of proof. WHEATON.
- 127 Federal Taxation (3) w.**  
Nature of taxable income; what is taxable income; time when taxable and to whom; capital gains and losses; corporate distributions; deductions and credits; estate and gift taxes. KILBOURN.
- 128 Trusts and Succession I (3) w.**  
Intestate succession; execution, revocation, validity and effect of wills; creation and validity of express private and charitable trusts; resulting and constructive trusts. FRATCHER.
- 160 Research (1) f, w.**  
Special investigations by student members of the Editorial Board of the *Missouri Law Review*. Three notes or the equivalent thereof.

### Third Year

- 138 Accounting for Lawyers (3) f.**  
Use of accounting in management of capital and control of business enterprise; accounting fundamentals; interrelationship of accounting principles and rules of law; analysis and interpretation of accounting and financial data. KILBOURN.
- 139 Domestic Relations (2) f.**  
Formation and dissolution of the domestic relationship. Marriage; divorce, limited and absolute, including separation agreements, alimony, and child care and custody upon separation; economic relations arising from the relationship. Adoption. PITTMAN.
- 140 Conflict of Laws (3) w.**  
Jurisdiction over and enforcement of claims having extraterritorial factual contacts; recognition and application of foreign law in state and federal courts; application of federal constitution. ANDERSON.

**141 Creditors' Rights (3) w.**

Remedies of unsecured creditors; enforcement of judgments, execution, attachment and garnishment, creditor's bills and supplementary proceedings; fraudulent conveyances; general assignments; creditor's agreements; receivership; bankruptcy. McCLEARY.

**142 Drafting of Legal Instruments (2) f, w.**

Instruction in drafting common legal instruments with which every lawyer must be familiar. Particular attention is given to the desires and needs of the client. PETERSON.

**143 Estate Planning (2) w.**

A study of the process of selecting particular arrangements for the devolution of wealth, including consideration of federal and state tax factors. KILBOURN.

**144 Federal Jurisdiction (2) f.**

Federal courts: creation, organization, jurisdiction; removal; procedure; relation between state and federal courts. WHEATON.

**145 Future Interests (2) f.**

Types of future interests; construction of limitations; powers of appointment; rule against perpetuities and associated rules; restraints on alienation. ECKHARDT.

**146 Insurance (2) f.**

Creation of contract; warranties and misrepresentations; excepted risks; waiver and estoppel; insurable interest; facts maturing the policy; construction of various clauses; subrogation. FRATCHER.

**147 Labor Law (3) f.**

Organized labor in relation to industry; collective bargaining, administration of labor agreements, arbitration; economic pressures and limitations on their use; union organization, security, and responsibility; rights of workers; labor legislation; industrial disputes and the public interest. HOWARD.

**148 \*Legal Profession (2) w.**

History of the profession in England and America; the organized bar; unauthorized practice of law; legal ethics and their enforcement; the work and problems of the lawyer; fees. FRATCHER.

**149 Negotiable Instruments (3) f.**

Principles of negotiability; characteristics of negotiable instruments; rights and liabilities of parties thereto with special reference to the Uniform Negotiable Instruments Act. HUNVALD.

**150 \*Pleading II (3) w.**

Parties, joinder and splitting of causes; union of law and equity; petition, answer and reply; demurrer and motion; amendment; emphasis on Missouri code and federal rules of civil procedure. WHEATON.

**151 \*Practice (4) f.**

Jurisdiction, venue; commencement of actions; process; motions; trials of issues of facts; instructions; verdict; judgment; new trials; appeal; special proceedings. WHEATON.

**152 Problems in Labor Relations and the Law (2) w.**

Consideration of special problems in labor arbitration; the administration of the collective bargaining agreement; rights of employees within a union, rights against the union or the employer under the agreement, and rights under legislation, state and federal. HOWARD.

**153 Problems in Property (1) f, w.**

Selected advanced problems in property: examination of abstracts of title; title examination standards; curing title defects; drafting title instruments; drafting limitations of future interests; perpetuities, restraints on alienation, and related problems; and other special problems. ECKHARDT.

\*Required.

- 155 Sales (3) f.**  
Subject matter of the contract; transfer of property and title; risk of loss; rights and obligations of seller and buyer; commercial statutes. **ANDERSON.**
- 156 Security Transactions (3) w.**  
Real and personal security; legal mortgages; equitable mortgages and liens; conditional sales; trust receipts; security holder's choice of remedies. **ECKHARDT.**
- 157 State and Local Taxation (2) f.**  
Assessment and collection of taxes, taxpayers' remedies; exemptions from taxation; state jurisdiction to tax; constitutional requirements of uniformity and equality of taxation; property taxes, business taxes, use and sales taxes, inheritance taxes, and income taxes. **HOWARD.**
- 158 Trusts and Succession II (3) f.**  
Integration and incorporation by reference; undue influence; fraud and illegality; mistake; probate of wills; administration of estates of decedents; trust administration. **FRATCHEL.**
- 159 Research (1) f, w.**  
Individual investigation of a special problem of law. Written paper required.
- 160 Research (1) f, w.**  
Special investigation by student members of the Editorial Board of the *Missouri Law Review*. Three notes or the equivalent thereof.

## LIBRARY SCIENCE

- 190-191 Distinction in Library Science (3) f, s; (3) w.**  
Independent work under the supervision of a member of the faculty involving intensive study of some area of library science or the investigation of a problem in library work. **MEMBERS OF THE STAFF.**
- 275 The Library as a Source of Information (3) f, w.**  
Prerequisite, junior standing. An introduction to the effective use of the library and its informational sources. For non-library science students as well as library science majors. **FLOOD.**
- 300 Problems (1-4) f, w, s.**  
Individual work which does not lead to a dissertation. Students registering in this course must obtain departmental approval.
- 373 The Administration of School Libraries (3) f, s (Same as Education D373).**  
Prerequisite, junior standing. Purposes and objectives of the school library, its functions and activities; qualifications of library personnel; physical facilities; school library standards. **BENNETT.**
- 374 Acquisition and Preparation of Library Materials (3) f, s (Same as Education D374).**  
Prerequisite, junior standing. Methods of selection; sources of supply; procedures in purchasing; processing of materials for use; elementary cataloging and classification. **FLOOD.**
- 375 Use of Library Materials (3) f, s (Same as Education D375).**  
Prerequisite, junior standing. The nature of library materials and the coordination of library resources with the teaching program. **BENNETT.**
- 376 Reference (3) w, s.**  
Prerequisite, 275 or 375. Continues 275 with emphasis on reference material in various subject fields. Some attention is directed to the administrative problems of reference work. **FLOOD.**
- 377 Cataloging and Classification (3) w, s.**  
Prerequisite, 374. Continues 374 with more attention to cataloging according to the A.L.A. rules and L.C. rules. Further study of classification, corporate entry, government publications, subject headings. **FLOOD.**

- 378 Book Selection (3) w, s.**  
Prerequisite, 374. The formation of book collections to fit the needs of the institution; evaluation techniques; responsibility for selection; characteristics of material in different subject areas. FLOOD.
- 379 Library Administration (3) f.**  
Prerequisite, junior standing. Emphasis on administration of small public libraries; coordination with other educational activities of the community; finance; housing; government; personnel; standards. FLOOD.
- 380 Library Practice (1-5) f, w, s.**  
Prerequisites, 9 hours of library science and consent of the department chairman. Supervised work in a school, public, special, or college library. MEMBERS OF THE STAFF.

### Related Courses Carrying Library Science Credit

- 96 Children's Literature (2) f, w, s (Same as Education E96).**  
SMITH.
- 109 Bookbinding I (2) s (Same as Art 109).**  
Includes the making of books and the binding of periodicals. WULFEKAMMER.
- 135 Cartography (2) f (Same as Geography 135).**  
Prerequisite, 50 hours of college credit or equivalent experience. A study of maps and charts, their types, history, uses, and construction. COLLIER.
- 304 Critical Essay (3) w (Same as English 304).**  
A workshop course for advanced students. Discussion in essay form of ideas and literary values. Admission determined by consent of instructor. NEIHARDT.
- 305 Book Reviewing (2) f, w, s (Same as English 305).**  
Analysis of professional book reviewing with frequent written reviews of contemporary fiction and nonfiction. Student reviews published in *The Columbia Missourian* and other papers. PEDEN.
- 321-322 World Literature (3) f; (3) w, s (Same as English 321-322).**  
Prerequisite, junior standing. A study of selected masterpieces of world literature. WEATHERLY, GWATKIN.
- 365 Problems of Teaching Reading in the Secondary School (2-3) w (Same as Education D365).**  
Designed to acquaint students with the problems that are met in teaching reading in the secondary school. Emphasis on the reading interests of and suitable literature for adolescents. ARTLEY.
- 371 Problems in Visual Education (3) f, s (Same as Education D371).**  
Evaluation of visual education procedures and classroom instruction including the preparation of visual education materials. BALLEW.
- 372 Selection and Utilization of Audio-Visual Materials in Teaching (3) w, s (Same as Education D372).**  
Prerequisite, Education D110 or E121. D371 is recommended. BALLEW.

### MATHEMATICS

- 2 Elementary Mathematics (3) f, w.**  
For students in the College of Agriculture. Other students admitted only by request of their deans. Five days a week.
- 3 Basic Algebra (3) f, w, s.**  
For students who do not have the prerequisite for course 7. Five days a week. No credit in Engineering.

- 4 Business Mathematics (3).**  
Application of elementary arithmetic and algebra to retailing and general business. For students in the College of Education who are specializing in commercial education and distributive education. Others admitted only by request of their deans.
- 5 Plane and Solid Geometry (2).**  
Prerequisite, one unit in algebra, or course 3 to be taken concurrently. Selected topics in plane and solid geometry for those students who have not had one unit in plane geometry. Five days per week.
- 6 Solid Geometry (2) f, w.**  
Prerequisites, one unit in algebra and one unit in geometry. No credit for a student with one-half unit in solid geometry or credit for Mathematics 5. Three days a week.
- 7 Introductory College Algebra (3) f, w, s.**  
Prerequisites, one unit in algebra and one unit in geometry, or two units in mathematics including one and one-half units in algebra. No credit for a student who has three units in mathematics, including one and one-half units of algebra and not including general mathematics, or who has had two units of algebra or Mathematics 3. Covers the same material as Mathematics 3. No credit in Engineering.
- 9 Trigonometry (2) f, w, s.**  
Prerequisite, any of the following: (a) one and one-half units in algebra and a unit in geometry; (b) a unit in geometry or Mathematics 5, and course 3 or 7.
- 10 College Algebra (3) f, w, s.**  
Prerequisite, same as for course 9.
- 80 Analytic Geometry and Calculus I (5) f, w, s.**  
Prerequisites, a grade of M in courses 9 and 10. Introduction to plane analytic geometry, differential calculus, and integral calculus. Courses 80, 175, 201 are a sequence of courses which have integrated the material normally contained in courses in plane and solid analytic geometry and differential and integral calculus.
- 155 The Mathematics of Finance (3) f, w.**  
Prerequisite, course 3 or 7. Compound interest and annuities with a variety of applications; an introduction to the mathematics of life insurance.
- 175 Analytic Geometry and Calculus II (5) f, w, s.**  
Prerequisite, a grade of M or better in course 80. Selected topics from plane analytic geometry and calculus.
- 198-199 Distinction (2) f, w.**  
Special work for seniors who are candidates for the A.B. degree with distinction.
- 201 Analytic Geometry and Calculus III (5) f, w, s.**  
Prerequisite, a grade of M or better in course 175. Solid analytic geometry and selected topics in calculus.
- 203 Introduction to Mathematical Thought (3) w, s.**  
Prerequisites, one unit in algebra, one unit in geometry, and junior or senior standing. Logical development of number systems; non-Euclidean geometries; infinite sets, discussion of postulation method. BLUMENTHAL.
- 250 Survey of Mathematics (3) f, s.**  
Prerequisite, course 175. Critical examination of certain parts of algebra, trigonometry, geometry, and calculus aimed at building confidence and mature perspective in these fields. Recommended for teachers. HAYNES, UTZ.
- 301 Differential Equations (3).**  
Prerequisite, course 201. Common types of ordinary differential equations including many applied problems, operational methods, and a brief introduction to partial differential equations and boundary value problems.

- 303 Advanced Calculus I (3)**  
Prerequisite, course 201. Continuity, derivatives, series, implicit functions, the Riemann integral, and other related topics.
- 306 Functions of a Complex Variable (3).**  
Prerequisite, course 301 or 303. An introduction to the theory and to its application in various physical problems. BETZ, EWING.
- 308 Vector and Tensor Analysis (3).**  
Prerequisite, course 301. Vector methods used in physics, engineering, and applied mathematics generally, with an introduction to tensor analysis and its applications. BETZ.
- 320 Mathematical Statistics (3).**  
Prerequisite, course 201. An introduction to the theory of probability and statistics using the concepts and methods of The Calculus. BRUNK.
- 325 Theory of Games (3).**  
Prerequisite, course 201. An introduction to the theory of zero-sum, two-person games including the continuous case, and of other related topics.
- 330 Theory of Equations (3).**  
Prerequisite, course 201. Roots of equations, numerical methods, determinants and matrices, symmetric function.
- 332 Higher Algebra I (3).**  
Prerequisite, course 201. Matrices, vectors, determinants. Systems of linear equations and quadratic forms. Equivalence, congruence, Hermitian congruence, similarity.
- 333 Higher Algebra II (3).**  
Prerequisite, course 201. The natural numbers, a brief development of the integers and the rational, real, and complex fields. An introduction to groups, rings, and polynomials over a field.
- 335 Theory of Numbers (3).**  
Prerequisite, course 201. Factorization, the Euler phi-function, congruences, and primitive roots.
- 350 Special Readings (1-3).**  
Prerequisites, course 201 and special permission.
- 352 History of Mathematics (3).**  
Prerequisite, Mathematics 201. Critical historical treatment of selected fundamental branches of mathematics, such as calculus, number theory, etc.
- 358 Mathematical Logic (3).**  
Prerequisite, junior or senior standing with interest and background in mathematics or philosophy. An introduction to the study of classical and modern logics as deductive systems with applications to the foundations of mathematics. BLUMENTHAL.
- 360 Synthetic Projective Geometry (3).**  
Prerequisite, course 201. An elementary treatment, without the use of coordinates, of the fundamental propositions of projective geometry. BLUMENTHAL.
- 362 Higher Geometry I (3).**  
Prerequisite, course 201. An account of some of the basic ideas and methods of higher geometry built around the concept of geometry as the study of the invariants of a group. An extensive treatment of collineations in two- and three-space. BLUMENTHAL.
- 363 Higher Geometry II (3).**  
BLUMENTHAL.
- 366 Foundations of Geometry (3).**  
Prerequisite, course 201. The development of three-dimensional Euclidean geometry from a selected set of postulates; e.g., Hilbert, Veblen, Pieri, etc. BLUMENTHAL.

- 367 Introduction to non-Euclidean Geometry (3).**  
Prerequisite, course 201. An account of the rise and development of the non-Euclidean geometries with an intensive study of plane hyperbolic geometry. BLUMENTHAL.
- 400 Problems (1-3).**
- 404 Theory of Functions of Real Variables I (3).**  
Prerequisite, course 303 or consent of instructor. The real number system, set theory, properties of functions of one or more real variables, introduction to measure theory and integration. BRUNK, BURCHAM, EWING.
- 405 Theory of Functions of Real Variables II (3).**  
Prerequisite, course 404. Integration theory, derivatives of absolutely continuous functions, and (or) other topics in continuation of course 404.
- 406 Measure Theory (3).**  
Prerequisite, course 404. Study of abstract measures and integration. BRUNK.
- 408 Differential Equations of Applied Mathematics (3).**  
Prerequisite, course 301. Partial differential equations, orthogonal functions and Fourier series, theory of matrices, Laplace transforms. BETZ.
- 410 Seminar (credit to be arranged).**
- 412 Calculus of Variations I (3).**  
Prerequisite, course 404. The development of necessary conditions and of sufficient conditions for nonparametric and parametric problems. Hamilton's principle and related topics. EWING.
- 413 Calculus of Variations II (3).**  
Prerequisite, course 412 or consent of instructor. Frechet Curves and Surfaces, existence theorems, and related topics. EWING.
- 415 Theory of Infinite Series and Summability (3).**  
Prerequisite, course 303. Properties of infinite series and a discussion of methods of summability. BURCHAM.
- 420 Topological Dynamics I (3).**  
Prerequisite, course 404. Periodicity and its generalizations in dynamical systems. Utz.
- 428 Topological Groups (3).**  
Elementary properties of topological groups, invariant integration in compact groups, and the existence of a complete system of representations for a compact group. Utz.
- 430 Topics from Algebra I (3).**  
Prerequisite, course 333.
- 431 Topics from Algebra II (3).**
- 440 Theory of Probability (3).**  
Prerequisite, course 404. Axiomatic development of fundamental concepts; limit theorems for sequences of independent random variables; selected topics from the theory of stochastic processes.
- 452 Lattice Theory (3).**  
Prerequisite, consent of instructor. Fundamental properties of general and special lattices (modular, normed, complemented, distributive) with emphasis on distance theoretic aspects. BLUMENTHAL.
- 458 Differential Geometry I (3).**  
Prerequisite, course 201. A study of the metric properties of restricted portions of curves and surfaces in three-dimensional Euclidean space. BLUMENTHAL.
- 459 Differential Geometry II (3).**  
A continuation of 458 devoted to surface theory. BLUMENTHAL.

- 460 Riemannian Geometry and the Mathematical Basis of Relativity Theory (3) w.**  
Prerequisites, courses 458 and 459. Introduction to intrinsic geometry of the general Riemannian metric. Applications to restricted and general relativity are emphasized. BLUMENTHAL.
- 462 Distance Geometry I (3).**  
A study of metric properties of metric spaces. Existence of segments and lines. Universal metric spaces. BLUMENTHAL.
- 463 Distance Geometry II (3).**  
The metric characterization of the classical spaces and related problems. Isometric imbedding. BLUMENTHAL.
- 464 Distance Geometry III (3).**  
An application of metric methods to differential geometry, calculus of variations, determinant theory, and the theory of linear inequalities. BLUMENTHAL.
- 466 Dimension Theory (3).**  
An introduction to the Menger-Urysohn theory of dimension in separable metric spaces. A critical examination of the concept of curve. BLUMENTHAL.
- 468 General Topology I (3).**  
An introduction to set topology in abstract spaces. BLUMENTHAL.
- 469 General Topology II (3).**  
Concerned mostly with properties of finitely compact metric spaces. BLUMENTHAL.
- 470 Introduction to Combinatorial Topology (3).**  
The combinatorial properties of plane sets. BLUMENTHAL.
- 490 Research (credit to be arranged).**

## MECHANICAL ENGINEERING

- 1 Engineering Drawing (3) f, w, s.**  
Lettering, sketches of machine parts and construction details, use of instruments, orthographic projection. Detail and assembly drawings, dimensioning, drafting conventions, tracings. BEACH, MEMBERS OF THE STAFF.
- 10 Descriptive Geometry (3) f, w, s.**  
Prerequisites, course 1 and preceded or accompanied by Mathematics 9 and 10. Space relations of points, lines, surfaces, intersections, and developed surfaces. BEACH, MEMBERS OF THE STAFF.
- 80 Machine Tool Lecture (1) f, w.**  
Prerequisite, course 10. A survey of modern machine tool operations with introduction to metal cutting phenomena. KESSLER, MEMBERS OF THE STAFF.
- 81 Machine Tool Laboratory (2) f, w.**  
Prerequisite, must be accompanied by M. E. 80. Laboratory exercises in the machine tool operations used to manufacture component parts required by machine design. KESSLER, MEMBERS OF THE STAFF.
- 90 Analytical Mechanics (4) f, w, s.**  
Prerequisites, Physics 23 and preceded or accompanied by Mathematics 201. A study of statics and kinetics. SMITH, MEMBERS OF THE STAFF.
- 99 Heat Engines (3) f, w, s.**  
Prerequisites, Physics 23 and Mathematics 175. Elementary thermodynamics with application to perfect gases, air compressors, ideal cycles, fuels and combustion, steam power. SCORAH, MEMBERS OF THE STAFF.
- 205 Kinematics of Machines (3) f.**  
Prerequisites, courses 10 and 90. Cams, toothed gearing, gear trains, link mechanisms, instant centers, velocity and acceleration diagrams. Recitations and drawing. SMITH, MEMBERS OF THE STAFF.



- 210 Dynamics of Machines (2) w.**  
Prerequisite, course 205. Kinetic analysis for machinery; masses, dynamic forces, balancing. SMITH, MEMBERS OF THE STAFF.
- 220 Machine Design (3) f.**  
Prerequisites, courses 205, 210, 310, C.E. 101 and C.E. 102. The design analysis of machine parts. PRINGLE, MEMBERS OF THE STAFF.
- 221 Machine Design (3) w.**  
Prerequisites, courses 81 and 200. Creative application of engineering science and analysis to the design of machines. PRINGLE, MEMBERS OF THE STAFF.
- 230 Engineering Thermodynamics (3) f, w.**  
Prerequisites, Mathematics 201, M. E. 99, and Physics 24. Properties of working substances, mixture, combustion, cyclic and steady-flow processes, power and refrigeration cycles. SCORAH, MEMBERS OF THE STAFF.
- 241 Mechanical Laboratory (2) f, w.**  
Prerequisite, course 99. Calibration and use of instruments and experimental apparatus; simple tests of machine units and power equipment. SNEED, MEMBERS OF THE STAFF.
- 242 Mechanical Laboratory (2) w.**  
Prerequisites, courses 230 and 241. Determination of heating value of fuels; coal analysis, psychrometry, gas analysis, tests of machine units. SNEED, MEMBERS OF THE STAFF.
- 243 Mechanical Laboratory (2) f.**  
Prerequisites, courses 330 and 242. Studies in heat transfer of compressible fluids; tests of blower, superheater, steam turbine plant, and condenser. SNEED, MEMBERS OF THE STAFF.
- 244 Mechanical Laboratory (2) w.**  
Prerequisites, courses 351 and 243. Tests and performance analysis of spark ignition and diesel engines, heat exchanger, complete steam power plant, refrigeration systems. SNEED, MEMBERS OF THE STAFF.
- 300 Problems (credit to be arranged) f, w, s.**  
Prerequisite, senior standing in mechanical engineering. Special design, experimental and analytical problems in the field of mechanical engineering. MEMBERS OF THE STAFF.
- 305 Industrial Engineering (3) f.**  
Prerequisites, courses 80, 81, 90, 99, and C. E. 82. Analysis of unit processes in mechanical engineering, process sequence and synthesis, technical process control. EASTMAN.
- 306 Industrial Engineering Laboratory (3) w.**  
Prerequisite, course 305. Laboratory tests of unit mechanical processes, time analyses and controls, predicted and measured performances. Reports. EASTMAN.
- 310 Engineering Metallurgy (3) f, w, s.**  
Prerequisites, courses 81 and C. E. 82. The effects of mechanical and thermal treatments on the structure and properties of metals and alloys, including topics in nuclear metallurgy. Experimental investigations in the metallographic, heat-treating, and physical testing laboratories. PRINGLE, MEMBERS OF THE STAFF.
- 315 Production Inspection (3) f.**  
Prerequisites, courses 80, 81, and 210. A basic study of methods of precision measurements as applied to industrial and research gaging; measurements with instruments for the design engineer as well as the gaging technicians. BROOKS.
- 319 Machine Design Laboratory (3) f, w.**  
Prerequisite, preceded or accompanied by course 220. Experimental studies of fasteners, fits, shafts, vibration dampers, and other machine elements including impact and fatigue testing. PRINGLE.

- 320 Aircraft Stress Analysis (3) w.**  
Prerequisites, course 210 and C. E. 101. Fundamentals of stress-strain, elastic energy, influence coefficients, redundants, buckling, flutter, and dynamic stability. SMITH.
- 325 Engineering Kinetics (3) f or w.**  
Prerequisite, course 90. Introductory mathematical treatment of complex forces and motions. Ballistics, vibrations, and balancing. BURTON.
- 330 Engineering Thermodynamics (3) w, s.**  
Prerequisite, course 230. Dimensional analysis, heat transfer, flow of compressible fluids; application to piping, nozzles, orifices, heat transfer apparatus. SCORAH, MEMBERS OF THE STAFF.
- 339 Evaluation of Engineering Data (3) f.**  
Prerequisite, Mathematics 201. Analysis of engineering data using graphical methods, frequency distribution, confidence intervals, significance tests, and probability theory; statistical quality control applications in engineering. EASTMAN.
- 340 Heating and Air-Conditioning (3) w.**  
Prerequisite, course 330. General principles; conditioning the air of buildings for comfort, ventilation, and industrial purposes; steam, water, and hot air heating systems. BOLSTAD.
- 345 Mechanical Instrumentation (3) f or w.**  
Prerequisites, courses 90 and 330. Applications of dynamical systems, optics, thermodynamics, and other energizing groups. Theory of errors and precision of design. SMITH.
- 347 Nuclear Engineering (3) w.**  
Prerequisites, Chemistry 2, Physics 24, Mathematics 201. Open to qualified senior students upon consultation with the instructor. Atomic structure, nuclear reactions, reaction control, effect of radiation on matter, protection, nuclear power reactors. SNEED.
- 351 Steam Power Plants (3) f, s.**  
Prerequisite, course 330. A study of combustion and steam generating equipment, steam prime movers and auxiliary apparatus, power plant cycles, complete plants. SCORAH.
- 355 Steam and Gas Turbines (3) w.**  
Prerequisite, course 330. Analysis of performance with special reference to off-design conditions, operating characteristics, thermodynamics, and fluid mechanics of steam and gas turbines. BURTON.
- 357 Automatic Control of Mechanical Systems (3) w.**  
Prerequisites, courses 210 and 330. A basic study of mechanical, pneumatic, hydraulic, and thermal control systems. Control system analysis with engineering applications. MOORE.
- 358 Economic Studies in Mechanical Engineering (3) w.**  
Prerequisites, course 351 and Economics 41 or 51. Economic problems in the design, selection, and life of equipment; cost of steam and power. EASTMAN.
- 360 Internal Combustion Engines (3) f, s.**  
Prerequisite, course 330. A study of gas and oil engines. Thermodynamics of ideal and actual cycles, fuels and combustion carburetor and injection systems, performances, construction. SNEED.
- 363 Aircraft Power Plants (3) w.**  
Prerequisite, course 360 or equivalent. A study of reciprocating, gas turbine, and compound aircraft engines. Thermodynamics, balancing, propulsion, and performance. SNEED.

- 365 Automotive Engineering (3) f or w.**  
Prerequisite, preceded or accompanied by course 220. Principles of design, construction, and operating characteristics of automotive vehicles. Selected design problems and review of current developments. PRINGLE.
- 368 Machinery for Compressible Fluids (3) f.**  
Prerequisite, course 330. Thermodynamics and fluid mechanics of radial, axial, and mixed flow turbomachines. Design and performance of jet pumps and ejectors. Theory of losses with special reference to boundary layer control. Potential flow and small-perturbation subsonic and supersonic compressible flow. BURTON.
- 370 Refrigeration Systems (3) f.**  
Prerequisite, course 330. A study of compression, absorption, and steam-jet refrigeration systems. Properties of refrigerants. BOLSTAD.
- 380 Factory Production (3) f.**  
Prerequisite, course 310. A study of factory production and equipment. Methods, scheduling, routing, inspection, and assembly. KESSLER.
- 381 Factory Design (3) w.**  
Prerequisite, course 380. The design of a factory and management system to produce a selected product. EASTMAN.
- 385 Tool Design (3) w.**  
Prerequisites, courses 220 and 380, or the equivalent. Design of production tools and equipment, punches, dies, cutting tools, jigs and fixtures, gages, special machines. KESSLER.
- 387 Operations Analysis (3) f or w.**  
Prerequisites, course 339 and Mathematics 201, or equivalent. Methods for solving complex applied industrial engineering problems by advanced modern scientific and mathematical techniques. EASTMAN.
- 390 Aerodynamics (3) f.**  
Prerequisite, course 210. Introductory theoretical aerodynamics including stability, performance, and control in subsonic and near-sonic ranges. SMITH.
- 395 Engineering Personnel Practice (2) f, w.**  
Prerequisite, senior standing. The structure of engineering personnel; professional ideals, ethics, licensing, consulting, employment procedures; individual professional development. EASTMAN.
- 410 Seminar (1) f, w.**  
Prerequisite, graduate standing. Reviews of recent investigations and projects of major importance in the field of mechanical engineering. MEMBERS OF THE STAFF.
- 415 Aerodynamic Theory (3) f or w.**  
Prerequisite, Mathematics 301 or C. E. 442, or equivalent. Mathematical development for helicopters, rockets, airfoils, and model testing; both subsonic and supersonic. SMITH.
- 420 Mechanical Vibrations (3) w.**  
Prerequisites, graduate standing and the equivalent of courses 90 and 205. The theory of mechanical vibrations with application to machinery, stabilizers, dampers, and absorbers. SMITH.
- 425 Dynamical Theory (3) f or w.**  
Engineering principles and application in the mathematical expression of energy, force, and inertia systems. BURTON.
- 430 Flow of Compressible Fluids (4) f or w.**  
Prerequisites, graduate standing and equivalent of courses 99 and 230. Flow of compressible fluids considering heat transmission and change of phase. SCORAH.
- 432 Thermodynamics (4) f or w.**  
Prerequisites, graduate standing and equivalent of courses 99 and 230. General theory, properties of working substances, thermodynamic equilibrium, engineering applications. SCORAH.

- 440 Psychrometry (3) f or w.**  
Prerequisite, course 230. Psychrometric theory, the physical and thermal properties of air-vapor mixtures, the construction and use of tables and charts. BOLSTAD.
- 441 Industrial Air-Conditioning (3) f or w.**  
Prerequisite, course 340. Studies of air-conditioning in a variety of industries, their specialized requirements and problems. BOLSTAD.
- 445 Instrumentation Theory (3) f or w.**  
Prerequisites, courses 210 and 330. Applied theory of dynamical and energizing systems for analyzing, computing, and control devices. SMITH.
- 450 Research (credit to be arranged) f, w, s.**  
Prerequisite, graduate standing in mechanical engineering. Independent design, experimental, or analytical problems to be presented in the form of a report. MEMBERS OF THE STAFF.
- 460 Combustion (4) f or w.**  
Prerequisites, graduate standing and equivalent of courses 99 and 230. A study of engineering combustion problems; selected topics. SCORAH.
- 462 Heat Exchangers (4) f or w.**  
Prerequisites, courses 230, 330, and 351. A study of heat exchangers with particular reference to those used in steam power plants. SCORAH.
- 470 Refrigeration (3) f.**  
Prerequisites, graduate standing and equivalent of course 370. General theory, low temperature refrigeration, liquefaction of gases, dry ice manufacture, selected studies. BOLSTAD.
- 471 Refrigeration Plants (3) w.**  
Prerequisite, course 470 or permission of instructor. Designs, specifications, and estimates for selected studies, such as: ice manufacture, frozen foods and cold storage, low temperature testing. BOLSTAD.
- 480 Machine Tool Processes (4) f or w.**  
Prerequisites, graduate standing and the equivalent of courses 80 and 310. Metallic surface generating methods, surface quality, tolerances and fits, dimensional control and gaging. KESSLER.
- 490 Research (credit to be arranged) f, w, s.**  
Prerequisite, graduate standing in mechanical engineering. Independent investigation in the field of mechanical engineering to be presented in the form of a thesis. MEMBERS OF THE STAFF.

## MEDICAL TECHNOLOGY

Twelve consecutive months. The medical technologist helps in the examination of body fluids. The work involves the use of precision instruments such as microscopes, spectrophotometers, and flame photometers. PERNA, LEEPER, NEAL, FLYNN.

## MEDICINE

- 101 Introduction to Psychiatry (1) f.**  
The development of the personality from infancy through senescence is presented with implications for the understanding of normal behavior of motivations, anxiety, and the adaptive reactions being stressed. GUHLEMAN.
- 121 Physical Diagnosis (2) f.**  
Lectures, demonstrations, and ward exercises covering history-taking and physical examinations. MEMBERS OF THE STAFF.

**122 Physical Diagnosis (2).**

This is a continuation of course 121 in which the student carries out more extensive activity on the wards of the hospital. Practical exercises are carried out in the field of history-taking and physical examination. MEMBERS OF THE STAFF.

**124 Psychiatry (1) f.**

After an introduction to the principles of psychiatric history-taking and interviewing, the various personality disorders are presented with emphasis on types of reaction and the dynamics of symptom formation. GUHLEMAN.

**202 Preventive Medicine (2) w.**

Prerequisite, Microbiology 201 or its equivalent. A lecture course concerned with vital statistics; communicable disease control; epidemiology; environmental hygiene; industrial hygiene; infant and maternal hygiene; public health administration; and degenerative disease. Second-year medical students and others. MEMBERS OF THE STAFF.

**Medicine, Third Year**

Lectures and demonstrations, with patient presentations by students, are given once weekly throughout the third year. One-third of the class is assigned to the medical ward for  $\frac{1}{3}$  of the third year. The students serve as clinical clerks. Conferences and discussions on individual patients are held daily with student presentation of material. The course work in the third year also includes 11 didactic and clinical sessions in dermatology. MEMBERS OF THE STAFF.

**Medicine, Fourth Year**

A fourth-year section, one-fourth of the class, is assigned to ward duties and clinic activities throughout the calendar year. Conferences and special clinics are held. MEMBERS OF THE STAFF.

**Medicine Elective**

Any student in his elective period may make special arrangements with the department to do special work on a subject of his interest. Hours to be arranged. MEMBERS OF THE STAFF.

**Psychiatry, Fourth Year**

One-half of a fourth-year section spends the entire time in psychiatry ward and clinic activities. MEMBERS OF THE STAFF.

**Psychiatry, Elective**

Any student in his elective period may make special arrangements with the department to do special work on a subject of his interest. Hours to be arranged. MEMBERS OF THE STAFF.

**Preceptorship**

Fourth-year medical students may elect a preceptorship in general practice during one section of the year with a selected general practitioner in one of the smaller communities in the state.

Advanced graduate and postgraduate instruction in medicine and general practice, both short-term and long-term, varying from one to four years in duration, are available to qualified physicians by special arrangements.

**MICROBIOLOGY**

For other courses in microbiology and applied microbiology, see Agricultural Chemistry 414, 419; Botany 202, 302, 307, 352, 360, 402, 461; Dairy Husbandry 320, 405, 417, 419; Soils 305; Veterinary Bacteriology and Parasitology 124, 126, 132, 134; Zoology 310.

**25 Elementary Preventive Medicine (2) f, w, s.**

Elements of personal, community, and school hygiene; the value of preventive medicine; methods of spread and prevention of communicable disease. IVEY, MEMBERS OF THE STAFF.

- 201 Medical Microbiology (8) f.**  
Prerequisite, Chemistry 210. General bacteriology recommended, but not required of medical students. Relationship of infectious agents to disease; principles of infection and immunity; the isolation and identification of pathogenic microorganisms. Second-year medical students and others by permission. ENGLE, MEMBERS OF THE STAFF.
- 202 Preventive Medicine (2) w.**  
Prerequisite, Microbiology 201 or its equivalent. A lecture course concerned with vital statistics; communicable disease control; epidemiology; environmental hygiene; industrial hygiene; infant and maternal hygiene; public health administration; and degenerative disease. Second-year medical students and others. MEMBERS OF THE STAFF.
- 205 Public Health Microbiology (4) f.**  
Open to students of nursing and others with the permission of the instructor. Principles of infection, immunity, and community health; the isolation and identification of pathogenic microorganisms. GOLDBERG, MEMBERS OF THE STAFF.
- 301 Advanced Medical Microbiology (credit to be arranged) f.**  
Prerequisite, Microbiology 201 or its equivalent. The morphology, chemistry, and physiology of microorganisms for advanced students. ENGLE, MEMBERS OF THE STAFF.
- 302 Public Health, Preventive Medicine, and Epidemiology (credit to be arranged) w.**  
Prerequisite, Microbiology 201 or its equivalent. A course for advanced students covering the broad principles of infectious diseases. IVEY, MEMBERS OF THE STAFF.
- 303 Medical Parasitology (credit to be arranged) w.**  
Prerequisites, Microbiology 201 and Zoology 310 or equivalent. A course for advanced students stressing parasites of medical importance. IVEY, MEMBERS OF THE STAFF.
- 304 Immunity (3) w.**  
Prerequisite, Microbiology 201. Theories of immunity; antigen-antibody reaction; complement fixation; hypersensitive states; vaccines; blood grouping and typing. BARRETT, MEMBERS OF THE STAFF.
- 305 Antibiotics (2) w.**  
Prerequisite, general bacteriology. Recommended, an advanced course in bacteriology. A discussion of antimicrobial substances isolated from microorganisms. Methods of screening; isolation; assay; a study of action on fungi, bacteria, rickettsia, and viruses. GOLDBERG, MEMBERS OF THE STAFF.
- 400 Special Investigations (credit to be arranged) f, w, s.**  
Prerequisites, general bacteriology and Chemistry 212, or Microbiology 201. Qualified students are assigned problems in microbiology for investigation. MEMBERS OF THE STAFF.
- 401 Medical Mycology (4) w.**  
Prerequisite, Microbiology 201 or its equivalent. The isolation and identification of fungi pathogenic for man. MEMBERS OF THE STAFF.
- 402 Virology (2) w.**  
Prerequisites, General Bacteriology (Botany 202) and Biochemistry 301 or their equivalents. The biochemical, biophysical, and genetic natures of viruses and their interrelations with host cells. KELLER, MEMBERS OF THE STAFF.
- 403 Advanced Microbiology (credit to be arranged) f, w, s.**  
Assigned reading, lectures, and laboratory work providing detailed information, training, and specialized techniques in microbiology. MEMBERS OF THE STAFF.
- 404 Physiology of Pathogenic Organisms (credit to be arranged) w.**  
Prerequisites, Microbiology 201 or its equivalent and a course in biochemistry. A course for advanced students stressing the physiological functions of microorganisms in relation to diagnosis and chemotherapy. BARRETT, MEMBERS OF THE STAFF.

**410 Seminar (1) f, w.**

A presentation and critical discussion of original investigations and current literature in the fields of microbiology. MEMBERS OF THE STAFF.

**490 Research (credit to be arranged) f, w, s.**

Original investigations in microbiology to be used for a graduate thesis. MEMBERS OF THE STAFF.

**MUSIC****Music Theory****1 Fundamentals of Music (2).**

A course presenting essentials of musicianship designed especially for elementary education majors but open to other interested students. Three class periods a week. (No credit for music majors). MULCHY.

**3 Elementary Theory (5) f.**

An intensive study of the basic materials of music developed through melodic, rhythmic and harmonic dictation, sight-singing, and keyboard and written harmony. Triads, their inversions and connections. CIPOLLA, PARRIGIN.

**4 Elementary Theory (5) w.**

Continuation of course 3 including seventh chords and their inversions. Non-harmonic tones. Intensive work in aural perception. CIPOLLA, PARRIGIN.

**103 Advanced Theory (3) f.**

Prerequisite, course 4. A study of altered chords and modulation. Composition in simple forms. Advanced work in aural perception and keyboard harmony. GARLAND.

**104 Advanced Theory (3) w.**

Continuation of course 103. Modal harmony. Introduction to contemporary techniques. Compositions for instrumental ensembles. Emphasis on keyboard harmony. GARLAND.

**205 Form and Analysis (2) f.**

Prerequisite, course 104. Harmonic and formal analysis of composition from the classic era. Emphasis on aural analysis of form. GARLAND.

**206 Form and Analysis (2) w.**

Continuation of course 205. Harmonic and formal analysis of compositions from preclassic eras. Introduction to contemporary formal principles. GARLAND.

**207 Counterpoint (2) f.**

Prerequisite, course 4. A study of sixteenth century counterpoint in two, three, and four parts. MINOR.

**208 Counterpoint (2) w.**

Continuation of course 207. MINOR.

**304 Advanced Counterpoint (2) f.**

Prerequisite, course 208. Invertible counterpoint, double and triple, at various intervals. Imitation of various types. The two-part invention. MINOR.

**306 Canon and Fugue (2) w.**

Prerequisite, course 304. A study of the various forms of the canon and fugue in two, three, and four parts. GARLAND.

**307-308 Orchestration (2) f; (2) w.**

Prerequisite, course 104. A study of the capacities of the orchestral instruments and scoring for various orchestral combinations including the full orchestra. GARLAND.

- 309 Band Arranging (2) w, s.**  
Prerequisite, course 307. Transcription and scoring of solo and ensemble literature for band instrument combinations of varying size up to and including the concert band. EMMONS.
- 310 Contemporary Harmonic Techniques (2) w.**  
Prerequisites, courses 104, 206, and 308. A study of the rhythmic, harmonic, and contrapuntal devices of the twentieth century. GARLAND.
- 311 Comparative Approaches to Music Theory (2) f.**  
Prerequisites, courses 104 and 208. A study of the different approaches to the interpretation of theory at the college level. Practical drill with freshman ear training groups. GARLAND.
- 315 Composition I (2) f.**  
Prerequisites, courses 104 and 208. A study of the techniques necessary to original composition with emphasis on rhythm, melodic line, form, and style. GARLAND.
- 316 Composition I (2) w.**  
Continuation of course 315 with emphasis on individual projects in the standard forms. GARLAND.
- 317-318 Composition II (2) f; (2) w.**  
Intensive creative work in the larger forms. Seminar and private lessons. GARLAND.
- 326-327 Advanced Orchestration (2) f; (2) w.**  
Prerequisites, courses 308, 316. Transcription for full orchestra of large works from different periods. Scoring of original works for orchestra. Private lessons and seminar. GARLAND.
- 401 Composition III (2) f, w.**  
Creative work in the larger forms. Seminar and private lessons. This course may be repeated for credit. GARLAND.

## Music History and Literature

- 21 Introduction to Music Literature (2) f, w.**  
A survey of the materials of music and a study of selected masterpieces from all fields of music literature. No credit for music majors. Three class periods per week. MINOR.
- 22 Masterpieces of Music (2) w.**  
Prerequisite, course 21 or equivalent. A study of significant choral, operatic, and chamber works. For non-music majors. MINOR.
- 121 History of Music (2) f, s.**  
A general survey of the history of music from the Greek period to the eighteenth century. MINOR.
- 122 History of Music (2) w, s.**  
A continuation of course 121 covering the period from the eighteenth century to the present day. MINOR.
- 321 Music in the Renaissance (2) f, s.**  
Prerequisite, course 122. A study of music of the fifteenth and sixteenth centuries and its relationship to the other arts of the period. MINOR.
- 322 The Baroque Era (2) f, s.**  
Prerequisite, course 122. A study of the Baroque Era with emphasis on the music of Bach and Handel. MINOR.
- 323 The Romantic Period (2) f, s.**  
Prerequisite, course 122. A study of nineteenth century music in its relationship to the Romantic Movement. MINOR.



- 324 Modern Music (2) w, s.**  
Prerequisite, course 122. A study of music since 1900 with particular emphasis on contemporary trends. MINOR.
- 325 The Classic Era (2) w, s.**  
Prerequisite, course 122. A study of the music of the last half of the eighteenth century. MINOR.
- 400 Problems (credit to be arranged) f, w, s.**  
This course may be repeated for credit. MEMBERS OF THE STAFF.
- 421 Seminar in Musicology (2) f, w, s.**  
A study of the techniques of research and the sources of available material. MINOR.
- 422 American Music (2) f, s.**  
A study of the history of music in America from the colonial period to the present. MINOR.
- 423 Bach and His Time (2) w, s.**  
Prerequisites, courses 103 and 206. A historical and critical investigation of the works of this master and their influence on subsequent music. Special topics assigned for original investigation. MINOR.
- 424 Haydn, Mozart, and Beethoven (2) w, s.**  
A historical and critical investigation of the works of these composers. Special topics assigned for original investigation. MINOR.
- 426 History of Performance Practices (2) w.**  
A study of performance practices with special emphasis on the Renaissance and Baroque periods. MINOR.
- 427 Studies in the History of Opera (2) f, s.**  
A study of the significant operatic masterpieces from 1600 to the present. MINOR.
- 428 Studies in the History of Choral Music (2) w, s.**  
A study of the significant choral works from the Renaissance to the present day. MINOR.
- 490 Research (credit to be arranged) f, w, s.**  
Thesis course. This course may be repeated for credit. MEMBERS OF THE STAFF.

## Applied Music

The applied music group includes private instruction in piano, voice, the string instruments, organ, and the wind instruments. The amount of credit per semester which may be elected is variable within the limits indicated for each course and is determined by advisement.

All students enrolled in string or wind instrument courses must participate in the University orchestra, or band, as advised by director of these organizations; students enrolled in voice must participate in one of the University's choral organizations.

- 50 Special Piano (0-2) f, w.**  
May be elected without credit and without prerequisite. The amount of material studied may be varied in accordance with the student's educational purpose. MACLEOD, SHELDON, BISCHOFF, MULCHY, QUANT, TURNER.
- 51 Underclass Piano (1-4) f, w.**  
Prerequisite, the ability to play in a pianistic and musical manner such works as the Haydn or Mozart Sonatas; Grieg, Papillons; Chopin, Nocturne, E flat; etc. MACLEOD, SHELDON, BISCHOFF, QUANT, TURNER.
- 251 Upperclass Piano (1-2) f, w.**  
Prerequisite, 8 hours piano of collegiate grade, the equivalent of course 51. MACLEOD, SHELDON, BISCHOFF, QUANT.

- 351 Upperclass Piano (1-5) f, w.**  
Prerequisite, 14 hours piano of collegiate grade, the equivalent of course 51.  
MACLEOD, SHELDON, BISCHOFF, QUANT.
- 60 Special Voice (0-2) f, w.**  
May be elected without credit and without prerequisite. The amount of material studied may be varied in accordance with the student's educational purpose.  
GOULD, MILLS, AVERY.
- 61 Underclass Voice (1-4) f, w.**  
Prerequisite, the ability to sing simple songs with musical intelligence and a knowledge of the rudiments of music. GOULD, MILLS, AVERY.
- 261 Upperclass Voice (1-2) f, w.**  
Prerequisite, 8 hours voice of collegiate grade, the equivalent of course 61.  
GOULD, MILLS, AVERY.
- 361 Upperclass Voice (1-5) f, w.**  
Prerequisite, 14 hours voice of collegiate grade, the equivalent of course 61.  
GOULD, MILLS, AVERY.
- 70 Special Violin (0-2) f, w.**  
May be elected without credit and without prerequisite. The amount of material studied may be varied in accordance with the student's educational purpose.  
WHITMORE, QUANT.
- 71 Underclass Violin (1-4) f, w.**  
Prerequisite, the ability to play the first ten of the Kayser Etudes; rudiments of music, etc. WHITMORE, QUANT.
- 271 Upperclass Violin (1-2) f, w.**  
Prerequisite, 8 hours violin of collegiate grade, the equivalent of course 71.  
WHITMORE, QUANT.
- 371 Upperclass Violin (1-5) f, w.**  
Prerequisite, 14 hours violin of collegiate grade, the equivalent of course 71.  
WHITMORE, QUANT.
- 80 Special Cello (0-2) f, w.**  
May be elected without credit and without prerequisites. The amount of material studied may be varied in accordance with the student's educational purpose.  
MULCHY.
- 81 Underclass Cello (1-4) f, w.**  
Prerequisites, knowledge of the first four positions and the ability to play with good intonation Romberg Sonata Op. 43, Mendelssohn Concerto, etc. MULCHY.
- 281 Upperclass Cello (1-2) f, w.**  
Prerequisite, 8 hours cello of collegiate grade, the equivalent of course 81.  
MULCHY.
- 381 Upperclass Cello (1-5) f, w.**  
Prerequisite, 14 hours cello of collegiate grade, the equivalent of course 81.  
MULCHY.
- 82 Special String Bass (0-2) f, w.**  
May be selected without credit and without prerequisite. The amount of material studied may be varied in accordance with the student's educational purpose.  
MULCHY.
- 83 Underclass String Bass (1-4) f, w.**  
Prerequisites, knowledge of the half, first, and second positions; rudiments of music. MULCHY.
- 283 Upperclass String Bass (1-2) f, w.**  
Prerequisite, 8 hours string bass of collegiate grade, the equivalent of course 83.  
MULCHY.

- 383 Upperclass String Bass (1-5) f, w.**  
Prerequisite, 14 hours string bass of collegiate grade, the equivalent of course 83. MULCHY.
- 85 Special Viola (0-2) f, w.**  
May be elected without credit and without prerequisite. The amount of material may be varied in accordance with the student's educational purpose. QUANT, WHITMORE.
- 86 Underclass Viola (1-4) f, w.**  
Prerequisite, same as for course 71, or the equivalent in viola literature and technique plus rudiments of music. QUANT, WHITMORE.
- 286 Upperclass Viola (1-2) f, w.**  
Prerequisite, 8 hours of viola of collegiate grade, the equivalent of course 86. QUANT, WHITMORE.
- 386 Upperclass Viola (1-5) f, w.**  
Prerequisite, 14 hours of collegiate grade, the equivalent of course 86. QUANT, WHITMORE.
- 90 Special Organ (0-2) f, w.**  
Prerequisite, a moderate degree of pianistic ability. The amount of material studied may be varied in accordance with the individual student's educational purpose. PARRIGIN.
- 91 Underclass Organ (1-4) f, w.**  
Prerequisite, the same as for course 51. PARRIGIN.
- 291 Upperclass Organ (1-2) f, w.**  
Prerequisite, 8 hours organ of collegiate grade, the equivalent of course 91. PARRIGIN.
- 391 Upperclass Organ (1-5) f, w.**  
Prerequisite, 14 hours organ of collegiate grade, the equivalent of course 91. PARRIGIN.
- 75 Special Woodwind Instruments (0-2) f, w.**  
May be elected without credit and without prerequisite. Material studied may be varied in accordance with the amount of credit elected and the individual student's educational purpose. HILLS.
- 76 Underclass Woodwind Instruments (1-4) f, w.**  
Prerequisite, ability to play material of comparable difficulty to that found in Klose, Book I, for clarinet; Andraud, Book I, Etudes for oboe; Weisenborn, Book I, for bassoon; Wagner, Book I, for flute; Gillette, Book I, for saxophone. HILLS.
- 276 Upperclass Woodwind Instruments (1-2) f, w.**  
Prerequisite, 8 hours credit in course 76 or equivalent on the same instrument elected for this course. HILLS.
- 376 Upperclass Woodwind Instruments (1-5) f, w.**  
Prerequisite, 14 hours credit in course 76 or equivalent on the same instrument elected for this course. HILLS.
- 77 Special Brass Instruments (0-2) f, w.**  
May be elected without credit and without prerequisite. Material studied may be varied in accordance with the amount of credit elected and the individual student's educational purpose. CIPOLLA.
- 78 Underclass Brass Instruments (1-4) f, w.**  
Prerequisite, ability to play material of comparable difficulty to that found in the first part of Arbans for cornet, trumpet, baritone, and trombone, Hauser foundation studies for French horn; first part of Eby bass method for tuba. CIPOLLA.
- 278 Upperclass Brass Instruments (1-2) f, w.**  
Prerequisite, 8 hours credit in course 78 or equivalent on the same instrument elected for this course. CIPOLLA.

- 378 Upperclass Brass Instruments (1-5) f, w.**  
Prerequisite, 14 hours credit in course 78 or equivalent on the same instrument elected for this course. CIPOLLA.
- 79 Underclass Percussion Instruments (0-1) f, w.**  
May be elected without credit and without prerequisites. The amount of material studied may be varied in accordance with the student's educational purpose. EMMONS.

## Ensemble Courses

- 38 Vocal Ensemble (1) f, w.**  
Open to all students possessing sufficient ability. Provides experience in vocal technique and repertoire. GOULD, MATHEWS.
- 39 University Singers (1) f, w.**  
A choral organization of selected voices, open to all students in the University by audition only. MILLS.
- 40 University Chorus (1) f, w.**  
Preparation and public performance of great choral masterpieces. A voice of pleasing quality and ability to read a simple hymn tune are required for membership. MILLS.
- 42 University Orchestra (1) f, w.**  
Open to all students in the University who play an orchestral instrument, subject to a test of playing ability by the conductor. EMMONS.
- 43 University Concert Band (1) f, w.**  
Open to all students in the University who play a band instrument, subject to a test of playing ability by the conductor. EMMONS.
- 44 Piano Ensemble (1) f, w.**  
A progressive study of orchestra literature in the form of four-hand and eight-hand arrangements. Two class periods per week. MACLEOD.
- 46 Chamber Music (1) f, w.**  
The material studied is from the recognized masterpieces of chamber music literature with emphasis on the string quartet. Two laboratory periods per week. WHITMORE, MULCHY, QUANT.
- 48 Wind Instrument Ensemble (1) f, w.**  
Practice in concerted playing of wind instruments. Two laboratory periods per week. CIPOLLA, HILLS.

## Instrumental and Vocal Techniques

- 140 Strings I (1) f.**  
**141 Strings II (1) w.**  
**142 Strings III (1) f.**  
**143 Strings IV (1) w.**  
**144 Woodwinds I (1) f.**  
**145 Woodwinds II (1) w.**  
**146 Brass I (1) f.**  
**147 Brass II (1) w.**  
**148 Percussion (1) f, w.**
- Practical work in orchestral instruments. These courses are designed to give class instruction in playing the various instruments of the orchestra. Given on a laboratory basis with two recitations per week. WHITMORE, MULCHY, HILLS, CIPOLLA, EMMONS.
- 240 String Instrument Techniques (1) s.**  
Prerequisite, a semester of training, or the equivalent, on the instrument elected. A laboratory course supplementing undergraduate preparation for instrumental teaching and orchestral conducting. WHITMORE, MULCHY.
- 244 Woodwind Instrument Techniques (1) s.**  
Prerequisite, a semester of training, or the equivalent, on the instrument elected. A laboratory course supplementing undergraduate preparation for instrumental teaching and orchestral conducting. HILLS.

- 246 Brass Instrument Techniques (1) s.**  
Prerequisite, a semester of training, or the equivalent, on the instrument elected. A laboratory course supplementing undergraduate preparation for instrumental teaching and orchestral conduction. CIPOLLA.
- 149 Conducting (2) f.**  
The technique of the baton, factors in interpretation, score reading, rehearsal procedures for choral and instrumental organizations, program building, public appearances. MATHEWS.
- 150 Conducting (2) w.**  
Continuation of course 149. EMMONS.
- 151 Voice Class (1) f.**  
A class dealing with the fundamentals of singing primarily for majors in music education with no previous vocal experience. Two laboratory meetings per week. GOULD, MEMBERS OF THE STAFF.
- 152 Voice Class (1) w.**  
A continuation of course 151. GOULD, MEMBERS OF THE STAFF.
- 431 Principles of Singing (2) s.**  
GOULD.
- 432 Principles of Singing (2) s.**  
Continuation of course 431. GOULD.
- 433 Advanced Choral Conducting (2) s.**  
Prerequisites, graduate standing, courses 149 and 150 or their equivalent. Baton technique and problems involved in the direction of choral ensembles. (Not accepted for A.M. degree). MATHEWS.

## NAVAL ROTC

All Naval ROTC courses require three recitations and two one-hour laboratory periods per week. All students enrolling in Naval ROTC courses must obtain permission from the Professor of Naval Science.

- 1 Naval Orientation (3) f.**  
Customs and traditions of the Navy, seamanship, naval communications, Rules of the Nautical Road, principles of leadership, fundamentals of naval vessels, elementary maneuvers. MEMBERS OF THE STAFF.
- 2 Naval Sea Power (3) w.**  
To acquaint the student with influence of sea power on global history, the contribution of sea power to the past, present, and future progress of the United States. MEMBERS OF THE STAFF.
- 25 Naval Weapons (3) f.**  
Modern naval guns (40 mm, 3-inch, 5-inch, major caliber), radar control of guns, ballistics, and basic principles of the control of naval guns against surface targets and against aircraft targets. MEMBERS OF THE STAFF.
- 26 Naval Weapons (3) w.**  
Prerequisite, course 25. Battery alignment, spotting, shore bombardment, torpedoes, antisubmarine weapons and tactics, mines, rockets, and guided missiles. MEMBERS OF THE STAFF.
- 100 Naval Machinery, Steam and Diesel Engines (3) f.**  
Prerequisites, Physics 1 and 2 or 23 and 24. Naval engineering, main propulsion installations, steam plants, auxiliary machinery, diesel engines; principles of ship stability and buoyancy in the practice of damage control. MEMBERS OF THE STAFF.
- 101 Navigation (3) w.**  
Prerequisites, Mathematics 9 and 10. Theory and technique of surface and aerial navigation; theory of celestial navigation and navigator's day's work at sea. MEMBERS OF THE STAFF.

**102 Naval Operations (3) f.**

Basic principles of aerology; training in maneuvering board, tactical and fleet communications, tactical instructions and Rules of the Nautical Road. MEMBERS OF THE STAFF.

**103 Naval Administration (3) w.**

Principles of good personnel management, elements and administration of military law, principles and psychology of leadership, and preparation of the prospective officer for his integration into a ship's organization. MEMBERS OF THE STAFF.

**104 Evolution of the Art of War (3) f.**

For students interested in a commission in the Marine Corps. The evolution of weapons, strategy, tactics, and material. Illustration of principles of war by the study of selected battles and campaigns. The development of U. S. military and foreign policy. MEMBERS OF THE STAFF.

**105 Modern Basic Strategy and Tactics (3) w.**

Prerequisite, course 104. Modern tactical principles and techniques, especially on small unit level. Illustrated by use of contemporary historical examples and practical problems. The development of general understanding of strategy. MEMBERS OF THE STAFF.

**106 Amphibious Warfare (3) f.**

Prerequisite, course 105. History and development of amphibious warfare, principles of amphibious warfare techniques, and their application in selected examples from modern history. MEMBERS OF THE STAFF.

**107 Amphibious Warfare: Part II, Leadership and The Uniform Code of Military Justice (3) w.**

Prerequisite, course 106. Amphibious warfare continued. Leadership techniques. Procedures for and the responsibilities of an officer in the administration of The Uniform Code of Military Justice. MEMBERS OF THE STAFF.

**NURSING****1 Introduction to College (0) f, w, s.**

Weekly discussions to assist the student in adjusting to college work. STUBER, WALSH.

**2 Orientation to Nursing (2) f, s.**

A description of the field of nursing, the development of the nursing profession, and the functions of the nurse in meeting the health needs of individuals and communities. Open to any University student. WALSH.

**10 Interpersonal Relationships in Nursing (2) w, s.**

A course designed to help the student nurse in increasing understanding of self and of the patient as a person, a member of a family, and a community. THOMAS.

**50 Growth and Development of the Individual (3) w, s.**

General psychology must precede or parallel this course. A study of the normal physical, social, mental, and emotional growth of the human being from birth to senescence. Open to any University student. WALSH.

**100 Fundamentals of Patient Care I (3) f.**

Classes and laboratory practice in nursing care of nonacutely ill and convalescent patients. CRIM, MEMBERS OF THE STAFF.

**101 Elementary Materia Medica (1) f.**

A laboratory course in drug dosage and preparation of solutions. Students not enrolled in School of Nursing must obtain consent of instructor. STUBER.

**102 Fundamentals of Patient Care II (3) w.**

Continuation of course 100. Aims to assist the student to understand, plan, and execute nursing care adapted to each patient's needs. Correlated with course 120. CRIM, MEMBERS OF THE STAFF.

- 103 Fundamentals of Patient Care III (1) f.**  
Continuation of courses 100 and 102, and correlated with course 124. Nursing care and procedures. CRIM, MEMBERS OF THE STAFF.
- 119 Introduction to Medical-Surgical Nursing (2) f.**  
A study of the development of medical science, general pathology, and diagnostic methods. Includes community resources available for the care of the patient and his family. THOMAS, MEMBERS OF THE STAFF.
- 120 Medical-Surgical Nursing (5) w.**  
Etiology, symptoms, and treatment of medical and surgical conditions. Includes pathology; diet therapy; social, health, and psychological aspects of nursing; and pharmacology. Respiratory, gastrointestinal, allergies, and tuberculosis disease conditions. RHODES, MEMBERS OF THE STAFF.
- 121 Medical-Surgical Nursing (3) w.**  
Continuation of course 120; covers circulatory and musculo-skeletal disease conditions and nursing care. RHODES, MEMBERS OF THE STAFF.
- 122 Medical-Surgical Nursing (1) s.**  
Continuation of course 121. Endocrine, metabolic, and skin conditions. RHODES, MEMBERS OF THE STAFF.
- 123 Medical-Surgical Nursing (1) f, w, s.**  
Surgical technique and operative procedures. GWINNUP.
- 124 Medical-Surgical Nursing (4) s.**  
Urinary, reproductive, nervous systems, and conditions of the eye and ear. Includes consideration of venereal diseases. RHODES, MEMBERS OF THE STAFF.
- 125 Medical-Surgical Nursing (2) f, w.**  
Nursing in the acute communicable diseases. MEMBERS OF THE STAFF.
- 130 Obstetrics and Obstetric Nursing (4) f, w.**  
Prenatal, natal, and postpartum care of the mother and her newborn baby. MEMBERS OF THE STAFF.
- 140 Pediatrics and Pediatric Nursing (4) f, w.**  
Medical and nursing care of sick and well children. MEMBERS OF THE STAFF.
- 150 Public Health Nursing (3) f, w.**  
Principles, objectives, and practices in public health nursing and the role of the nurse in health education and conservation. SMITH.
- 160 Psychiatry and Psychiatric Nursing (5) f, w, s.**  
Diagnosis, care, and treatment of patients with mental and emotional disorders. MEMBERS OF THE STAFF.
- 170 Contemporary Nursing I (2) f, s.**  
A study of the historical background of the nursing profession and the problems facing the young graduate nurse. POTTER.
- 171 Contemporary Nursing II (3) f, w.**  
Continuation of course 170. Administration and teaching in a small unit and legal aspects of nursing. MASON, STUBER.
- 175 Senior Nursing (3) f, w.**  
Recent developments in medical and other fields which influence modern nursing practice. Field trips and conferences to help the student integrate her knowledge of total patient care. MEMBERS OF THE STAFF.
- 185 Community Organization for Health (1-3) f.**  
Prerequisite, junior standing. A course designed to acquaint the student with facilities for health maintenance which exist through community organization. MEMBERS OF THE STAFF.
- 190 Problems (1-3) f, w, s.**  
Prerequisites, senior standing and permission of the instructor. MEMBERS OF THE STAFF.

- 191 Team Nursing (2) f.**  
Definition, purposes, organization, and functioning of the nursing team. STUBER.
- 192 Newer Aspects in General Nursing (3) f, w.**  
This course is designed to bring the graduate nurse up to date in all aspects of general nursing. MEMBERS OF THE STAFF.
- 194 Methods and Content in Health Teaching (3) w, s.**  
Prerequisites, junior standing and educational psychology preceding or parallel. A laboratory course designed to develop skill in teaching health to lay groups. Special attention is given to content. SMITH.
- 195 The Field of Public Health Nursing (3) f.**  
Prerequisite, graduate nurse status. Nursing as a socio-economic force; team concepts in community health programs, and application of basic nursing science and art to family and community living. SMITH.
- 196 Ward Management (3) w.**  
Prerequisite, registered nurse status. Study of basic principles and methods of administration, fundamental to nursing care. Designed primarily for preparation for head nursing but applicable to other nursing leadership functions in the hospital. SPALDING.
- 197 Clinical Teaching (3) f.**  
Prerequisite, graduate nurse status. Educational psychology must precede or parallel this course. Philosophy, principles, methods, and evaluation in clinical instructions. STUBER.
- 198 Introduction to Principles and Methods of Teaching in Nursing (3) w.**  
Prerequisites, graduate nurse status and educational psychology. Philosophy and objectives, principles of teaching and evaluation, and methods of guiding learning. POTTER.
- 199 Current Developments in Nursing (3) w.**  
An overview of the history of nursing leading to the present situation and a study of the steps being taken by the nursing profession to meet current needs. POTTER.

## OBSTETRICS AND GYNECOLOGY

- 121 Obstetrics and Gynecology, Second Year, w.**  
This course consists of 16 lectures during the semester dealing with normal obstetrics. MEMBERS OF THE STAFF.

### Obstetrics and Gynecology, Third Year

One-sixth of the class will be assigned at any one time. Complicated obstetrics and gynecology is taught by means of lectures, ward rounds, seminars, and through attendance on the clinics, wards, delivery rooms, and operating rooms. The mechanism of labor is taught with the manikin. MEMBERS OF THE STAFF.

### Obstetrics and Gynecology, Fourth Year

One-eighth of the class will be assigned to ward duties and clinic activities throughout the calendar year. Students will assist at operations on their patients and do normal deliveries under appropriate supervision. Weekly conferences are held with radiology and pathology. Seminars on maternal mortality, infertility, and gynecological endocrinology are held twice weekly. MEMBERS OF THE STAFF.

### Obstetrics and Gynecology, Elective

Any student in his elective period may make special arrangements with the department to do special work on a subject of his interest. Hours are to be arranged. MEMBERS OF THE STAFF.

Advanced graduate and postgraduate instruction in obstetrics-gynecology, both short-term and long-term, varying from one to four years in duration, are available to qualified physicians by special arrangements.



**PATHOLOGY****210 General Pathology (6) f.**

The course consists of a total of 160 lecture, recitation, demonstration, and laboratory hours for second-year medical students. FLYNN, NEAL, LEEPER, PERNA.

**211 Systemic Pathology (5) w.**

Prerequisite, Pathology 210. A course of 160 lecture, recitation, demonstration, and laboratory hours for second-year medical students. FLYNN, NEAL, PERNA, LEEPER.

**212 Clinical Pathology (5) w.**

Prerequisites, Microbiology 201, Anatomy 203, and Biochemistry 106 and 108. A course of 112 lecture, recitation, demonstration, and laboratory hours for second-year medical students. FLYNN, NEAL, PERNA, LEEPER.

**404 Advanced Pathology (credit to be arranged) f, w.**

A graduate course in which the amount and character of the work will depend upon the needs, qualifications, and interests of the student. FLYNN, NEAL, PERNA, LEEPER.

**491 Research in Pathology (credit to be arranged) f, w.**

Open only to properly qualified graduate students. (A background of advanced chemistry and mathematics is required. A reading knowledge of German is desirable but French is not necessary or particularly recommended.) FLYNN, NEAL, PERNA, LEEPER.

**Lectures in Pathology for Nurses**

These lectures are given as a part of the courses offered by the School of Nursing. RANSDELL.

**Clinical Pathologic Conference (no formal credit) f, w.**

An interesting case presenting diagnostic, therapeutic, or teaching points is discussed jointly by a clinician and pathologist. A monthly conference required of all third- and fourth-year medical students.

**Pathology Seminar (no formal credit) f, w, s.**

An informal biweekly seminar by members of the Department of Pathology and pathologists of the central Missouri area. Required of fourth-year students with pathology elective and open to other fourth-year students by invitation. FLYNN, MEMBERS OF THE STAFF.

**Pathology Elective, f, w, s.**

This program is designed to give the fourth-year student an insight into the practice of pathology. The elective may cover any phase of pathology including the blood bank. Specific areas for study may be selected after consultation with the staff.

Advanced graduate and postgraduate instruction in pathology, both short-term and long-term, varying from one to four years in duration, are available to qualified physicians by special arrangements.

**PEDIATRICS****Pediatrics, Third Year**

Full-time assignment to ward and outpatient clinics. Lectures, conferences, seminars, and teaching rounds are attended regularly. Offered to one-sixth of the class in rotation throughout the academic year. JACKSON, MEMBERS OF THE STAFF.

**Pediatrics, Fourth Year**

Full-time assignment to ward and outpatient clinics. Conferences, seminars, and teaching rounds are attended regularly. Offered to one-eighth of the class in rotation throughout the calendar year. JACKSON, MEMBERS OF THE STAFF.

**Pediatrics, Elective**

Fourth-year medical students are eligible during the elective period. Arrangements are made with the department to do special work on a subject of the student's interest. Hours to be arranged. Offered throughout the calendar year. JACKSON, MEMBERS OF THE STAFF.

**Growth and Development**

A series of lectures given as a part of Physical Diagnosis (Medicine 122). Includes physical, mental, and emotional aspects of growth and maturation of children. JACKSON, MEMBERS OF THE STAFF.

Advanced graduate and postgraduate instruction in pediatrics, both short-term and long-term programs, up to four years in duration, are available to qualified physicians by special arrangement.

**PHILOSOPHY****1 Elementary Logic (3) f, w, s.**

The formal principles of deduction and induction with special attention to criticism of argument, detection of fallacies, and certain philosophic problems arising out of logic. MEMBERS OF THE STAFF.

**5 Introduction to Philosophy (3) f, w, s.**

The principal problems of philosophy and their typical solutions with special reference to problems of knowledge, of the natural world, and of society. MEMBERS OF THE STAFF.

**10 Introduction to Ethics (3) f, w, s.**

The philosopher's quest for the good life: an evaluation of means and ends. MEMBERS OF THE STAFF.

**102 Philosophy of Materialism (3) w.**

An analytic and genetic study of Marxian dialectical materialism from anticipations in early materialists to contemporary Leninism and the official philosophy of the U.S.S.R.

**199 Distinction (3) f, w, s.**

Special work for candidates for graduation with distinction. MEMBERS OF THE STAFF.

**204 Early European Philosophy (3) f.**

Philosophic thought from Thales to Augustine with emphasis upon Plato and Aristotle. COSTELLO.

**205 Early Modern Philosophy (3) w, s.**

A survey of the critical and speculative thinking of the modern period, up to and including Kant, in its relation to scientific, religious, political, and general social movements. COSTELLO.

**212 American Ideals (3) w.**

Historical and critical study of the democratic philosophy from its classical and biblical backgrounds to the present. HODGES.

**310 American Philosophy (2) f.**

The major trends and changing context of American thought from colonial days to the middle of the nineteenth century. BERNDTSON.

**311 Recent American Philosophy (3) w, s.**

The leading philosophers and philosophic movements in American thought since 1850 with emphasis upon Dewey, James, Peirce, and Royce. OLIVER.

**315 Philosophical Ideas in Literature (3) w.**

Metaphysical and ethical world-views embodied in representative classics of poetry and prose. BERNDTSON.

**317 Aesthetics (3) f, s.**

A study of the nature of art and beauty and of their relation to other modes of experience. BERNDTSON.

- 320 Philosophy of Science (3) f.**  
Prerequisites, junior standing and ten hours in science. A critical analysis of science from the point of view of its method, its presuppositions, and its implications for general philosophy. BENJAMIN.
- 325 Social and Political Philosophy (3) f.**  
A study of selected major social philosophies, and their effect on political theory and practice, from Rousseau, through Marx and Nietzsche, to Freud. HODGES.
- 326 Philosophy of Justice (3) f.**  
A logical and historical analysis of rival interpretations of justice within Western culture: their Greek, Roman, Hebrew, and Christian backgrounds, their irreconcilable differences, and the principles of critical judgment common to each. HODGES.
- 330 Intermediate Logic (3).**  
Prerequisites, junior standing and Philosophy 1. A critical discussion of the formal aspects of thinking with special reference to symbolic logic, the nature of deductive systems, and certain questions of logical theory. BENJAMIN.
- 335 Philosophy and Language (3) w.**  
Prerequisite, junior standing. Classical and contemporary views of the effect of language on man's experience and on his beliefs about reality, knowledge, and moral values. The construction of improved languages. OLIVER.
- 340 Latin-American Philosophy (2) w.**  
Prerequisite, one course in philosophy or junior standing. An examination of philosophical and related ideas in Latin America. BERNDTSON.
- 345 Nineteenth Century Philosophy (3) f.**  
Prerequisites, junior standing and either Philosophy 5 or a course in the history of philosophy. An introduction to German, British, and French philosophy from Fichte to Nietzsche and Spencer. BERNDTSON.
- 346 Contemporary Philosophy (3) w.**  
Prerequisites, junior standing and either Philosophy 5 or a course in the history of philosophy. A critical survey of tendencies and systems of the current century. BERNDTSON.
- 350 Special Readings (1-3) f, w, s.**  
MEMBERS OF THE STAFF.
- 405 Problems in the Teaching of Philosophy (2).**  
Discussion of the presentation of material, selection of texts, and outlining of courses, with practice teaching under supervision. BENJAMIN.
- 410 Seminar (1-3) f, w, s.**  
MEMBERS OF THE STAFF.
- 415 Fundamental Problems in Metaphysics (1-3) f.**  
BERNDTSON.
- 420 Fundamental Problems in the Theory of Knowledge (1-3) w.**  
BENJAMIN.
- 425 Fundamental Problems in the Theory of Value (1-3) w.**  
BERNDTSON.
- 430 Continental Rationalism (1-3) f.**  
OLIVER.
- 435 English Empiricism (1-3) f.**  
OLIVER.
- 490 Research (credit to be arranged) f, w, s.**  
MEMBERS OF THE STAFF.

## PHYSICAL EDUCATION

All students are required to take four semesters of physical education during their freshman and sophomore years.

- 1-2 Required Course—Freshman Men (1) f, w, s.**  
Various games and sports may be selected including basketball, volleyball, tennis, softball, golf, and many others. Two class meetings each week. MEMBERS OF THE STAFF.
- 3-4 Required Course—Freshman Women (1) f, w, s.**  
A wide variety of games and rhythmic activities are offered including archery, soccer, softball, tennis, basketball, swimming, and dancing. Two class meetings each week. MEMBERS OF THE STAFF.
- 5-6 Required Course—Sophomore Men (1) f, w, s.**  
A continuation of 1 and 2. Two periods each week. MEMBERS OF THE STAFF.
- 7-8 Required Course—Sophomore Women (1) f, w, s.**  
A continuation of 3 and 4. Two periods each week. MEMBERS OF THE STAFF.
- 11-12 Recreational Activities for Junior Women (1) f, w, s.**  
Prerequisites 3, 4, 7, 8, or equivalents. Two periods each week. MEMBERS OF THE STAFF.
- 13-14 Recreational Activities for Senior Women (1) f, w, s.**  
A continuation of 11 and 12. Two periods each week. MEMBERS OF THE STAFF.
- 20 Introduction to Physical Education, Men (2) f, w.**  
Historical background, analysis of individual aptitudes, and description of training needed for teaching of physical education. BUNKER, EDWARDS.

## Professional Courses

- 27 Modern Dance (1) f.**  
Dance from the standpoint of its use in education and physical education. The course includes materials in fundamentals of movement and rhythm. Two periods each week. TAYLOR, CHARNOCK.
- 28 Modern Dance (1) w.**  
A continuation of course 27 including dance composition. Two periods each week. TAYLOR, CHARNOCK.
- 41 Freshman Physical Education Activities, Women (1) f.**  
Designed for students in the teacher training curriculum in physical education. Activities are selected to meet prerequisites for upperclass courses. MEMBERS OF THE STAFF.
- 42 Freshman Physical Education Activities, Women (1) w.**  
A continuation of course 41. MEMBERS OF THE STAFF.
- 43 Sophomore Physical Education Activities, Women (1) f.**  
A continuation of course 42. MEMBERS OF THE STAFF.
- 44 Sophomore Physical Education Activities, Women (1) w.**  
A continuation of course 43. MEMBERS OF THE STAFF.
- 45 Individual Techniques in Men's Sports (1) f.**  
Designed for second-year students in the physical education teacher training program. Analysis and participation in skills involved in football and basketball. A prerequisite for course 106. BUNKER, EDWARDS, SIMPSON.
- 46 Individual Techniques in Men's Sports (1) w.**  
A continuation of course 45, emphasis on skills involved in baseball and track and field. A prerequisite for course 107. BUNKER, EDWARDS, SIMPSON.

- 54 Plays and Games (2) f, s.**  
Analysis and participation in play activities suitable for playgrounds, recreation centers, elementary and secondary schools. Two periods each week. Credit may not be received for both this course and 56. MCKEE.
- 56 Minor Games (2) f, w.**  
Methods of organizing and teaching informal and semi-organized games suitable for boys and men. Two periods each week. Credit may not be obtained for both this course and 54. BUNKER, RITCHIE.
- 101 Physical Education Activities, Men (1) f.**  
Designed for third-year students in the physical education teacher training program. Participation in selected games and stunts useful for teaching in schools, camps, and recreation centers. KELLER.
- 102 Physical Education Activities, Men (1) w.**  
A continuation of course 101. KELLER.
- 106 Major Sports, Men (3) f, s.**  
Prerequisite, course 45 or coaching experience. Coaching and management of interschool football and basketball squads. FAUROT, STALCUP.
- 107 Major Sports, Men (3) w, s.**  
Prerequisite, course 46 or coaching experience. Coaching and management of interschool baseball and track squads. SIMMONS, BOTTS.
- 115 Sports and Gymnastics, Junior Women (3) f.**  
Prerequisites, courses 41, 42, 43, 44, or equivalent. Theory and practice of teaching sports, gymnastics, and tumbling. Analysis of skills; team play; officiating; and conduct of intramural programs. MEMBERS OF THE STAFF.
- 116 Sports and Gymnastics, Junior Women (3) w.**  
A continuation of course 115. MEMBERS OF THE STAFF.
- 117 Sports and Gymnastics, Senior Women (3) f.**  
A continuation of courses 115, 116. MEMBERS OF THE STAFF.
- 118 Sports and Gymnastics, Senior Women (3) w.**  
A continuation of course 117. MEMBERS OF THE STAFF.
- 122 Rhythmic Form and Analysis (2) f.**  
A study of the nature of rhythm and the basic rhythmic motor experiences. This course includes an elementary analysis of musical as well as dance forms. TAYLOR, CHARNOCK.  
*See Education H124—Rhythmic Activities for Elementary Schools.*
- 125 Elementary Folk Dancing (2) w.**  
Analysis of dance patterns and dances, selected and graded rhythms, singing games, and folk dances, with program planning, methods of instruction and practice. TAYLOR, CHARNOCK.  
*See Education H127—Physical Education Activities for the Elementary School.*
- 128 Theory of the Modern Dance (2) w.**  
Prerequisite, 2 semesters of dance. Brief history of the dance; the aims and the justifications of the dance in the school curriculum; application of dance material to different age groups. TAYLOR, CHARNOCK.
- 134 Technique of Swimming (2) f, w, s.**  
Principles and methods in teaching swimming, diving, and life saving. The problems of construction and management of swimming pools are considered. Open to men and women of advanced swimming ability. CLINE, HOWELL.
- 140 Camp Leadership (2) w.**  
A study of camp history, standards, trends, programs, and behavior problems. Practical application of outdoor cookery, camp craft, and trips. MACNEILL, HOWELL.

- 142 Leadership of Social Recreation (2) f, w, s.**  
A study of and practice in techniques of leading social activities suitable in settings such as schools, churches, settlement or community houses, camps, clubs, and other social organizations. **LAWNICK.**
- 144 The Organization and Conduct of Recreation Centers (2) f, w.**  
Problems of operation and management of playgrounds and indoor recreation centers. **LAWNICK.**
- 151 Community Recreation (3) f.**  
A survey of the recreational field, its history, development, and significance to the community. Special fields of development. Promotion and administration of recreational programs. Volunteer service opportunities. Open to students interested in recreational leadership. **LAWNICK.**  
*See Education H152—History and Principles of Physical Education.*
- 155 Officiating for Women's Sports (2) f.**  
Methods and techniques of officiating in volleyball, basketball, and field sports. Opportunity will be offered to take examinations of the Women's National Officials Rating Committee. **MEMBERS OF THE STAFF.**
- 156 Officiating for Women's Sports (2) w.**  
Methods and techniques of officiating in softball and tennis. Opportunity will be offered to take examinations of the Women's National Officials Rating Committee. **MEMBERS OF THE STAFF.**
- 157 Officiating for Men's Sports (2) f.**  
Methods and techniques of officiating in football, basketball, wrestling, and swimming and diving. Practice in officiating under supervision in the intramural program will be required. **KELLER.**
- 158 Officiating for Men's Sports (2) w.**  
Methods and techniques of officiating in softball, baseball, track and field, volleyball, and tennis. Practice in officiating under supervision in the intramural program will be required. **KELLER.**
- 162 Advanced Folk Dancing (2) f.**  
History of dances of different nations, a study of characteristic steps and dances, and methods of presenting material to high school and college classes. **TAYLOR, CHARNOCK.**
- 181 Athletic First Aid (2) f, w.**  
Prerequisite, anatomy. Theory and practice in prevention, emergency care, and rehabilitation of injuries encountered in vigorous games. **WAPPEL AND A PHYSICIAN SUPERVISOR.**

## PHYSICS

### Basic Courses

- 1 Survey of College Physics (5) f, w.**  
Prerequisite, one year of high school algebra. A terminal survey of physics for the general student. Will meet physical science requirement for the A.B. degree but not premedical requirements. Four lectures and one laboratory period per week. **MEMBERS OF THE STAFF.**
- 11 Elementary College Physics (5) f, w, s.**  
Prerequisites, high school algebra and plane geometry. Covers mechanics, heat, sound, and a few topics in magnetism and electrostatics. Three recitations and two laboratory periods per week. **MEMBERS OF THE STAFF.**

- 12 Elementary College Physics (3) f, w, s.**  
Prerequisite, course 11. The latter part of the sequence begun in course 11. It includes the remainder of electricity, modern physics, and light. Two recitations and one laboratory period per week. MEMBERS OF THE STAFF.
- 23 General Physics (5) f, w, s.**  
Mathematics 175 must be taken prior to or concurrently with the course. Covers mechanics, heat, and sound. GINGRICH, MEMBERS OF THE STAFF.
- 24 General Physics (5) f, w, s.**  
Prerequisite, course 23. Covers magnetism and electricity, and modern physics. GINGRICH, MEMBERS OF THE STAFF.

### Advanced Courses

A year of college physics with a grade of M or better is prerequisite for all advanced courses. Mathematics 175 must precede or accompany course 311. Mathematics 175 must precede course 312. Mathematics 201 must precede or accompany courses 310 and 314.

- 225 Fundamentals of Physics for High School Teachers: Part I (2) s.**  
A survey of mechanics, heat, and sound for the high school teacher. Special reference to the fundamental concepts, demonstrations, use of equipment, problems.
- 226 Fundamentals of Physics for High School Teachers: Part II (2) s.**  
Similar to course 225 but covering magnetism and electricity, light, and certain features of modern physics. Course 226 may be taken before course 225.
- 310 Electricity and Magnetism (3) w, s.**  
An introduction to the theory of electricity and magnetism and to its application in typical problems.
- 311 Light (3) w, s.**  
Covers the fundamental principles of geometrical and physical optics.
- 312 Heat (3) w, s.**  
A development of the concepts of heat and temperature based on the two laws of thermodynamics. Introduction to kinetic theory of gases and statistical mechanics.
- 314 Mechanics (3) f, s.**  
A development of the fundamental concepts and principles of mechanics using mathematical methods. Many problems are used.
- 380 Atomic Structure (3) f, s.**  
Prerequisites, courses 310 and 314 or equivalents. Studies of the electron, the atomic nucleus, the quantum theory. Bohr theory, line spectra, photoelectric effect, and the magnetic properties of atoms. An introductory course. GINGRICH.

### Advanced Laboratory Courses

A year of college physics with a grade of M or better is prerequisite for all advanced courses. Mathematics 175 must precede and Mathematics 201 must precede or accompany any course in the following group.

- 304 Electrical Measurements (3) f, w, s.**  
One class and two laboratory periods per week. Theory and practice of methods of measurements of resistance, electromotive force, capacitance, inductance, etc., using direct and alternating currents of both audio and radio frequencies. SCHMIDT.
- 305 Applied Electronics Circuits (3) f, w, s.**  
Prerequisites, course 304 and consent of instructor. Two class periods and one laboratory period per week. Designed to acquaint the student with the construction, use, and maintenance of electronic circuits commonly used in physical research. HENSLEY.

- 306 Atomic Physics Laboratory (3) f.**  
Prerequisite, course 304. Course 310 is recommended. One class and two laboratory periods per week. Experiments in electron emission, gas discharge, determination of fundamental atomic constants and atomic energy levels. HENSLEY.
- 307 Nuclear Physics Laboratory (3) w.**  
Prerequisite, course 304 or consent of instructor. One class and two laboratory periods per week. Detection and properties of nuclear radiations. DULLER.
- 308 Light Laboratory (3) w, s.**  
One class and two laboratory periods or two three-hour laboratory periods per week. Experiments in geometrical and physical optics. HOLROYD.

## Graduate Courses

Integral calculus and two years of college physics or its equivalent are prerequisites for all courses numbered 400 or higher.

- 400 Problems (credit to be arranged) f, w, s.**  
Laboratory work involving study of the literature of special experiments in physics. An introduction to research methods.
- 410 Seminar (1) f, w.**  
A colloquium in which all members of the departmental staff and students of sufficient attainments participate. May be elected repeatedly. Some credit in seminar is required for all graduate degrees in physics.
- 411 Seminar in Solid State Physics (1) f, w.**  
Prerequisite, course 415. Topics of current interest will be selected for discussion. May be elected repeatedly. HENSLEY.
- 412 Seminar in Nuclear Physics (1) f, w.**  
Prerequisite, course 420. Topics of current interest will be selected for discussion. May be elected repeatedly. DULLER.
- 415 Physical Electronics I (3) w.**  
Theoretical and experimental aspects of the electronic properties of solids: metals, semiconductors, and insulators. HENSLEY.
- 416 Physical Electronics II (3) f.**  
Prerequisite, course 415. Selected topics from current literature; electronic properties of thin films, photoelectric emission from composite surfaces, oxide-coated cathodes, etc. HENSLEY.
- 417 Physical Electronics Laboratory (3) f, w, s.**  
A laboratory course designed to acquaint the student with the techniques of research in physical electronics, glass manipulation, vacuum tube construction, and vacuum technique. HENSLEY.
- 418 X-Rays (3) w, s.**  
Prerequisite, course 380 or equivalent. A study of the theory and application of X-ray apparatus, production of X-rays, absorption, scattering, refraction, X-ray spectra, and diffraction. GINGRICH.
- 419 X-Ray Laboratory (2-4) f, w, s.**  
Prerequisite, consent of instructor. The technique of X-ray measurements acquired through a repetition of classical experiments on the absorption, scattering, polarization, and diffraction of X-rays. GINGRICH.
- 420 Nuclear Physics I (4) w, s.**  
Prerequisite, course 380. Properties of nuclei and nuclear radiations, detection methods, high-energy nuclear phenomena. DULLER.
- 421 Nuclear Physics II (3) f, s.**  
Prerequisite, course 420. Advanced topics in nuclear physics. Study of research papers of high-energy nuclear phenomena. DULLER.



**425 Small-Angle Scattering of X-Rays (1-3) f, w, s.**

Prerequisite, course 418 or consent of instructor. Lectures, reading and discussion of the theory, apparatus and applications of small-angle X-ray scattering including the determination of particle size and shape. The relation of small-angle X-ray scattering to light scattering is reviewed. SCHMIDT.

**475 Theory of Spectra (3) w, s.**

Prerequisite, course 471 or consent of instructor. A study of atomic and molecular spectra with emphasis on the use of spectral data for analysis and for determination of atomic and molecular structure. HOLROYD.

## Mathematical Physics

The course in differential equations should be taken prior to or concurrently with any of the courses in mathematical physics.

**461 Dynamics (4) f; (3) s.**

Brief discussion of vectors and tensors. Classical dynamics of particles and rigid bodies, elasticity and vibrations. Newtonian, Lagrangian, and Hamiltonian methods.

**462 Electromagnetic Theory (4) w; (3) s.**

Prerequisite, course 461. Classical electrostatics and electrodynamics. Development of Maxwell's equations. Application of Maxwell's equations in electromagnetic theory and optics. Introduction to theory of relativity.

**464 Electrodynamics (3) f, w; (2) s.**

Prerequisite, course 462 or consent of instructor. The special theory of relativity. Radiation from moving charges. Topics in diffraction and in microwaves. The electron theory of matter. GOODMAN.

**466 Mathematics of Modern Physics (3) f, w, s.**

Prerequisite, Mathematics 301. Concentrates on those aspects of mathematics of importance in atomic, molecular, and nuclear theory: matrices, eigenvalue problems, Hilbert space, group representation theory.

**468 Thermodynamics and Statistical Mechanics (3) f, w.**

Prerequisites, courses 380 and 461. Thermodynamics as applied in physics and chemistry, laws of distribution, statistical methods of studying matter and radiation.

**471 Quantum Mechanics I (4) f; (3) s.**

Prerequisites, courses 380 and 461 or consent of instructor. Proceeds from wave-particle duality to non-relativistic Schrodinger theory including operator formalism. Eigenvalue problems; barrier phenomena and scattering theory. Perturbation and variational methods. GOODMAN.

**472 Quantum Mechanics II (3) w, s.**

Prerequisite, course 471. Angular momentum and special topics in spectroscopy. Emission of radiation. Dirac electron theory. Introduction to quantum theory of fields. GOODMAN.

**473 Quantum Mechanics III (3) f, w.**

Quantum field theory of elementary particles.

**478 Theory of Solid State I (3) w, s.**

Prerequisite, course 471. Theories of the mechanical, thermal, and electrical properties of solids. GOODMAN.

**479 Theory of Solid State II (3) f, w.**

Theories of phase change, lattice imperfections, and optical and magnetic properties of solids.

## Research and Reading Courses

- 450 Research in Experimental Physics (credit to be arranged) f, w, s.**  
Selected experiments in advanced physics. A report is required. This work does not lead to a dissertation.
- 451 Research in Theoretical Physics (credit to be arranged) f, w, s.**  
Selected topics in advanced reading. A report is required. This work does not lead to a dissertation.
- 490 Research in Experimental Physics (credit to be arranged) f, w, s.**  
Work for the preparation of a dissertation for the master's or doctor's degree.
- 491 Research in Theoretical Physics (credit to be arranged) f, w, s.**  
Work for the preparation of a dissertation for the master's or doctor's degree.

## PHYSIOLOGY AND PHARMACOLOGY

- 201 Elements of Physiology (5) f, w, s.**  
The basic physiological principles and activities with special reference to the human body for those desiring a general knowledge of physiology. MERRICK, ZATZMAN.
- 204 Elements of Pharmacology (2) f.**  
Prerequisite, course 201. An introductory study of drugs commonly used in clinical medicine with particular reference to pharmacodynamics using selected laboratory animals. WESTFALL, RUSSELL.
- 250 Medical Physiology I (5) w.**  
The physiology of muscle, nerve, cardiovascular system, and respiratory system. Laboratory work based primarily on the reactions of mammals and man. MEYER, PLATNER, MERRICK, RANDALL, ZATZMAN.
- 251 Medical Physiology II (5) f.**  
Prerequisite, Physiology 250. Physiology of the digestive, excretory, endocrine, central nervous systems, and the special senses. PLATNER, MEYER, RANDALL, MERRICK, ZATZMAN.
- 260 Pharmacology (6) w.**  
Prerequisites, courses 250 and 251. Basic pharmacology for medical practice. WESTFALL, RUSSELL.
- 301 Biophysics (2) f.**  
A study of the main quantitative and physical concepts in biology including ionizing radiations. RANDALL.
- 303 Physiology of Environmental Stress (2) w.**  
Prerequisite, course 201, 5 hours of chemistry, 5 hours of physics, or equivalent. A study of the effects of certain environmental factors on various body functions. PLATNER.
- 400 Problems (credit to be arranged) f, w, s.**  
Individual problems in physiology and pharmacology are assigned to expand previous work or as an introduction to research. MEMBERS OF THE STAFF.
- 410 Seminar (1) f, w.**  
Review of current literature on physiological and pharmacological topics. MEMBERS OF THE STAFF.
- 416 Advanced Experimental Physiology (4) f.**  
Prerequisites, course 201 and graduate standing. Advanced studies of the physiology of the various systems and organs of the mammalian organism. MEYER, RUSSELL.
- 420 Physiological and Pharmacological Methods (3) w.**  
Prerequisite, course 416. A review of the objectives and approaches in physiological and pharmacological experimentation. MEMBERS OF THE STAFF.

- 430 Experimental Pharmacodynamics (4) w.**  
Prerequisite, course 416. Actions of selected groups of substances affecting the normal physiology of the organism. RUSSELL, WESTFALL.
- 450 Research (credit to be arranged) f, w, s.**  
Opportunities for research in physiology and pharmacology not leading to a dissertation, are offered. MEMBERS OF THE STAFF.
- 490 Research (credit to be arranged).**  
Research in physiology and pharmacology leading to a dissertation. MEMBERS OF THE STAFF.

## POLITICAL SCIENCE

- 1 American Government (5) f, w.**  
A basic course dealing with the American system of government. Political organization, institutions, and functions at national, state, and local levels are covered. KARSCH, MEMBERS OF THE STAFF.
- 55 International Relations (3) f, w.**  
Contemporary international affairs including the family of nations, the control of national foreign policies, and competition and cooperation in the legal, political, economic, and social fields. HILL, SCHWADA, MIWA.
- 101 State Government and Administration (3).**  
Prerequisite, three hours in American national government. The structure and operation of governments on the state level with particular reference to that of Missouri under the Constitution of 1945. This course is intended primarily for transfer students who have had no course work in Missouri government. FAUST, KARSCH.
- 103 British Government (3) f, w.**  
Prerequisite, course 1. A study of the constitutional development, organization, and practical workings of the government of Great Britain and the British Commonwealth nations. KAHLE.
- 160 Introduction to Political Thought (3) f, w.**  
Prerequisite, course 1. A survey of political thought relating to the source and nature of authority, forms of government, and the control of power. MIWA.
- 198 Distinction (1-3) f, w.**  
Special readings and reports in the several fields of political science. Limited to candidates for graduation with distinction in political science. MEMBERS OF THE STAFF.
- 200 Problems (1-3) f, w.**  
MEMBERS OF THE STAFF.
- 201 Local Rural Government (2) w.**  
Prerequisites, course 1 and junior standing. The development, organization, and functions of the county, township, school district, and other rural units of government in the United States with special reference to Missouri. SPIEGEL.
- 202 Administration of Justice (2) f.**  
Prerequisites, course 1 and junior standing. The development, organization, and procedure of our judicial system including the selection and tenure of judges, court organization, and the prosecution of criminal offenses. SPIEGEL.
- 216 Legislation (2) w.**  
Prerequisites, course 1 and junior standing. The organization, procedure, and practice of American national and state legislative bodies. KARSCH.
- 304 Inter-American Relations (3) f, w.**  
Prerequisites, course 1 and junior standing. A survey of recent problems in the relations of the United States with Latin-American powers. KAHLE.

- 305 Political Parties (3) f, w.**  
Prerequisites, course 1 and junior standing. The development, organization, functions, and activities of major and minor political parties; pressure groups; and election administration, especially in the United States. BRADSHAW.
- 306 Municipal Government (3) f.**  
Prerequisites, course 1 and junior standing. A study of the growth of cities; their legal status; municipal politics and elections; forms of city government. SPIEGEL.
- 307 Municipal Administration (3) w.**  
Prerequisite, course 306. A study of the functions and administrative activities of American city government. SPIEGEL.
- 308 Pan-American Organization (2) f.**  
Prerequisites, one course in the international field or Latin-American history and junior standing. Institutional bases for political, economic, and military cooperation in the western hemisphere. KAHLE.
- 309 International Law (3) f.**  
Prerequisites, course 1 and junior standing. The legal system which defines the rights of states in the international community illustrated by court decisions and state practice. HILL.
- 310 Principles of Public Administration (3) f, w.**  
Prerequisites, course 1 and junior standing. A survey of public administration with reference to organization, financial administration, personnel management, and judicial control of the administrative process. FAUST.
- 311 Administrative Regulation of Business (3) f, w.**  
Prerequisites, course 1 and junior standing. A study of the powers and procedures of the more important government agencies concerned with the regulation of business. FAUST.
- 314 American Foreign Policies (3) w.**  
Prerequisites, Political Science 55, History 20, and junior standing. The bases, formulation, and evaluation of current American foreign policies. SCHWADA.
- 315 Foreign Service Organization (3) w.**  
Prerequisites, course 1 and junior standing. A survey of the conduct of foreign affairs in the United States and in selected foreign states. HILL.
- 320 The American Constitution (3) w.**  
Prerequisites, course 1 and junior standing. A study of Supreme Court decisions dealing with the American federal system and with federal and state legislative powers and the limitations upon them. SCHWADA.
- 321 Tax Administration (3) f.**
- 330 Government Budget Administration (3) w.**  
Prerequisite, course 310 or equivalent. A detailed study of practical problems involved in budget planning and management and in fiscal controls. HARVEY.
- 351 South American Governments (3) f.**  
Prerequisites, course 1 and junior standing. The development and present status of political institutions in South America with emphasis on current political problems. KAHLE.
- 352 Mexican and Caribbean Governments (3) w.**  
Prerequisites, course 1 and junior standing. The development and present status of political institutions in Mexico and Caribbean countries with special emphasis on current political problems. KAHLE.
- 354 Continental European Governments (3) w.**  
Prerequisites, junior standing and course 203 or 6 hours of European history. A study of the constitutional development, organization, and practical workings of the governments of France, Italy, Germany, and Russia. KAHLE.

- 356 Soviet Political Institutions (3) w.**  
Prerequisites, course 1 and junior standing. The growth and operation of governmental and party institutions of the U.S.S.R. and their relation to Soviet theory and law.
- 370 Government and Politics in the Far East (3) w.**  
Prerequisites, courses 1 and 55 and junior standing. A comparative study of the evolution of national governments and policies in China and Japan. MRWA.
- 371 Government and Politics in Southeast Asia (3) f.**  
Prerequisites, courses 1 and 55 and junior standing. A survey of governments and politics in Indonesia, Indo-China, and Malaya. MRWA.
- 385 International Organization (3) w.**  
Prerequisites, course 1 and junior standing. The forms and functions of international organizations with special reference to the United Nations and to the International Court of Justice. HILL, SCHWADA.
- 390 Democratic Theory (3) w.**  
Prerequisites, course 1 and junior standing. Constitutionalism, representation, individualism, social justice, and other ideological assumptions of American democracy. KARSCH.
- 400 Problems (credit to be arranged) f, w.**  
Opportunity is offered to graduate students who have completed the necessary prerequisite courses to choose topics in one of the fields of political science for individual study. MEMBERS OF THE STAFF.
- 402 Problems in Comparative Government (3) w.**  
Prerequisite, course 203. Detailed individual studies of selected problems in comparative government. KAHLE.
- 403 Problems in Public Administration (3) w.**  
Prerequisite, course 201, 306, or 310. An intensive study of problems selected from any one of the following: budgeting, fiscal organization, personnel management, or administrative regulation. FAUST.
- 404 Problems in International Politics (3) f.**  
Prerequisite, one of the following courses: Political Science 314, 309; History 371, 372. An intensive study of the problems of foreign policy formulation and implementation with special emphasis upon American foreign policies. SCHWADA.
- 405 Problems in Political Parties (2) w.**  
Prerequisite, course 305 or equivalent training. Specific problems in the fields of party activities, pressure politics, public opinion, popular control, and election administration. BRADSHAW.
- 409 Problems in International Law (3) w.**  
Prerequisite, course 309. A detailed study of certain specific problems in international law. HILL.
- 416 Problems in State Legislation (3) w.**  
Prerequisite, course 216. A detailed study of problems related to state legislative systems. KARSCH.
- 417 Problems in Federal Legislation (3) f.**  
Prerequisite, course 216. A detailed study of problems related to the federal legislative system. HARVEY.
- 460 Early Political Thought (3) w.**  
A review of the history of political thought from Plato to Rousseau. Classic masterpieces, such as Aristotle's *Politics*, are read in full and discussed critically.
- 461 Modern Political Thought (3) w.**  
A review of modern political theories with some attention to their historical settings. Selections of leading theorists and recent tendencies are critically examined. KARSCH.

**490 Research (credit to be arranged) f, w.**

A thesis is required of all candidates for advanced degrees majoring in political science. A student should confer with the instructor in whose field he wishes to do his research work. MEMBERS OF THE STAFF.

*The following courses in public 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.*

**420 Administrative Law (3) w.**

HOWARD.

**427 Federal Taxation (3) w.**

HOWARD.

**447 Labor Law (3).**

HOWARD.

**452 Problems in Labor Relations and the Law (2) w.**

HOWARD.

**PORTUGUESE (See ROMANCE LANGUAGES)****POULTRY HUSBANDRY****1 Poultry Production (3) f, w.**

A general course in poultry husbandry including a study of breeds, breeding, culling, incubation, brooding, housing, feeding, management, marketing, and the control of disease. FUNK, MEMBERS OF THE STAFF.

**101 Poultry Farm Management Practices (2) w.**

Students will receive instruction and practice in the operation and management of a poultry farm. Offered in 1958-59 and alternate years. FUNK, MEMBERS OF THE STAFF.

**200 Problems (credit to be arranged) f, w, s.**

For advanced undergraduates. Students may enroll for problems in poultry breeding, incubation, management, marketing, nutrition, or turkey production. MEMBERS OF THE STAFF.

**201 Poultry Judging (2-3) f.**

Prerequisite, course 1. The judging and grading of poultry and poultry products including production, judging, grading live and dressed poultry and eggs. Training in flock selection and blood testing. KINDER.

**202 Incubation, Brooding, and Broiler Production (3) w.**

Principles and practices used in incubation, brooding, and broiler growing. Offered in 1958-59 and alternate years. STEPHENSON.

**300 Problems (credit to be arranged) f, w, s.**

For seniors and graduate students. Students may enroll for problems in poultry breeding, incubation, management, marketing, nutrition, physiology, or turkey production. MEMBERS OF THE STAFF.

**301 Egg Technology (3) w.**

Prerequisite, General Bacteriology (Botany 202), Agricultural Chemistry 210, or consent of instructor. The application of science to the processing, preservation, quality control, and utilization of shell, frozen, and dried egg products. COTTERILL.

**302 Poultry Farm Management (3) w.**

Must be preceded or accompanied by course 1. A study of poultry farm methods and practices and factors affecting costs and returns with poultry. KINDER.

- 304 Turkey Production and Management (3) w.**  
The principles and practices used in turkey raising. BIELLIER.
- 305 Hatchery Operation and Management (3) w.**  
A study of the operation and management of hatcheries. Offered in alternate years. Not offered in 1958-59. FUNK.
- 306 Poultry Meat Technology (3) f.**  
A complementary course to Poultry Husbandry 301 but dealing with poultry meat and by-products. Offered in 1958-59. COTTERILL.
- 307 Poultry Breeding (3) w.**  
Prerequisite, Poultry Husbandry 1. Application of genetics to poultry improvement. Offered in alternate years. Not offered in 1958-59. STEPHENSON.
- 308 Poultry Feeding and Nutrition (3) w.**  
Prerequisites, Poultry Husbandry 1 and Animal Husbandry 202. Application of principles of nutrition and recent research to poultry feeding and feed formulation. SAVAGE.
- 309 Avian Biology (3) f.**  
Prerequisites, Poultry Husbandry 1, Zoology 1. A study of the anatomy, embryology, physiology, and endocrinology of the domestic fowl. Offered in alternate years. Not offered in 1958-59. BIELLIER.
- 350 Special Readings (1-2) f, w, s.**  
Scientific literature on selected subjects will be reviewed. MEMBERS OF THE STAFF.
- 400 Problems (credit to be arranged) f, w, s.**  
Advanced study with a research problem selected by the student and the instructor. MEMBERS OF THE STAFF.
- 410 Seminar (1) f, w.**  
Scientific literature and problems in poultry husbandry will be reviewed and discussed by the class. MEMBERS OF THE STAFF.
- 420 Design and Analysis in Experimentation (3) f.**  
Prerequisite, six hours of statistics. Principles of efficient experimental design and statistical analysis as applied to biological investigations. Offered in 1958-59 and alternate years. STEPHENSON.
- 423 Genetics of Populations (4) f.**  
Prerequisites, Animal Husbandry 203 or Poultry Husbandry 307, and 3 hours of statistics. Genetic composition of populations and conditions which influence their rate of change. Relative effectiveness of various breeding plans. Not offered in 1958-59. STEPHENSON.
- 430 Advanced Poultry Products Technology (2) f.**  
Prerequisite, Poultry Husbandry 301 or 306. A literature study leading to the development of research projects related to the processing, preservation, quality control, development, and utilization of poultry products. Offered in 1958-59. COTTERILL, KAHLENBERG.
- 490 Research in Poultry Husbandry (credit to be arranged) f, w, s.**  
Graduate students may conduct research investigations and present the results as a thesis or a written report. MEMBERS OF THE STAFF.

## PSYCHOLOGY

### Basic Courses

- 1 General Psychology (3) f, w, s.**  
No prerequisite. A survey of the facts, principles, and methods in the study of human behavior. This course does not satisfy the biological science requirement for the A.B. degree. MEMBERS OF THE STAFF.

**2 General Experimental Psychology (5) f, w.**

No prerequisite. A survey of the facts, principles, and methods in the study of human behavior. Lectures and laboratories. Satisfies the requirement in biological science (except in the College of Education). DANIEL, LICHTÉ.

**Intermediate Courses****15 Psychology Methods Laboratory (3) w.**

Prerequisite, Psychology 1 or 2. Projects and experiments representative of the field of general psychology. DANIEL, MEMBERS OF THE STAFF.

**20 Psychology of Personal Adjustment (2) f, w, s.**

Prerequisite, Psychology 1 or 2. The dynamic principles of human behavior with an emphasis on advertising, personnel selection, and efficiency. Briefer reference to organization. MCKINNEY, LANDFIELD, MORAN, HILLIX.

**30 Applied Psychology (2 or 3) f, w, s.**

Prerequisite, Psychology 1 or 2. The application of psychology to business with emphasis on advertising, personnel selection, and efficiency. Briefer reference to personal efficiency, law, medicine, and education. LICHTÉ, MCKINNEY.

**150 Social Psychology (3) f, s.**

Prerequisite, Psychology 1 or 2. The social bases of behavior and the behavior of the individual in social situations. Application of the psychological principles to problems such as propaganda, juvenile delinquency, and race prejudice. HILLIX.

**170 Child Psychology (3) f, s.**

Prerequisite, Psychology 1 or 2. The origins and development of human behavior with emphasis on the principles of child guidance and personality development. BROWN.

**190 Distinction (3) f, w.**

Special work for candidates for graduation with distinction in psychology. MEMBERS OF THE STAFF.

**201 Psychological Statistics (3) f, w.**

Prerequisite, Psychology 1 or 2. Statistical methods used in psychological measurement and in the analysis of psychological data: frequency distribution analysis, sampling, tests of significance, and correlation methods. BAKAN, HILLIX.

**212 Human Learning (3) f.**

Prerequisite, Psychology 1 or 2. The factors affecting human learning and retention and the basic principles of learning and forgetting. MARX, TYLER.

**230 Individual Differences (2) w, s.**

Prerequisite, Psychology 1 or 2. A survey of individual and group differences. Contributions of various factors to variations in behavior. LICHTÉ, MORAN.

**Advanced Laboratory Courses****302 Psychological Tests and Measurements (3) f.**

Prerequisites, Psychology 201 and 230. Theory and practice of testing and measurement in psychology. CLYDE.

**304 Industrial Psychology (3) f, w.**

Prerequisite, Psychology 201. Training, efficiency, supervision, morale, group dynamics, and consumer research in business and industry. Projects and field study. MCKINNEY.

**308 Psychology of Emotions (3) w.**

Prerequisite, Psychology 314. Research and theory in the field of affection and emotion with emphasis upon response processes. DANIEL.



**310 Psychology of Learning (3) w.**

Prerequisite, Psychology 212. A survey of principles of classical and instrumental conditioning, with special reference to data from animal studies, and an introduction to learning theories. MARX, TYLER.

**311 Psychology of Sensation and Perception (3-4) f.**

Prerequisite, 6 hours of psychology. The minor senses, vision, visual perception, audition, auditory perception. LICHTER.

**312 Psychology of Action (3) w.**

Prerequisites, Psychology 201 and 314. Reflex and voluntary action, motor skills, mental and physical work, fatigue and efficiency. DANIEL.

**Advanced Lecture Courses****314 Physiological Psychology (3) f.**

Prerequisite, 8 hours of psychology or psychology and biology. Survey of the physiological bases for behavior. DANIEL.

**315 Psychology of Personality (3) w.**

Prerequisite, Psychology 1 or 2. An introduction to the study of human personality. CLYDE.

**320 Psychology of Music (2) w.**

Prerequisite, 3 hours of psychology or 3 hours of music theory. Attributes of sound, characteristics of musical performances, aptitudes for listening and performance, the expressiveness of music, the uses of music, and learning in music. LICHTER.

**330 Animal Behavior (3) w.**

Prerequisite, 8 hours of psychology or the biological sciences, Psychology 1 or 2 required. A comparative study of animal behavior. The relation of behavior to bodily structure and environment. MARX, TYLER.

**340 Advanced Social Psychology (3) w.**

Prerequisite, Psychology 150. A survey of theoretical, applied, and research aspects of social psychology. BAKAN, MORROW.

**345 Abnormal Psychology (3) w, s.**

Prerequisite, 8 hours of psychology including 20 or 170. A survey of the causes, forms, and methods of treating behavior abnormalities with emphasis on the neuroses and psychoses. BROWN.

**350 Special Readings (3) f, w, s.**

Individual guidance on selected topics by permission of staff members. MEMBERS OF THE STAFF.

**360 Systematic Psychology (3) f.**

Prerequisites, 9 hours in psychology and senior standing. A critical evaluation of major theoretical systems of psychology with an introduction to methodological problems of theory construction and system-making and an emphasis on the integration of recent trends. MARX, HILLIX.

**361 The History of Psychology (3) w.**

Prerequisites, 9 hours in psychology and senior standing. Historical foundations of contemporary psychology. BAKAN, HILLIX.

**370 Psychology of Development (3) f.**

Prerequisite, Psychology 170. Primarily for majors and graduate students in psychology and related fields. Principles, theories, and research in normal and psychopathological human development. BROWN.

## Graduate Courses

- 400 Problems (1-5) f, w, s.**  
On consultation with the instructor concerned, properly qualified students may undertake original investigations of psychological problems. MEMBERS OF THE STAFF.
- 404 Introduction to Clinical Psychology (2) f.**  
Prerequisites, Psychology 302, 315, 345 or equivalents. Survey of professional and scientific aspects of clinical psychology. BROWN.
- 405 Clinical Methods in Psychology (2) w.**  
Prerequisite, Psychology 404. Lecture and laboratory. Techniques, theories, and principles of intensive individual case investigation. BROWN.
- 408 Behavior Disorders (3) f.**  
Problems of etiology, diagnosis, and treatment in psychopathology. Consideration of theory, research, and case histories. Registration in course must be approved by professor. LANDFIELD.
- 410 Seminar (1) f, w.**  
Presentation of psychological problems and investigations by staff and students. MARX, MEMBERS OF THE STAFF.
- 411 Studies in Professional Problems (3) f.**  
Sources for psychological literature research, techniques of scientific reporting, and problems of professionalization. DANIEL.
- 412 Clinical Psychometrics I (3) w.**  
Prerequisite, Psychology 404. Techniques of administration and interpretation of tests of intelligence, deterioration, and other diagnostic devices. Lecture and laboratory. ALLEE.
- 414 Personality Appraisal I (3) f.**  
Prerequisite, Psychology 412. Techniques of administration and interpretation of projective type diagnostic devices. Registration in course must be approved by professor. Lecture and laboratory. ALLEE.
- 416 Studies in Personality (2) w.**  
Prerequisite, Psychology 315 or equivalent. Contemporary research and theory in personality including the relationship of personality to learning and perception. MCKINNEY, LANDFIELD.
- 419 Advanced Psychological Statistics I (3) f.**  
Prerequisite, Psychology 100. Correlation; theory of testing statistical hypotheses; analysis of attribute data; introduction to analysis of variance and covariance. BAKAN, COLLIER.
- 420 Advanced Psychological Statistics II (3) w.**  
Prerequisite, Psychology 419. Theory of exact testing; special tests of significance; the relationships among tests of significance; advanced problems in analysis of variance and covariance. BAKAN, COLLIER.
- 421 Design of Experiments in Psychology (2) f.**  
Prerequisite, Psychology 420. Techniques for organizing experiments and analyzing data to achieve maximum efficiency in obtaining information from large- and small-scale studies. BAKAN, COLLIER.
- 422 Studies in Learning (2) w.**  
Prerequisite, Psychology 310. Critical consideration of selected experimental work in the psychology of learning and memory. MARX, COLLIER.
- 423 Studies in Audition (2).**  
Prerequisite, Psychology 311. Reports and discussion of contemporary research in audition with emphasis on the attributes of auditory experience and their physical and physiological correlates. LICHTER.

- 424 Studies in Physiological Psychology (2) w.**  
Prerequisite, Psychology 314. Critical consideration of recent experimental and theoretical work in physiological psychology. DANIEL.
- 425 Studies in Therapeutic Theory and Methods (2) w.**  
Prerequisite, Psychology 404. Contemporary theories and techniques of counseling emotional problems including group therapy. MCKINNEY, LANDFIELD.
- 426 Studies in Comparative Psychology (2) f.**  
Prerequisite, Psychology 330. Critical consideration of selected experimental work in animal behavior. MARX, COLLIER, TYLER.
- 427 Studies in Visual Perception (2) w.**  
Prerequisite, Psychology 311. Critical evaluation of current theories and contemporary research in visual perception. LICHTÉ.
- 428 Studies in Thought and Language (2) w.**  
A study of the function of symbols in explicit and implicit behavior. BAKAN, MOSS.
- 429 Studies in Theories of Learning (2) f.**  
Prerequisite, Psychology 310. Intensive consideration of the major contemporary theories of learning and their extension to general theories of behavior and motivation. MARX, TYLER.
- 430 Studies in Contemporary Psychological Theory (2) w.**  
Prerequisite, Psychology 360. The logic of modern psychology with emphasis on major methodological trends in theory construction in recent years. MARX.
- 445 Clinical Practicum I (1-4) f, w, s.**  
Prerequisites, Psychology 404, 412, and consent of instructor. Supervised training in the use and interpretation of psychological techniques in cooperating clinics and institutions. BROWN, LANDFIELD.
- 446 Clinical Practicum II (1-4) f, w, s.**  
Prerequisites, Psychology 414, 425, 445. Supervised training in counseling and psychotherapy in cooperating clinics and institutions. BROWN, LANDFIELD.
- 450 Research (credit to be arranged) f, w, s.**  
Experimental investigations not leading to a thesis. MEMBERS OF THE STAFF.
- 490 Research (credit to be arranged) f, w, s.**  
Investigations in psychology undertaken with the expectation that the work will terminate in a thesis. MEMBERS OF THE STAFF.

## RADIOLOGY

### Radiologic Pathology.

Lecture course given in conjunction with second-year pathology in which the gross and radiologic findings in disease are correlated.

### General Principles of Radiology.

Advanced radiology for third-year medical students. Lectures and demonstrations cover the applications of roentgen diagnosis, radiation therapy, radiation physics, and radioisotopes to the diagnosis and treatment of human disease. LODWICK, KEATS.

### Radiological Conferences.

Scheduled weekly conferences for students, residents, and staff covering varying aspects of roentgen diagnosis and treatment of human disease. LODWICK, KEATS.

Advanced graduate and postgraduate instruction in radiology, both short-term and long-term, varying from one to four years in duration, are available to qualified physicians by special arrangements.

## RELIGION

Courses in religion offered by the Missouri School of Religion and by the Baptist Chair of Bible may be taken for credit toward degrees in the University. All courses are accredited in the College of Arts and Science. A student may elect as many as fourteen semester hours toward the degree of Bachelor of Arts. Students working toward other degrees may elect courses in religion by consent of the deans of the respective schools.

### 3 Fundamental Moral and Religious Values (2) f, w.

The problem of right or wrong in the light of the Kingdom of God and Jesus' conception of the abundant life; the method, scope, and limitations of science in relation to religion. A philosophical approach to the problems of immortality, God, and freedom. Open to freshmen and sophomores. Juniors and seniors in the College of Arts and Science may not take this course for credit. PEERY, NEIGER.

## Language and Literature

### *Biblical Literature*

### 102 The Poetry of the Bible (2) f, w.

Prerequisite, six hours of literature or course 110, Life and Literature of the Old Testament. KEYFITZ.

### 110 Life and Literature of the Old Testament (2) f, w.

Prerequisite, sophomore standing or course 3. The social, economic, and religious phases of the periods in which particular texts were written. The literary quality and growth of ideas in the Old Testament. KEYFITZ, NEIGER.

### 121 Life and Literature of the New Testament (2) f, w.

Prerequisite, sophomore standing or course 3. A study of the central documents of the Christian religion to determine the origin, authorship, literary structure, nature, and permanent value. PEERY, NEIGER.

### 122 Life and Teachings of Jesus (3) f, w.

Prerequisite, sophomore standing or course 3. After a brief historical introduction, a study of the principal events in the life of Jesus. The course will include a study of Jesus' teachings with application to life today. SHROUT, NEIGER.

### 201 Masterpieces of Sacred Literature (3) f, w.

Prerequisites, junior standing and six hours of literature. A study of selected texts in world religious literature in English. The course will include representative prose and poetry in Egyptian, Babylonian, Persian, the Old and New Testaments, the Koran, Chinese, and Hindu sacred writings. Each division will be introduced with a historical background of the selections studied. KEYFITZ.

### *Language*

### 100 Introduction to the Study of New Testament Greek (3) f.

Prerequisites, Greek 3 and 5. The characteristics of the language, a drill on forms and syntax, the building of a New Testament vocabulary, a translation of John. SHROUT.

### 101 Introduction to the Study of New Testament Greek (2) w.

A continuation of course 100.

### 105 Hebrew Language I (3) f.

Beginner's course: The alphabet, grammatical principles, acquisition of vocabulary, and translation of Genesis I-VIII with some easy reading. KEYFITZ.

### 106 Hebrew Language II (3) w.

A continuation of course 105.

### 107 Hebrew Language III (3) f.

Advanced course: A knowledge of the forms is presupposed. Introduction to syntax. Selections from the prophets and Hagiographa. KEYFITZ.

- 108 Hebrew Language IV (2) w.**  
A continuation of course 107.
- 111 Post-Biblical Hebrew (2) f.**  
Lectures on history of post-Biblical Hebrew literature. Representative selections read from Talmudic, Midrashic, and modern prose and poetry. Open to students who qualify in knowledge of Hebrew. KEYFITZ.
- 112 Post-Biblical Hebrew (2) w.**  
A continuation of course 111.
- 113 Elementary Syriac (2) f.**  
A beginner's course in Syriac. Grammar and reading of easy selections from Kalilah wa-Dimnah. KEYFITZ.
- 114 Elementary Syriac (2) w.**  
A continuation of course 113.
- 115 Elementary Arabic (2) f.**  
An elementary course in Arabic, in Arabic grammar, exercises in the language, and reading of selected portions in the *Arabian Nights*. KEYFITZ.
- 116 Elementary Arabic (2) w.**  
A continuation of course 115.
- 117 Assyrian for Beginners (2) f.**  
An introductory course in cuneiform. Grammar and selected readings in Assyrian annals. KEYFITZ.
- 118 Assyrian for Beginners (2) w.**  
A continuation of 117.
- 119 Introduction to Egyptian (2) f.**  
The students will be introduced to hieroglyphics through selected reading from Sinhue and other Egyptian narratives. The course will be accompanied by a study of Egyptian grammar. KEYFITZ.
- 120 Introduction to Egyptian (2) w.**  
A continuation of course 119.

## History

### *History of Religion*

- 130 Comparative Religion (2) f, w.**  
Prerequisite, junior standing or instructor's consent. A survey of the chief religions now prevailing in the world including Hinduism, Buddhism, Confucianism, Shinto, Zoroastrianism, Islam, Judaism, and Christianity. HEARN.
- 131 The Living Religions of the World (3) f, w.**  
Prerequisite, junior standing or instructor's consent. A survey of the living religions of the world, including Hinduism, Buddhism, Confucianism, Shinto, Zoroastrianism, Islam, Judaism, Christianity, and other religions. HEARN.
- 132 Ethics of World Religions (2) f, w.**  
Prerequisite, junior standing or consent of the instructor. A study of the ethics of the above religions. Surveyed first in their formative periods; their scriptural expressions; then in their present approach to ethical problems of the modern world. HEARN.

### *Oriental History*

- 75 The Area of the Middle East (3) f, w.**  
The survey of the geography, resources, and means of communication in the Biblical world including Egypt, Palestine, Asia Minor, Mesopotamia, and Persia; the growth of civilization from ancient to modern times; religion, culture, and national movements will receive special attention. KEYFITZ.

**140 The Ancient Orient (2) f.**

The rise of civilization in Egypt and Mesopotamia and political history of ancient kingdoms and empires. A study of history of Assyria, the Hittites, and Syria-Palestine through the Amarna period. Special consideration to material civilization, spiritual culture, art, literature, and religion. KEYFITZ.

**141 The Early History of Israel (3) f, w.**

Historical survey of Israel from settlement in Palestine to end of the Maccabean period. Chief content of the course is evaluation of government, law, religion, and prophecy. Palestine's contacts with neighbors and their influence upon Israel's ideas and institutions especially stressed. Open to freshmen. KEYFITZ.

**145 Religion of the Ancient Hebrews (2) f, w.**

Comparative study of religions of Egypt and Mesopotamia and their influence on religion of Palestine. Survey of religious development in pre-Hebrew days; early Hebrew religious beliefs; and rise of henotheism and the triumphs of monotheism. KEYFITZ.

**146 Post-Exilic Religion of the Jews (2) w.**

Progress of religious thought under Ezekiel and other post-exilic prophets. Development of democracy in religious practice and later education. Importance of synagogue. Judaism's progress under Scribes, Pious, and Pharisees. KEYFITZ.

*Church History***150 Origins of the Christian Church (2) f, w.**

A study of the ideals and environment out of which the early Christian Church developed. Source materials; pre-Christian life and literature of the Jewish people; customs, philosophical and religious beliefs of contemporary nations; New Testament and other first century writings. HEARN.

**152 History of the Christian Church (2) f, w.**

A survey of the outstanding developments in the life of the church from the apostolic age to the present. The history of the church will be considered in the light of political, economic, and social movements. HEARN.

**154 History of Religion in America (2) f, w.**

A study of the religious background of the early colonists, the distinctive features of American religious history, the growth of denominations, movements toward unity, and other modern trends. HEARN.

**Philosophy****171 Philosophy of Religion (3) f, w.**

Prerequisite, junior standing or instructor's consent. Philosophy which inquires into the origin, nature, and function of religion; examines source and validity of claims religion makes; clarifies fundamental religious concepts. HEARN.

**The Rural Church****160 The Church in the Rural Community (3) f, w.**

Prerequisite, instructor's consent. A study of the rural church movement. The relationship of the church to its social setting and to the programs of the agricultural and social agencies. The cooperation and use of these resources for the development of a comprehensive community program. RICH.

**165 Rural Church Administration (3) f, w.**

Prerequisite, instructor's consent. Principles and problems of rural church administration. Special attention will be given to the purposes, duties, organization, financing, and surveys of the church. Field visits will be made to selected churches. RICH.

**170 Field Work in Rural Churches (2) f, w.**

Prerequisite, instructor's consent. Designed for students planning to be rural ministers. Program of guidance and field supervision, conferences with the local church, and reports of accomplishment. RICH.

## ROMANCE LANGUAGES

### French

Students entering with no high school units in French should take course 1; students entering with one high school unit in French should take course 1 for which they will receive 3 hours credit; students entering with two high school units in French should take course 2; students entering with three high school units in French may take course 2 for 3 hours credit or course 103.

**1 Elementary French (5) f, w.**

Beginning course in composition, conversation, and reading. Five recitation and two laboratory periods per week. MEMBERS OF THE STAFF.

**2 Intermediate French (5) f, w.**

Continuation of course 1. Five recitation periods per week. Two additional periods in the language laboratory are provided for students who demonstrate oral-aural aptitude in course 1. MEMBERS OF THE STAFF.

**103 French Reading (3) f, w.**

Prerequisite, course 2 or equivalent. Cultivation of reading skill combined with introduction to the humanistic values of the literature. MEMBERS OF THE STAFF.

**106 French Composition (2) f, w.**

Prerequisite, course 2 or equivalent. A systematic review of grammar and practice in composition. MEMBERS OF THE STAFF.

**109 French Conversation (3) f, w.**

Prerequisite, course 2 or equivalent. Practice in conversation and in improvement of pronunciation. MEMBERS OF THE STAFF.

**198 Distinction (3).**

Special work for majors who desire to graduate with distinction. MEMBERS OF THE STAFF.

**203 Advanced French Reading (2-3).**

Prerequisite, course 103 or equivalent. For students needing to improve accuracy and fluency in reading before going on to courses in literature. MEMBERS OF THE STAFF.

**206 Advanced French Composition (2).**

Prerequisite, course 106 or equivalent. Practice in free composition. MEMBERS OF THE STAFF.

**209 Advanced French Conversation (3).**

Prerequisite, course 109 or equivalent. Conversation on a variety of topics designed to increase fluency in the spoken language. MEMBERS OF THE STAFF.

**210 French Civilization (3) f.**

Open to any student interested. No knowledge of French required. Study of the different epochs of French civilization and their impact on present-day French living. Readings, recitations, and lectures. WHITWORTH.

**301 Masterpieces of French Literature (3) f.**

Prerequisite, French 103 or equivalent. It is recommended that students take this introductory course before taking others in French literature. Class readings in various types of classical French literature from 1700 to the present with emphasis on comedy and tragedy, and library readings on earlier periods. MEMBERS OF THE STAFF.

**302 Masterpieces of French Literature (3) w.**

Prerequisite, French 103 or equivalent. Reading of selected works from the origins to 1700, classroom discussion, and outside reading in the literary background. MEMBERS OF THE STAFF.

- 304 Phonetics (3).**  
Prerequisite, French 103 or equivalent. A systematic but practical study of French pronunciation with emphasis upon listening to and imitating French recordings. Students receive individual attention. JESSE.
- 311 History of the French Language (3).**  
An elementary knowledge of Latin recommended. Evolution of the French language from its inception to the present. GIFFIN.
- 316 The French Renaissance (3).**  
Prerequisite, French 103 or equivalent. A survey of sixteenth century French literature stressing Rabelais, Montaigne, and the Pleiade poets. WHITWORTH.
- 317 Seventeenth Century French Literature (3).**  
Prerequisite, French 103 or equivalent. A survey of seventeenth century French literature with special emphasis on Corneille, Racine, and Moliere. JESSE.
- 318 Eighteenth Century French Literature (3).**  
Prerequisite, French 103 or equivalent. A survey of eighteenth century French literature with special emphasis on Montesquieu, Voltaire, Rousseau, and Diderot. WHITWORTH.
- 319 The Novel from Balzac to Zola (3).**  
Prerequisite, French 103 or equivalent. A survey of the nineteenth century novel. Readings, discussion, reports. GIFFIN, WHITWORTH.
- 320 The Twentieth Century Novel (3).**  
Prerequisite, French 103 or equivalent. A survey of the contemporary novel. Readings, discussion, reports. GERSHMAN, GIFFIN.
- 321 French Theater of the Nineteenth Century (3).**  
Prerequisite, French 103 or equivalent. A survey of the French theater from 1814 to 1914. Reading and classroom discussion of one play per week. GIFFIN, JESSE.
- 322 Contemporary French Theater (3).**  
Prerequisite, French 103 or equivalent. A survey of the French theater from 1914 to the present. Reading and classroom discussion of one play per week. GERSHMAN, GIFFIN.
- 323 Lyric Poetry from Chenier to Verlaine (3).**  
Prerequisite, French 103 or equivalent. Study of selected poems of the major poets of the nineteenth century. Classroom discussion and written reports. GERSHMAN.
- 324 Poetry from Symbolism to the Present (3).**  
Prerequisite, French 103 or equivalent. Study of selected poems of twentieth century poets. Classroom discussion and written reports. GERSHMAN.
- 350 Special Readings (1-3) f, w.**  
Intended for upperclassmen who desire to study some aspects of French literature not covered by other courses. MEMBERS OF THE STAFF.
- 353 Readings in French (1-3).**  
Subject varies each semester. Selected works of an author, a genre, or a period. Reading and classroom discussion with outside reading of a background nature. MEMBERS OF THE STAFF.
- 400 Problems (credit to be arranged) f, w.**  
Investigation of and written report on some aspect of language or literature. MEMBERS OF THE STAFF.
- 401 Beginning French for Graduate Students (no credit).**  
To prepare graduate students for the Ph.D. reading examination. MEMBERS OF THE STAFF.



- 411 Old French (3).**  
An elementary knowledge of Latin recommended. This course aims to provide the student with ability to read the Old French language and with a knowledge of its linguistic structure. GIFFIN.
- 412 Survey of Old French Literature (3).**  
The period 1200-1500. Reading and discussion of texts in modern French with outside background reading. GIFFIN.
- 413 Old Provençal (3).**  
Background in Latin or another Romance language recommended. A survey of the language and literature (chiefly troubadour poetry) with discussion of its origin, value, and influence. Reading of the original texts in anthology form. GIFFIN.
- 416 Studies in the French Renaissance (3).**  
Prerequisite, French 316 or equivalent. MEMBERS OF THE STAFF.
- 417 Studies in 17th Century French Literature (3).**  
Prerequisite, French 317 or equivalent. GIFFIN.
- 418 Studies in 18th Century French Literature (3).**  
Prerequisite, French 318 or equivalent. WHITWORTH.
- 419 Studies in 19th Century French Literature (3).**  
Prerequisite, French 319 or equivalent. MEMBERS OF THE STAFF.
- 420 Studies in 20th Century French Literature (3).**  
Prerequisite, French 320 or equivalent. GERSHMAN.
- 453 Seminar (1-3).**  
Subject varies each semester, for example, Villon, Moliere, Balzac, Voltaire, History of Literary Criticism, Surrealism, and so on. MEMBERS OF THE STAFF.
- 490 Research (credit to be arranged).**  
MEMBERS OF THE STAFF.

## Italian

- 1 Elementary Italian (5) f.**  
Beginning course in composition, conversation, and reading. Five recitation and two laboratory periods per week. GIFFIN.
- 2 Intermediate Italian (5) w.**  
Continuation of course 1. Five recitation periods per week. Two additional periods in the language laboratory are provided for students who demonstrate oral-aural aptitude in course 1. GIFFIN.
- 103 Italian Reading (3).**  
Prerequisite, course 2 or equivalent. Cultivation of reading skill combined with introduction to the humanistic values of the literature. GIFFIN.
- 106 Italian Composition and Conversation (2).**  
Prerequisite, course 2 or equivalent. A systematic review of grammar and practice in composition and conversation. GIFFIN.
- 320 Readings in Italian Literature (3).**  
Study of selected masterpieces of Italian prose and verse. GIFFIN.
- 321 Dante (3).**  
Study of the *Vita Nuova* and the *Inferno*. GIFFIN.
- 350 Special Readings (1-3).**  
Intended for upperclassmen who desire to study some aspects of Italian literature not covered by other courses. GIFFIN.

## Spanish

Students entering with no high school units in Spanish should take course 1; students entering with one high school unit in Spanish should take course 1 for which they will receive 3 hours credit; students entering with two high school units in Spanish should take course 2; students entering with three high school units in Spanish may take course 2 for 3 hours credit or course 103.

- 1 Elementary Spanish (5) f, w.**  
Beginning course in composition, conversation, and reading. Five recitation and two laboratory periods per week. MEMBERS OF THE STAFF.
- 2 Intermediate Spanish (5) f, w.**  
Continuation of course 1. Five recitation periods per week. Two additional periods in the language laboratory are provided for students who demonstrate oral-aural aptitude in course 1. MEMBERS OF THE STAFF.
- 103 Spanish Reading (3) f, w.**  
Prerequisite, course 2 or equivalent. Cultivation of reading skill combined with introduction to the humanistic values of the literature. MEMBERS OF THE STAFF.
- 106 Spanish Composition (2).**  
Prerequisite, course 2 or equivalent. A systematic review of grammar and practice in composition. MEMBERS OF THE STAFF.
- 109 Spanish Conversation (3).**  
Prerequisite, course 2 or equivalent. Practice in conversation and in improvement of pronunciation. MEMBERS OF THE STAFF.
- 198 Distinction (3).**  
Special work for majors who desire to graduate with distinction. MEMBERS OF THE STAFF.
- 203 Advanced Spanish Reading (2-3).**  
Prerequisite, course 103 or equivalent. For students needing to improve accuracy and fluency in reading before going on to courses in literature. MEMBERS OF THE STAFF.
- 206 Advanced Spanish Composition (2).**  
Prerequisite, course 106 or equivalent. Practice in free composition. MEMBERS OF THE STAFF.
- 209 Advanced Spanish Conversation (3).**  
Prerequisite, course 109 or equivalent. Conversation on a variety of topics designed to increase fluency in the spoken language. MEMBERS OF THE STAFF.
- 210 Hispanic Civilization (3).**  
An introduction to the civilization and culture of Spain and Spanish America. No knowledge of Spanish is required. STABB.

## Spanish Literature

- 301 Survey of Spanish Literature—From the Origins to 1700 (3).**  
Study of the historical background and the most important authors and works from the earliest period to 1700. It is recommended that this course be taken before course 302. BRENT, JOHNSON.
- 302 Survey of Spanish Literature—From 1700 to the Generation of 1898 (3).**  
Continuation of 301. Study of the historical background, literary movements, and important authors and works from 1700 to the writers of the Generation of 1898. BRENT, JOHNSON.
- 303 Survey of Spanish Literature—From the Generation of 1898 to 1936 (3).**  
Continuation of 302. Study of the most significant writers of this period from the Generation of 1898 to the beginning of the Spanish Civil War. BRENT, JOHNSON.

- 304 Spanish Lyric Poetry (2).**  
Reading and discussion of Spanish and Spanish-American poems, selected by theme. An appreciation course, not a survey. BRUSHWOOD.
- 305 The Spanish Short Story (2).**  
Readings, lectures, and reports dealing with the representative works in this genre from the early nineteenth century to the present. SCHERR.
- 307 The Golden Age Drama (3).**  
An introduction to the Spanish national theater as exemplified by its leading exponents: Lope de Vega, Tirso de Molina, Ruiz de Alarcón, and Calderón. BRENT, SCHERR.
- 310 Cervantes (3).**  
A study of *Don Quijote*, the *Novelas ejemplares*, and selected *entremeses*. Readings, reports, and discussions. SCHERR.
- 313 The Eighteenth Century (3).**  
Studies in the literature of Spain from 1700 to 1806 as provided in the works of Feijoo, Cadalso, Jovellanos, Garcia de la Huerta, Leandro Fernandez de Moratin, and others. SCHERR.
- 316 The Romantic Period (3).**  
A study of the prose, poetry, and theater during the literary movement from 1830 to 1850 in Spain. Lectures, readings, and reports. BRUSHWOOD.
- 319 The Nineteenth Century Spanish Novel (3).**  
A survey of the rebirth and development of the novel with reading and analysis of representative works by Alarcón, Valera, Pereda, Galdós, Pardo Bazán, Palacio Valdés, and Blasco Ibáñez. BRENT.
- 322 The Transition Drama of the 19th Century (2).**  
A study of the most important dramatists and dramas after the Romantic Period to the late nineteenth century. JOHNSON.
- 325 Modern Spanish Drama (3).**  
A study of the most important dramatists and dramas from the late nineteenth century to the present time. JOHNSON.
- 328 The Twentieth Century Spanish Novel (3).**  
A survey of the novel from the Generation of 1898 to the present. BRENT.
- 401 Studies in the Literature of the Medieval Period (3).**  
An intensive study of the *Poema del Cid*, Alfonso el Sabio, *El conde Lucanor*, and the *Libro de buen amor*. Lectures, discussions, and reports on the historical, literary, and linguistic background of the Middle Ages. BRENT, JOHNSON.
- 404 Studies in the Literature of the 16th and 17th Centuries (1-3).**  
The *entremés*, the novel of the Golden Age, or other selected studies. SCHERR.
- 407 The Spanish Ballad (2).**  
An intensive study of the ballad genre with major emphasis on the oldest ballads, their origin, and development. JOHNSON.
- 413 Perez Galdos (3).**  
An intensive study of the life and works of Pérez Galdós in the light of the religious, political, and literary ideas of his time. JOHNSON.
- 416 Miguel de Unamuno (3).**  
An intensive study of the life, literary works, and philosophy of Unamuno. JOHNSON.

### Spanish-American Literature

- 331 Spanish-American Literature—Colonial and Revolutionary Periods (3).**  
Lectures, readings, and discussions of literary expression from the Conquest to 1880 with attention to the growth of intellectual independence. BRUSHWOOD, STABB.

- 332 Spanish-American Literature—Modernism and Realism (3).**  
Continuation of 331. Survey of literature from 1880 to the present with special attention given to the contemporary novel. BRUSHWOOD, STABB.
- 335 Mexican Literature (3).**  
Lectures, readings, discussions. General survey of the literature with emphasis on contemporary authors. BRUSHWOOD.
- 338 The "Indianista" Novel (3).**  
A study of the Indian theme in the Spanish-American novel from its beginning to contemporary times. BRUSHWOOD.
- 341 Argentine Literature (3).**  
General survey with emphasis on Sarmiento and his contemporaries. Lectures, readings, discussions. STABB.
- 435 The Novel of the Mexican Revolution—From 1910 to the Present (3).**  
A study of aesthetic social values of ten or more representative works. Extensive background readings. Readings and discussions. BRUSHWOOD.

## Spanish and Spanish-American Literature

- 350 Special Readings (1-3).**  
Intended for upperclassmen who desire to study some aspects of Spanish literature not covered by other courses. MEMBERS OF THE STAFF.
- 400 Problems (credit to be arranged).**  
Conferences with individual students on certain aspects of the language and literature. MEMBERS OF THE STAFF.
- 410 Seminar in Special Studies (3).**  
Study of selected research material to accommodate the requirements of an advanced graduate group. MEMBERS OF THE STAFF.
- 480 Bibliography and Method (2-3).**  
A course designed primarily for the doctoral candidate or the master's candidate electing to write a thesis. Acquaintance with important reference works, studies, and periodicals in the field of Spanish and Spanish-American literature and practice in bibliographical methods. BRENT.
- 490 Research (credit to be arranged).**  
Required of students who elect to present a thesis. MEMBERS OF THE STAFF.

## Linguistics

- 360 Phonetics (2).**  
Prerequisite, course 205 or the instructor's consent. Intensive study of Spanish pronunciation and intonation. SCHERR.
- 361 History of the Spanish Language (3).**  
A study of the various social and linguistic factors that have contributed to the growth and development of Spanish. Lectures, collateral readings, and reports. SCHERR.
- 460 Old Spanish—Phonology, Morphology, and Syntax (3).**  
Intensive study of the phonetic evolution of Spanish from the popular Latin of the Iberian Peninsula. Study of the origins and development of Spanish word forms and sentence structure. SCHERR.  
For the Teaching of Spanish, see Education D118.

## Portuguese

### 1 Elementary Portuguese (5).

A beginning course in reading, composition, and conversation. SCHERR.

**2 Intermediate Portuguese (5).**

Continuation of course 1. SCHERR.

**103 Portuguese Reading (3).**

The reading of selected works of Portuguese and Brazilian authors. SCHERR.

**106 Portuguese Composition (2).**

Additional training in speaking and writing Portuguese. SCHERR.

**RURAL SOCIOLOGY****1 Introduction to Rural Life (3) f, w.**

The organization and functioning of rural social life. Problems of living among and working with rural people. LIONBERGER, MEMBERS OF THE STAFF.

**100 Group Organization and Leadership (5) f, w.**

A course of 96 lecture, discussion, demonstration, and laboratory hours dealing with interpersonal relations, group formation, and the principles and techniques of working with rural groups and organizations. HEPPLER.

**120 Sociology of Rural Life (2) f.**

A course primarily for employed workers who feel the need for a brief course in general rural sociology. LIVELY.

**210 Rural Youth (2) f.**

Prerequisites, Rural Sociology 1, Sociology 1, or equivalent background and junior standing. The cultural basis of the problems of rural youth, their social characteristics, the agencies serving them, and the improvement of programs and methods designed to serve their needs. LIONBERGER.

**300 Problems (credit to be arranged) f, w, s.**

MEMBERS OF THE STAFF.

**310 Rural Sociology (3) w.**

Prerequisites, Rural Sociology 1 or Sociology 1 and junior standing. A systematic review of the field of rural sociology with applications to current problems. McNAMARA.

**320 The Farm Population (3) w.**

Prerequisite, course 1 or equivalent background. A study of the number, distribution, and quality of the people who live on farms in relation to agricultural resources, food production, national characteristics and vitality, and the advancement of scientific technology. McNAMARA.

**330 Social Aspects of Rural Health (2) f.**

Prerequisite, Rural Sociology 1, or Sociology 1, or consent of instructor. The state of rural health and the problem of obtaining and maintaining adequate health agencies and services for rural people. McNAMARA.

**335 Rural Social Trends (2) f.**

Prerequisite, course 1, or Sociology 1, or consent of instructor. An examination of the major changes occurring in present-day rural society and the apparent direction of these changes. LIVELY.

**340 The Small Community (3) w.**

Prerequisites, course 1 or 100, or equivalent, and junior standing. The nature and function of the small community in American life, its trends and problems; also, a review of theories and programs for development. HOLIK.

**360 Farmers' Organizations (2) w.**

Prerequisite, 5 hours of rural sociology or equivalent. A study of the general farm organizations and agencies, such as the Farm Bureau, Grange, and Extension Service, from the point of view of their educational and social significance. LIVELY.

- 370 The Church in Rural Society (2) w.**  
Prerequisites, Rural Sociology 1, or 100, or Sociology 1 and junior standing. A study of rural churches as sociological groups including their ecology, life history, and professional leadership with particular attention to churches in rural Missouri. HEPPLE.
- 375 Advanced Social Statistics (3) w.**  
Prerequisite, statistics through simple correlation. A study of Guttman and other scaling techniques, analysis of variance, multiple factor analysis, and latent structure analysis. GREGORY.
- 400 Problems (credit to be arranged) f, w, s.**  
Research for students capable of semi-independent work. MEMBERS OF THE STAFF.
- 410 Seminar (credit to be arranged) f, w.**  
Special lectures, reviews of literature, and individual reports. MEMBERS OF THE STAFF.
- 420 Advanced Rural Sociology (3) f.**  
The historical development of rural sociology, including its principles and theories, in the United States. LIVELY.
- 430 Techniques of Social Investigation (3) f, w.**  
Prerequisite, 12 hours of social science. Includes definition of the problem, schedules and questionnaires, field work, coding, table construction and machine tabulation. Two lectures and one laboratory per week. GREGORY.
- 435 Advanced Group Organization and Leadership (2) s.**  
Advanced study of the theory and practices of group organization and leadership with particular reference to rural life. HEPPLE.
- 440 Readings in Farm Population (credit to be arranged) f, w, s.**  
McNAMARA.
- 442 Readings in the Rural Community (credit to be arranged) f, w, s.**  
LIONBERGER.
- 444 Readings in Advanced Rural Sociology (credit to be arranged) f, w, s.**  
LIVELY.
- 446 Readings in Group Organization and Leadership (credit to be arranged) f, w, s.**  
HEPPLE.
- 450 Research (credit to be arranged) f, w, s.**  
Independent research not leading to a dissertation. LIVELY, McNAMARA, HEPPLE, LIONBERGER.
- 490 Research (credit to be arranged) f, w, s.**  
Research leading to a dissertation. LIVELY, McNAMARA, HEPPLE, LIONBERGER.

## SOCIAL WORK

- 140 The Field of Social Work (3) f, w, s.**  
Prerequisite, junior standing. An introduction to the field of social work functions; development and organization of public and private services. NEBEL.
- 150 Child Welfare (2) f, w, s.**  
Prerequisite, junior standing. Child care in its public and private settings; factors affecting child welfare; community organization to meet child welfare needs. MENGEL.
- 160 Introduction to Community Organization (2) f, w.**  
Prerequisite, junior standing. A study of the community with emphasis on the social needs which arise within the community setting and the manner in which these needs are met. MEMBERS OF THE STAFF.

- 170 Introduction to Social Case Work (2) f, w, s.**  
Prerequisite, junior standing. Biological, psychological, and social theories which underlie social case work are reviewed and applied through study of case material. MEMBERS OF THE STAFF.
- 180 Introduction to Group Work (2) f.**  
Prerequisite, junior standing. Group work in public and private community agencies; its relation to education and recreation; factors affecting the needs for such services.
- 190 Field Experience (1-3) f, w, s.**  
Prerequisites, senior standing; Social Work 150, or 170, or 180 or concurrently with one of these; and permission of the instructor. Work in a social service agency on the level planned volunteer service under agency supervision. Two hours work for each credit hour will be required. MEMBERS OF THE STAFF.
- 301 Principles of Social Security (3) f, w, s.**  
Prerequisites, graduate standing and either Sociology 1, Economics 51, or Social Work 140. Critical analysis of public aid programs in the United States. Problems faced in planning assistance work and insurance programs.
- 302 Public Welfare (2) f, s.**  
Prerequisites, graduate standing and Sociology 50, or Social Work 140, or equivalent. The development and organization of local, state, federal agencies and programs for persons in need of assistance, care, and protection. PLETZ.
- 305 Child Care and Protection (3) f, s.**  
Prerequisites, graduate standing and 30 hours social science or education. Safeguards for children involving parent-child relationship, child labor, delinquency, adoption, dependency, and neglect. Facilities for foster care. MENGEL.
- 307 Juvenile Delinquency and Social Treatment (2) f, s.**  
Prerequisite, Social Work 140 or 150, or Sociology 1 or 50. Nature and extent of juvenile delinquency, theories of causation, juvenile courts, programs of treatment and prevention. ROBINS.
- 313 Social Insurance (2) f, s.**  
Prerequisite, Sociology 1, or Economics 51, or Social Work 140. Social insurance as a device to meet the hazards of unemployment, old age, illness, and death. The federal-state social insurance program. PHELPLAD.
- 314 Public Assistance (2).**  
Prerequisite, Social Work 140 or 150, or Sociology 1, or Economics 51. Public assistance as a device to meet the hazards of a needy old age, illness, disability, and death. The federal-state public assistance program.
- 315 Interviewing (2).**  
Prerequisites, advanced standing and Social Work 140 or 150; or 8 hours in psychology, sociology, education, or economics. The process of interviewing and the relation of human behavior to obtaining valid and reliable facts in this process. MYERS.
- 319 Social Statistics (3) f, w, s.**  
Prerequisites, senior standing and 12 hours in social work and sociology. Descriptive and analytic statistical techniques applied to qualitative and quantitative social data. Two lectures and one laboratory per week. ROBINS.
- 320 Psychiatric Approach to Personality (2) f.**  
Prerequisite, graduate standing in social work, or 20 hours in psychology or counseling. Psychiatric theory of normal personality development from infancy to old age with attention to how equilibrium is maintained between inner and outer pressures at each stage. GUHLEMAN, ROBINS.
- 321 Psychopathology (2) w.**  
Prerequisite, Social Work 320. Biological, social, and psychological dynamics of specific neuroses and psychoses. GUHLEMAN, ROBINS.

- 325 Medical-Social Problems (3) w.**  
Prerequisites, graduate standing and 12 hours social work or sociology. Inter-relationship of biological, psychological, and social factors in causation and treatment of common physical illnesses. COOPER.
- 330 Social Group Work (2) w.**  
Prerequisites, graduate standing and 30 hours social science. Theory and methods in group work practice. Group work agencies, their organization, policies, and objectives. SCHRAGE.
- 340 Supervision in the Public Welfare Agency (2) f.**  
Prerequisite, second-year graduate standing. This course is also open to agency supervisors and those eligible for advancement to agency supervisory positions. A study of supervisory principles and methods within the framework of the public welfare agency. KEATHLEY.
- 360 Social Case Work I (3) f, w, s.**  
Prerequisite, graduate standing in social work. Basic skills in study, diagnosis, and treatment of social problems of individuals and application of the case work process in various agency settings. MYERS.
- 361 Social Case Work II (3) f, w, s.**  
Prerequisite, Social Work 360. A continuation of course 360. MYERS.
- 365 Child Welfare Case Work (2) w.**  
Prerequisites, Social Work 360 and 361 or concurrently with it. A study of case records from children's agencies serving dependent, handicapped, delinquent, and other children with behavior problems. MYERS, MENGEL.
- 370 Law and Social Welfare (2) f.**  
Prerequisite, graduate standing in social work. Social problems of the client requiring legal consideration. Legal rights of the individual under public welfare programs.
- 390 Field Work I (4) f, w, s.**  
Prerequisite, graduate standing in social work and Social Work 360 or concurrently with it. Supervised practice in an approved public or private social work agency. MYERS, MEMBERS OF THE STAFF.
- 391 Field Work II (4) f, w, s.**  
Prerequisite, Social Work 390 and 361 or concurrently with it. A continuation of course 390. MYERS, MEMBERS OF THE STAFF.
- 400 Problems (1-6) f, w, s.**  
Individual problems assigned to expand previous work or an introduction to research. MEMBERS OF THE STAFF.
- 401 Research Methods in Social Work (2) w.**  
Prerequisites, Social Work 319 or equivalent, and 12 semester hours of graduate social work. Research process as applied to study of social work techniques and problems. ROBINS.
- 410 Social Case Work Seminar (2) f, w.**  
Prerequisites, Social Work 361 and 491. Discussions covering recent developments in social case work and directed toward integrating case work theory and practice MYERS.
- 411 Seminar: The Offender (3) f.**  
Prerequisites, Social Work 307, Sociology 311 and 312 or the equivalent. Study of the youthful and adult offenders; factors contributing to delinquent behavior; problems of social treatment. GURMAN.
- 412 Seminar: Probation and Parole (2) f.**  
Prerequisite, Social Work 411, or concurrently with it. Case analysis of probation and parole situation; the dynamics of treating antisocial tendencies on the part of individuals on parole and probation. GURMAN.



- 413 Psychiatric Social Work Seminar (2).**  
Prerequisites, Social Work 360, 361, 390, 391, and 491 or concurrent with it. The use of case work concepts and processes in giving social services to emotionally disturbed and mentally ill individuals in hospitals and clinics. **ROBINS.**
- 420 Emotional Problems in Childhood (2) w.**  
Prerequisites, Social Work 320, 360, and 390. Study of the emotional development of young children and case work treatment of behavior difficulties with particular attention to the troubles of the child placed in foster care. **MYERS.**
- 425 Organization of Medical Care (2) f, s.**  
Prerequisite, Social Work 325. Organization of medical care both public and private; function and administration of social work in medical institutions and public health programs.
- 430 Community Organization for Social Welfare (2) w.**  
Prerequisites, graduate standing and 30 hours social science. Social agency structure; agencies for planning and coordinating social services; organization of social welfare programs on a community-wide basis. **MYERS.**
- 435 Social Work Administration (2) w.**  
Prerequisite, Social Work 301 or 302. Study of process of implementation of social policy with reference to public and private welfare programs; organization, policy development, administrative supervision, staff functions, and community relationships. **PLETZ.**
- 450 Research (1-6) f, w, s.**  
Research leading to a written project but not a thesis. **ROBINS, MEMBERS OF THE STAFF.**
- 465 Readings in Case Work and Social Welfare (3) f, w.**  
Prerequisite, 30 hours graduate social work credit. Selected readings based on the student's needs and the advanced field experience. Emphasis may be placed on the student's area of interest, such as medical, psychiatric, child welfare. Reports covering the readings and relation to current experience will be required. **MEMBERS OF THE STAFF.**
- 490 Research (1-6) f, w, s.**  
Prerequisite, faculty permission. Research leading to thesis. **ROBINS, MEMBERS OF THE STAFF.**
- 491 Field Work III (8-10) f, w.**  
Prerequisite, Social Work 391. Supervised full-time practice in an approved social agency. Six months from August 1 to February 1. **MYERS, FIELD SUPERVISORS.**

## SOCIOLOGY AND ANTHROPOLOGY

- 1 General Sociology (3) f, w, s.**  
Open to freshmen and sophomores only. Nature of organization and activities of human groupings—family, community, crowd, social class, etc.; structure and function of institutions; social influences shaping personality and behavior; social change. **MEMBERS OF THE STAFF.**
- 50 Social Disorganization (3) f, w, s.**  
Prerequisite, course 1. Deviations from group norms to which there is a negative societal reaction: crime, prostitution, alcoholism, radicalism. **KYLLONEN.**
- 60 General Anthropology (3) f, w.**  
A general survey course over the fields of anthropological concern—archaeology, cultural anthropology, and physical anthropology—with emphasis placed on underlying concepts and principles. Examples taken from the nonliterate peoples of the world. **SPIER.**

**100 Fundamentals of Sociology (3) f, w, s.**

Open to juniors and seniors only. No credit for students who have taken course 1. Research methods and evidence on the nature of social interaction and its products. KYLLONEN.

**110 Marriage Education (2) f.**

Analysis of the personal and practical problems surrounding mate selection, preparation for marriage, happiness in marriage, and marital adjustment. Juniors and seniors only. HABENSTEIN.

**142 Introduction to Field Research Archaeology (1-6) s.**

Prerequisite, 3 hours of anthropology or a declared major field of study in anthropology and premission of the instructor. Archaeology of the Eastern United States; laboratory methods; archaeological techniques through field work in Missouri. CHAPMAN.

**150 Introduction to Physical Anthropology (2) f.**

Prerequisite, course 1, 60, 100, or 3 hours in a biological science, or consent of instructor. Human origins and the races of man; types of prehistoric man; formation and nature of races; human genetics; elementary anthropometry. SPIER.

**151 Old World Prehistory (2) w.**

Prerequisite, course 1, 60, 100, or consent of instructor. The beginnings of culture in the Old World; prehistoric cultures, primarily of Europe and Asia, to the early Iron Age. SPIER.

**190 Introduction to Social Research Methods (3) f.**

Prerequisite, course 1, 60, or 100. Methods of collecting data, procedures for presenting research materials such as tabulations, charts, graphs; problems of sampling; interviewing techniques, laboratory experience in collecting and analyzing data. KYLLONEN.

**198 Distinction in Sociology (3) f, w.**

Extensive work in a selected field, including reading and special investigation, for students who are candidates for graduation with distinction. MEMBERS OF THE STAFF.

**305 Population Trends (3) f.**

Prerequisite, course 1 or 100 or senior standing. Trends in population growth; fertility and mortality; social consequences of population change; problems of population quality and population policy. PIHLBLAD.

**308 Social Psychology of Group Life (3) f.**

Prerequisites, junior standing and course 1 or 100. Group structure and social interaction in relation to personality and behavior; status and role as related to the self; attitudes and motives; communications symbols and the socialization of the individual. GIST.

**310 Public Opinion and Communication (3) f.**

Prerequisites, course 1 (or 100) and junior standing, or 6 hours of journalism. Nature of public opinion and of publics; propaganda and censorship in modern society; communication and the effects of mass media, opinion surveying. GIST.

**311 Criminology (3) f, w, s.**

Prerequisites, course 1 (or 100) and junior standing. Individual and social factors conditioning criminal behavior; the institutions of criminal justice; treatment of offenders; prevention of crime. PIHLBLAD.

**312 Contemporary Corrections (3) w.**

Prerequisite, course 311. Historical development of penal institutions. Contemporary correctional institutions; problems of custody, education, classification, industry, and treatment programs. Probation and parole. PIHLBLAD.

**314 The Family (3) f, w, s.**

Prerequisite, course 1 or 100. The development of the family from institution to companionship; comparison of ethnic families; personality development within the family; family organization, disorganization, and reorganization. HABENSTEIN.

- 315 Collective Behavior (3) w.**  
Prerequisites, course 1 (or 100), and junior standing. An analysis of mass behavior and related phenomena including types and organization of social movements; crowd behavior and social epidemics; fashions and fads; leadership and authority. GIST.
- 316 Urban Sociology (3) w.**  
Prerequisites, course 1 (or 100), and junior standing. Urbanism as a world phenomenon; ecological and demographic characteristics of cities; organization of urban society including status systems, occupational structure, formal and informal associations, racial and cultural relations, and forms of communication; housing and city planning. GIST.
- 317 Industry and Society (3) f.**  
Prerequisite, course 1 or 100. The nature of an emergent industrial civilization. Secularism; mass nature of modern human collectivities; rationalization of behavior and rise of interest groups seen from a sociological viewpoint. HABENSTEIN.
- 318 Industrial Sociology (3) w.**  
Prerequisite, course 1 or 100. Formal and informal groups within an industrial plant; stratification and mobility; factors in cooperation and conflict. HABENSTEIN.
- 320 Psychiatric Approach to Personality (2). (Same as Social Work 320).**
- 321 Psychopathology (2). (Same as Social Work 321).**
- 323 Folk Society (2) f.**  
Prerequisite, course 1, 60, or 100. The comparative study of social organization in smaller societies. Contrasts and similarities between folk, feudal, and urban societies over the world. SPIER.
- 326 Cultural Anthropology (3) w.**  
Prerequisite, course 1, 60, or 100. The nature of culture, pertinent anthropological concepts, and comparative study of primitive economic life, social organization, government, law, and religion. SPIER.
- 327 Ethnic Minority Groups in the United States (2) f.**  
Prerequisites, course 1 (or 100), and junior standing. Cultural background of principal immigrant groups; culture conflicts; accommodation and assimilation; immigrant minority groups in contemporary American society. PIHLBLAD.
- 328 Personality and Culture (2) f.**  
Prerequisites, Sociology 1 or 60 and Psychology 1 or 2. A critical examination of the approaches to the study of interrelations between personality and culture; techniques for gathering relevant data; contrasts between modern and selected primitive cultures. SPIER.
- 329 Peoples of Asia (3). (Offered every third semester).**  
Prerequisite, course 1, 60, 100, or consent of instructor. Survey of the peoples and cultures of Asia with emphasis on the native societies of this area. SPIER.
- 330 Peoples of Africa (3). (Offered every third semester).**  
Prerequisite, course 1, 60, 100, or consent of instructor. Survey of the peoples and cultures of Africa south of the Sahara (i.e., the Negroid peoples). SPIER.
- 331 Peoples of Oceania (3). (Offered every third semester).**  
Prerequisite, course 1, 60, 100, or consent of instructor. Survey of the peoples and cultures of the Pacific Basin including Australia. The sources, development, and characteristics of native cultures of this area. SPIER.
- 335 American Indian I: North America (2) f.**  
Prerequisite, course 1, 60, 100, or 326. Origin of man in North America including Mexico; culture areas; customs of representative tribes; Indians of Missouri. CHAPMAN.

- 336 American Indian II: South America (2) f.**  
Prerequisite, course 1, 60, 100, or 326. Origin of man in South America and Central America; culture areas; customs of representative tribes. CHAPMAN.
- 337 Racial and Cultural Relations (3) f.**  
Prerequisite, course 1 or 100, or one course in anthropology. Interracial and intercultural relations in various societies. Attitudes, social tensions, and forms of adjustment. GIST.
- 339 The American Negro (2) w.**  
Prerequisites, course 1 (or 100) and junior standing. Historical background. Special attention will be directed to the changing pattern of Negro-White relations in American society. PIHLBLAD.
- 340 American Archaeology I: North America (2) w.**  
Prerequisite, course 1, 60, or 100. Ancient man and the development of American Indian cultures in North America; the archaeology of Missouri. CHAPMAN.
- 341 American Archaeology II: South America (2) w.**  
Prerequisite, course 1, 60, or 100. Ancient man and the development of Indian cultures in South America. CHAPMAN.
- 342 Field Methods in Archaeology (1-8) s.**  
Prerequisites, course 142 (or equivalent) and permission of instructor. Techniques and materials of archaeological excavation; field surveying and recording; care and interpretation of material; field work in Missouri. CHAPMAN.
- 350 Special Readings (credit to be arranged) f, w, s.**  
Prerequisites, 12 hours in sociology and departmental approval. Extensive reading in a selected area or intensive reading in a special field. MEMBERS OF THE STAFF.
- 351 Special Readings in Anthropology (credit to be arranged) f, w, s.**  
Prerequisites, two courses in anthropology and consent of instructor. Directed reading in ethnology or archaeology not leading to a thesis. CHAPMAN, SPIER.
- 352 Occupations and Professions (3) f.**  
Prerequisite, course 1 or 100. Analysis of occupational and professional aspects of American society. Division of labor; occupational mobility; work and the self; collegueship and informal organization of work. HABENSTEIN.
- 360 Social Case Work I (3). (Same as Social Work 360).**
- 381 Experimental Sociology (3) w.**  
Prerequisite, 6 hours of sociology. Critical historical review of problems, methods, and results of experimentation in interpersonal relations under controlled conditions. KYLLONEN.
- 391 Social Prediction (2) w.**  
Prerequisite, 12 hours in social science or senior standing. Basic theory and methods of social prediction as applied to parole, probation, success in marriage. KYLLONEN.
- 392 Community Planning and Housing (2) w.**  
Prerequisite, junior standing or consent of instructor. Types of planning including specially planned communities; planning for metropolitan areas; large-scale housing projects; social aspects of planning and housing. Housing and redevelopment legislation. GIST.
- 400 Problems (credit to be arranged) f, w, s.**  
Prerequisites, 12 hours in sociology and departmental approval. Directed research not leading to a thesis or dissertation. MEMBERS OF THE STAFF.
- 402 Social Classes (3) w.**  
Prerequisite, 12 hours of sociology or consent of instructor. Theories and character of status systems; comparative analysis of class and caste in different societies; stratification and power; personality and the social structure; social mobility. GIST.

- 410 Seminar (1) f, w, s.**  
Reports of research by graduate students and staff. Required of all graduate students with or without credit. Credit limited to a total of 2 hours. MEMBERS OF THE STAFF.
- 411 Seminar in the Professions (2) w.**  
Prerequisite, 1 or 100. Institutionalization, structure, and function of major professions in America. Special attention given to medicine, law, nursing, accounting, journalism, education, and the ministry. HABENSTEIN.
- 421 Seminar in Population (2) w.**  
Selected readings in population trends and problems in various parts of the world. PIHLBLAD.
- 422 Methods of Social Research (2) w.**  
Prerequisite, 12 hours of sociology. An analytical study of methods applicable to sociological data. Critical examination of methods employed in recent researches. Required of all graduate majors. KYLLONEN.
- 424 Theory and Method in Anthropology (2) w.**  
Prerequisite, consent of instructor. The growth of theory and method in anthropology leading to modern historical, sociological, and psychological interpretations. SPIER.
- 426 Readings in Social Psychology (1-3) w.**  
Prerequisite, 12 hours of sociology or consent of instructor. Selected readings based on students' needs and interests with critical class discussion. GIST.
- 428 Seminar on Race Relations (2) w.**  
PIHLBLAD.
- 429 Readings in Criminology (2) w.**  
Readings in recent research materials in criminology. Reports and class discussion. PIHLBLAD.
- 438 History of Sociology (3) f.**  
Prerequisite, 12 hours of sociology or equivalent training. Traces development of objectivity in the development of sociological theory out of political, social, and moral philosophy from pre-Socratic Greeks through the nineteenth century. HABENSTEIN.
- 439 Contemporary Sociological Theory (3) w.**  
Prerequisite, 12 hours of sociology or equivalent training. Theoretical developments in sociology in Europe and the United States since 1900. Recent formulations and controversies. HABENSTEIN.
- 440 Seminar in Systematic Sociology (2) w.**  
Prerequisite, 438 or 439. Evaluation of systems of current sociological theories; problems of theoretical system building, alternative approaches to the production of sociological knowledge. HABENSTEIN.
- 442 Field Problems in Archaeology (2-8) f, w, s.**  
Prerequisite, course 342. CHAPMAN.
- 490 Research (credit to be arranged) f, w, s.**  
Advanced work leading to a thesis or dissertation. MEMBERS OF THE STAFF.

## SOILS

- 1 Introduction to Soil Science (3) f, w.**  
Soils as influenced by geography, geology, temperature, rainfall, and other natural factors. The soil as a factor in the ecology of plants, farm crops, animals, and peoples. ALBRECHT, RENNER.
- 100 Soils (5) f, w.**  
Prerequisites, Chemistry 1 and Geology 1 or 2. Soils and the principles underlying their rational management. GRAHAM, WOODRUFF.

- 101 Forest Soils (3) w.**  
Prerequisites, Chemistry 1 and Geology 1 or 2. Soils under forests, their classification, organic matter, microorganisms, and management. WOODRUFF.
- 102 Soil Surveying and Land Appraisal (3) w.**  
Prerequisite, course 100. The principles and practices of soil surveying, soil judging, and land appraisal. SCRIVNER.
- 142 Introductory Meteorology (3 or 5) f (Same as Geography 142).**  
A study of the physical processes of the atmosphere in relation to day-to-day changes of weather; weather instruments and the interpretation of daily weather maps. DECKER.
- 200 Problems (1-5) f, w, s.**  
Prerequisite, ample background in soils and allied sciences. Assigned problems in soil genesis, physics, fertility, or biology. MEMBERS OF THE STAFF.
- 201 Soil Management (3) w.**  
Prerequisite, course 100. Principles of soil management as applied to the physical improvement and the fertility maintenance of soils. SMITH.
- 265 Climates of the World (3) w. (Same as Geography 265).**  
Prerequisite, course 142 or equivalent. Study of the climatic elements, climatic classifications, and climatic regions of the world. Special attention is given to the ecological and pedological aspects of climate. Offered in alternate years. Offered in 1958-59. DECKER.
- 301 Soil Fertility and Plant Nutrition (3) f.**  
Prerequisite, course 100. Eight hours of chemistry should precede this course. The essential principles in maintaining soil fertility. ALBRECHT, GRAHAM.
- 302 Fertilizers (2) f.**  
Prerequisites, courses 100 and 201. The constituents, manufacture, and proper use of various kinds of fertilizers. SMITH.
- 305 Soil Microbiology (3) w.**  
Prerequisites, courses 100 and general bacteriology. Microorganic life of the soil in relation to soil fertility. ALBRECHT, GRAHAM, WAGNER.
- 306 Soil Development and Morphology (2) f.**  
Prerequisite, course 100. Course 102 is recommended. Soil origin and development as determined by environmental factors. Offered in alternate years. Offered in 1958-59. MARSHALL.
- 307 Physical Properties of Soils (3-5) w.**  
Prerequisites, course 100 and college physics. The physical constitution of soils in relation to soil structure, consistency, water relationships, aeration, and temperature. Offered in alternate years. Not offered in 1958-59. WOODRUFF.
- 308 Soil Conservation (3) f.**  
Prerequisite, course 100. Agricultural Engineering 221 is recommended. Conservation of soils with respect to fertility, erosion, and other deterioration. WOODRUFF.
- 350 Special Readings (1-3) f, w, s.**  
Individual study of assigned subjects. MEMBERS OF THE STAFF.
- 351 Soil Management Problems (2-3) s.**  
Prerequisite, ten credit hours in soils or the equivalent. A study of soil management with emphasis on either (a) the geology and mineralogy of soil development, or (b) soil fertility, plant nutrition, and plant composition, or (c) fertilizers and fertilizer reactions. Credit under either (a) or (b) or (c) is variable with extra readings. MEMBERS OF THE STAFF.
- 365 Agricultural Climatology (3) w (Same as Geography 365).**  
Prerequisite, course 142 or equivalent. A description of the weather factors influencing crop production. A study of the methods of analysis of climatological data and the use of micro-climatic data. Offered in alternate years. Not offered in 1958-59. DECKER.

- 391 Climatological Problems (2) w, s (Same as Geography 391).**  
Prerequisite, course 265 or equivalent. Practical applications of weather investigations relating to the effects of either on selected activities. DECKER.
- 400 Problems (2-5) f, w, s.**  
Prerequisite, one year of graduate study for non-majors in soils. Independent investigation of soil problems not terminating in a thesis. MEMBERS OF THE STAFF.
- 403 Theories and Applications in Soil Research (2) w.**  
Prerequisite, graduate standing. The development of theories underlying the major phases of soil research and the methods of conducting soil investigations. Offered in alternate years. Not offered in 1958-59. ALBRECHT.
- 404 Physical Chemistry and Mineralogy of Soils (3-5) f.**  
Prerequisite, physical or colloid chemistry. The nature and properties of the inorganic and organic soil colloids. Offered in alternate years. Not offered in 1958-59. MARSHALL.
- 410 Seminar (1) f, w.**  
Discussion of recent developments in soil science. Papers on assigned topics including research problems are presented for discussion. MARSHALL.
- 490 Soil Research (credit to be arranged) f, w, s.**  
Special investigation in soils. MEMBERS OF THE STAFF.

## SPANISH (See ROMANCE LANGUAGES)

## SPEECH AND DRAMATIC ART

*Speech and Hearing Clinic.* In courses 2, 175, 176, 333, 334, 346, 371, 372, and 376, the instructor may refer any students having unsatisfactory habits of speech to the Speech Clinic. Students enrolled in other courses in the Department of Speech and Dramatic Art may enter the Clinic. Any student enrolled in the University may be admitted at the discretion of the director. Residents of the state of Missouri may be admitted, whenever the facilities permit, on complying with regulations governing the Clinic. GARDNER, HALL, TROMBLY, WELLS.

Course 1, or the equivalent, is prerequisite to all other courses in the department except 6, 10, and 252.

- 1 Oral Communication (2) f, w.**  
Individual attention to speech problems. Required of students in Arts and Science and Engineering except those who fulfill the requirements through the speech survey. GARDNER, TROMBLY.
- 2 Voice and Articulation (2) f, w.**  
Prerequisite, course 1, or the equivalent. A study of the techniques for improving the speaking voice and of theories underlying those techniques. Attention is given to the student's articulation, pronunciation, voice quality, and general expressiveness. HALL, HUMPHREY, O'ROURKE, PRESTON.
- 6 Introduction to the Theatre (2) f, w.**  
Consideration of contributions to modern dramatic production by directors, actors, designers, and playwrights; illustrated lectures; recordings. An appreciation of the contemporary theatre. RHYNSBURGER.
- 7 Beginning Collegiate Debate (1) f.**  
Prerequisite, consent of the instructor. Procedures and practice in collegiate debating for students without any, or only limited, experience in intramural or interscholastic debating. FERNANDEZ.
- 10 British and American Oratory (2) f, w.**  
Analysis of masterpieces of British and American oratory with reference to the audience, the occasion, the speaker, and the subject. REID.

- 20 Theatre (1) f, w.**  
Practical work and participation in theatre activities under faculty supervision.
- 105 Principles of Radio and Television (3) f, w.**  
Prerequisite, course 2. Radio and television broadcasting as a special form of speaking, with consideration of the problems arising from the nature of the audience. ANGLIN.
- 106 Elementary Radio and Television Production (3) f, w.**  
Prerequisites, courses 2 and 105. The elementary principles and practices of broadcast production in varied program formats. May be taken concurrently with course 105. GRIFFITH.
- 172 Collegiate Debate (1) f.**  
Prerequisite, course 7 or consent of the instructor. Procedures and practice in collegiate debating leading to interscholastic debates. FERNANDEZ.
- 175 Public Speaking (3) f, w, s.**  
Prerequisites, course 1, or the equivalent, and sophomore standing. Lectures, assigned reading, and practice in parliamentary procedure, preparation, and delivery of speeches. BRAMMER, BROOKSHIRE, BURCH, FERNANDEZ, GOW, McCABE, MONROE, O'ROURKE, REID, VERDERBER.
- 176 Persuasive Speaking (3) f, w.**  
Prerequisite, course 175. Public and conference speaking with emphasis on the principles of logical and psychological persuasion; special attention to the individual problems of each student. BAIRD, McCURDY.
- 252 Staging Techniques for Theatre and Television (3) f, w, s.**  
Prerequisite, 5 hours of humanities. Theory and functions of stage and television settings; methods of scene construction; brief consideration of principles of stage and television lighting.
- 300 Problems (credit to be arranged) f, w.**  
Individual problems designed for students whose major interests require special attention. MEMBERS OF THE STAFF.
- 305 Basic Television Techniques (3) f.**  
Prerequisites, courses 105 and 106. The study of various types of television program production with studio practice. GRIFFITH.
- 306 Advanced Television Direction (3) w.**  
Prerequisites, course 305 and permission of the instructor. Application of principles to advanced television production and direction. GRIFFITH.
- 308 Radio, Television, and Society (3) w.**  
Prerequisite, 106 or consent of instructor. The role of broadcast media as influential factors in society; a study of the nature and extent of the impact of radio and television. GRIFFITH.
- 311 American Phonetics (3) f, w, s.**  
Analysis of the sounds of American speech with some attention to historical and comparative phonetics; standards of pronunciation; dialect studies. REID.
- 322 Speech Correction (3) w, s.**  
Systematic study of defects of speech with emphasis on articulatory problems; lectures, case presentations, laboratory demonstrations, readings. WELLS.
- 323 Speech Therapy (3) f.**  
Prerequisite, course 322 or the equivalent. Study and practice of types of therapy employed with the defective in speech. WELLS.
- 324 Speech Rehabilitation (3) w.**  
Prerequisite, course 322 or the equivalent. Study of major speech disorders with observation and practice of techniques employed in rehabilitation and in diagnostic procedures. WELLS.



- 326 Audiology (3) s.**  
Mechanism and functioning of hearing with special reference to the measurement of speech and sound perception. WELLS.
- 333 Oral Interpretation of Literature (3) f, w.**  
Communication through oral reading of prose and poetry. Planned to meet the needs of the prospective teacher of English or speech and of those interested in public speaking, theatre, and broadcasting. Conferences and classroom presentation. McCURDY.
- 334 Oral Interpretation of Literature: Advanced (3) f, w.**  
Prerequisite, course 333. Emphasis on understanding and appreciation of forms of literature. Survey and preparation of programs for reading aloud. Conferences and classroom presentation. McCURDY.
- 340 Theatre and Television Workshop (8) s only.**  
A participative laboratory in theatre and television production including STARLIGHT THEATRE and MISSOURI FORUM, a television show. GRIFFITH, RHYNSBURGER.
- 343 Dramatic Interpretation (3) f, s.**  
Study and practice of makeup; techniques of stage and television pantomime in theory and practice; improvisation.
- 346 Characterization and Acting (3) w.**  
Acting technique in theory and practice; methods and procedure in building characterization for plays; individual and group rehearsal and performance.
- 352 Elementary Design for Stage and Television (3) f.**  
Prerequisite, course 252. History of the development of the physical plant of the stage and television studio. Principles of scenic design; sketching, rendering, and scene painting techniques.
- 353 Advanced Design for Stage and Television (3) w.**  
Prerequisite, course 352. History of architectural forms and periods applicable to scenic design. Trends and styles in design and production. Problems in design and lighting.
- 361 Principles of Direction for Stage and Television (3) f, w.**  
Analysis, study, and practical demonstrations of fundamental principles of directing; consideration of all the visual aspects of directing. RHYNSBURGER.
- 364 Play Production for Stage and Television (3) w, s.**  
Prerequisite, course 361. Directing different kinds of plays for stage and television; casting, rehearsals, and production. RHYNSBURGER.
- 371 Discussion (3) f.**  
Prerequisite, course 175. Procedures in various forms of modern group discussion studied in application to current problems. BAIRD.
- 372 Debating (3) w.**  
Prerequisite, course 175. Procedures in debating with practice in analysis, briefing, and delivery. BAIRD.
- 374 Argumentation (3) w.**  
Prerequisite, course 176. Technique of persuasion by means of logical and psychological analysis. BAIRD.
- 376 Public Address (3) w.**  
Prerequisite, course 175. Principles of speech composition; persuasive speaking adapted to audience and occasion; study and delivery of deliberative, professional, social, and ceremonial speeches. BAIRD.
- 381 Principles of Rhetoric (3) f, w.**  
Prerequisite, course 175. Development of rhetoric from the time of Corax with emphasis upon Aristotle; derivation and application of standards for judging effectiveness in speaking. REID, BAIRD.

- 391 Beginning Playwriting (3) f, w.**  
Study and practice of the fundamentals of playwriting with special emphasis upon the dramatic form of the one-act play and its adaptability to the mediums of stage, radio, and television. RHYNSBURGER.
- 393 Radio and Television Playwriting (3) w.**  
Basic techniques of writing drama for the aural medium with adaptation for television. RHYNSBURGER.
- 400 Problems (credit to be arranged) f, w, s.**  
Individual work not leading to dissertation. MEMBERS OF THE STAFF.
- 401 Speech Bibliography and Method (3) f, s.**  
The discovery, delimitation, and investigation of graduate problems in the field of speech. BAIRD.
- 405 Television Speaking (3) f.**  
Theory and practice of speechmaking applied to television programming. GRIF-FITH.
- 406 Television Drama (3) w.**  
Theory and practice of the arts of production utilized in television drama. RHYNSBURGER.
- 411 Comparative Phonetics (3) w.**  
Review of the sound systems of French, German, Spanish, and other languages with application to problems of foreign accent. WELLS.
- 422 Speech Pathology (3) f, s.**  
Prerequisite, course 322 or the equivalent. Studies in the causes, symptoms, and management of disorders of speech; review of current theories and of recent experimental work. WELLS.
- 434 Theories of Oral Interpretation (3) w.**  
Prerequisite, course 333 or 334. Examination of the basic philosophies of the interpretation of literature. MCCURDY.
- 450 Research (credit to be arranged) f, w, s.**  
Research equivalent to that done for dissertation but not leading directly to the preparation of a thesis. MEMBERS OF THE STAFF.
- 462 Theories of Dramatic Production (3) w.**  
Prerequisite, course 364. Methods of producing tragedy, melodrama, comedy, and farce. Influence of styles of directing on interpretation and presentation. RHYNSBURGER.
- 472 Forensics (3) w.**  
Prerequisite, course 374. Analysis and criticism of topics and propositions with review of current bibliography and materials. BAIRD.
- 485 Rhetorical Criticism (3) f.**  
Prerequisite, course 381. A study of rhetorical theory in principles and practice; application of categories of rhetorical criticisms to periods and movements in public address. REID.
- 487 Philosophic Foundations of Speech (3) w.**  
Examination and evaluation of research and trends in theories and practices in representative areas of speech. BAIRD.
- 488 History and Criticism of British Oratory (3) w.**  
Prerequisite, course 381. A study of structure, modes of persuasion, and style in typical British oratory from the seventeenth century to the present. REID, BAIRD.
- 489 History and Criticism of American Oratory (3) f.**  
Prerequisite, course 381. The history of public speaking in America with emphasis upon the relation of historical development to current problems in criticism of public address. BAIRD.

**490 Research (credit to be arranged) f, w, s.**

Candidates for advanced degrees will meet with advisers for consultation on their individual problems. GRIFFITH, REID, RHYNSBURGER, WELLS.

**SURGERY****148 First Aid (1) f.**

A course emphasizing the fundamentals of first aid for first-year medical students. STEPHENSON, MEMBERS OF THE STAFF.

**198 Introduction to Surgery (1) w.**

General principles of surgery are emphasized especially as they apply to surgery of the ambulatory patient. Sixteen lecture hours are devoted to practical sessions covering diagnostic surgical procedures, applications of plaster casts, bandages and dressings, resuscitative procedures, and an introduction to operating room technique. For second-year students. STEPHENSON, MEMBERS OF THE STAFF.

**Surgery, Third Year**

General surgery is taught by means of conferences, lectures, ward rounds, and seminars and through attendance on the surgical wards and in surgical clinics. The student is assigned a particular patient on his arrival in the outpatient surgery clinic and he continues close contact with the patient during his hospital stay, in the operating room and postoperative recovery room, during his convalescence, and following his return for an outpatient surgical visit. Students assist in the operating room. Included in the course of study are series of conferences on oncology and surgical pathology. Special clinics include general surgery, neurological surgery, ophthalmology, otolaryngology, plastic surgery, urology, and orthopedics. An introduction to operative technique is taught in a weekly canine surgery laboratory. Offered in rotation to one-third of the junior class for twelve weeks. STEPHENSON, MEMBERS OF THE STAFF.

**Surgery, Fourth Year**

Instruction in surgery is continued in the fourth year with increasing emphasis on the surgical specialties. This will include mornings spent in anesthesia as well as pre- and post-operative anesthesia rounds. Courses in pre- and post-operative care, thoracic and cardiovascular surgery, and surgical anatomy are included. The student is given considerably more responsibility in the care of his patient, under appropriate supervision. Offered to one-fourth of the senior class in rotation during a period of twelve weeks. STEPHENSON, MEMBERS OF THE STAFF.

**Surgery Elective**

Any student in his elective period may make special arrangements with the department to do work on a subject of his interest. Electives in canine surgery, peripheral vascular and cardiovascular surgery, anesthesia, plastic surgery, gastrointestinal physiology, and special problems in neurosurgery.

Advanced graduate and postgraduate instruction in surgery both short-term and long-term, varying from one to four years in duration, are available to qualified physicians by a special arrangement.

**VETERINARY ANATOMY****100 Veterinary Gross Anatomy (7) f.**

A study of the gross structures of the dog, from which comparisons are made and applied to other domestic animals, consisting of osteology, myology, arthrology, angiology, splanchnology, and neurology. WEINMAN.

**101 General Veterinary Science (3) f, w.**

For agricultural students. Prerequisite, Zoology 1. An elementary study of the anatomy and physiology of domestic animals and the prevention of common diseases of farm animals. MEMBERS OF THE STAFF.

- 105 Veterinary Histology (3) f.**  
A study of the microscopic structure of the body to cover cells, tissues and organs, histogenesis, embryogenesis, and structure. CRENSHAW.
- 110 Veterinary Gross Anatomy (7) w.**  
A continuation of 100 with greater emphasis on a study of comparative anatomy of the common domestic animals. WEINMAN.
- 115 Veterinary Histology (3) w.**  
A continuation of 105. CRENSHAW.
- 172 Veterinary Applied Anatomy (1) w.**  
A review of systematic anatomy as it pertains to clinical application, physical diagnosis, and surgery. WEINMAN.
- 200 Problems (credit to be arranged) f, w, s.**  
Assignment of special problems for training in research in veterinary anatomy or histology. CRENSHAW, WEINMAN.
- 300 Problems (credit to be arranged) f, w, s.**  
Assignment of special problems for training in research in veterinary anatomy or histology. CRENSHAW, WEINMAN.
- 315 Advanced Veterinary Anatomy (5) f, w, s.**  
Prerequisite, approval of department chairman. Regional, systematic, and topographic dissections as related to veterinary medicine and surgery.

## VETERINARY BACTERIOLOGY AND PARASITOLOGY

- 107 Poultry Sanitation and Disease Prevention (3) w.**  
Prerequisites, Veterinary Anatomy 101 and Botany 202, General Bacteriology. Preventive measures for control of poultry diseases and parasites. DURANT.
- 124 Veterinary Bacteriology (3) f.**  
A general course to acquaint the student with the fundamentals and to study various representative forms in relation to bacteriological techniques in veterinary medicine. McDUGLE, SHELTON.
- 126 Veterinary Parasitology (5) f.**  
General introduction to parasitology, a study of veterinary proto-zoology, morphological and biological aspects of helminthology, and a brief review of external parasites. SHELTON.
- 132 Veterinary Bacteriology (5) w.**  
Pathogenic microorganisms of farm animals and their relation to public health. Reactions to various antigens and production methods of veterinary biologics. Virology is included with consideration given to filterable viruses important in veterinary medicine. McDUGLE, SHELTON.
- 134 Veterinary Parasitology (3) w.**  
A detailed study of the parasites of each domestic animal. Special emphasis is placed on the parasites of public health importance. SHELTON.
- 200 Problems (credit to be arranged) f, w, s.**  
Assignment of special problems for training in research in veterinary bacteriology. MEMBERS OF THE STAFF.
- 300 Problems (credit to be arranged) f, w, s.**  
Prerequisite, a degree in veterinary medicine. MEMBERS OF THE STAFF.
- 301 Research Methods in Veterinary Parasitology (3) w.**  
Prerequisite, graduate standing in biological science or veterinary medicine. The study and application of methods used for parasitological research in domestic animals. SHELTON.

**410 Seminar (1-2) f, w.**

Study of researches in poultry diseases. Open to graduate students in veterinary medicine and to graduate students specializing in animal, dairy, and poultry husbandry. MEMBERS OF THE STAFF.

**490 Research (credit to be arranged) f, w, s.**

An inquiry into the nutrition and metabolic activities of disease producing agents of farm animals and poultry. MEMBERS OF THE STAFF.

**VETERINARY MEDICINE AND SURGERY****140 Veterinary Clinical Orientation and Diagnosis (2) w.**

Methods and procedures employed for determining the condition and health of the patient. NIEMEYER.

**142 Veterinary Medicine (3) f.**

Prerequisites, Veterinary Bacteriology and Parasitology 124 and 132. The diagnosis and treatment of diseases and parasites of poultry. MCDUGGLE.

**148 Veterinary Medicine (5) f.**

The study of diseases of small animals consisting of diagnosis, prognosis, treatment, care, breeds, and type. NIEMEYER.

**152 Veterinary Surgery (3) f.**

The basic principles of surgery with laboratory applications. HOWELL.

**158 Veterinary Clinic (4) f.**

A practical application of diagnosis and treatment of clinical patients. MEMBERS OF THE STAFF.

**164 Veterinary Radiology (1) w.**

Basic fundamentals in the use of X-ray equipment. CASE.

**166 Veterinary Medicine (5) f.**

A detailed study of the diseases of large animals including diagnosis, prognosis, treatment, and care. MCGINITY.

**168 Veterinary Surgery (3) w.**

A continuation of course 152 including small animal surgery and ophthalmology. HOWELL.

**178 Veterinary Clinic (4) w.**

Continuation of course 158. MEMBERS OF THE STAFF.

**182 Veterinary Professional Orientation (1) f.**

Medical economics, applied veterinary ethics, and laws pertaining to the practice of veterinary medicine. GROTH.

**184 Veterinary Surgery (3) f.**

Continuation of courses 152 and 168 with emphasis on large animals. EBERT.

**186 Veterinary Clinic (8) f.**

Ambulatory clinic required of senior students. Advanced application and continuation of course 178. MEMBERS OF THE STAFF.

**188 Veterinary Obstetrics and Reproductive Diseases (5) f.**

Diseases of the reproductive organs, their causes, control, treatment; and normal and abnormal parturition. BIERSCHWAL, MCGINITY.

**192 Veterinary Clinic (15) w.**

Continuation of course 186. MEMBERS OF THE STAFF.

**198 Veterinary Medicine (5) w.**

The study of infectious diseases of farm animals including their relationship to public health. MCGINITY.

- 310 Advanced Techniques in Radiology (credit to be arranged) f, w, s.**  
Prerequisite, a degree in veterinary medicine. Special application to domestic animals. CASE.
- 320 Advanced Surgical Techniques (credit to be arranged) f, w, s.**  
Prerequisite, a degree in veterinary medicine. Special application to small animals. HOWELL, EBERT.
- 450 Research (credit to be arranged) f, w, s.**  
Open to graduate students who have the requisite preparation.
- 490 Research (credit to be arranged) f, w, s.**  
Open to graduate students who have the requisite preparation.

## VETERINARY PATHOLOGY

- 108 Stock Farm Sanitation and Disease Prevention (3) f, w.**  
Prerequisites, Veterinary Anatomy 101 and Botany 202, General Bacteriology. Preventive measures for diseases and parasites of farm animals. RODABAUGH.
- 128 Veterinary Pathology (5) f.**  
A detailed study of disease manifestations of the body as caused by various disease producing agents. ELDER, KINTNER.
- 136 Veterinary Pathology (5) w.**  
Continuation of course 128. Special attention is given specific body tissues and organs. ELDER, KINTNER.
- 144 Veterinary Clinical Pathology (2) f.**  
The application of laboratory methods in the diagnosis of disease. BERRIER.
- 162 Veterinary Meat Inspection (3) w.**  
Meat and meat products in relation to public health including basic phases of meat inspection. ELDER, WRIGHT.
- 200 Problems (credit to be arranged) f, w, s.**  
Assignment of special problems for training in research in veterinary pathology. ELDER.
- 300 Problems (credit to be arranged) f, w, s.**  
Prerequisite, a degree in veterinary medicine. MEMBERS OF THE STAFF.
- 305 Pathological Technique (credit to be arranged) f, w.**  
Prerequisite, 10 hours of chemistry. A study of special methods and techniques in the fixation, preparation, and staining of pathological specimens. ELDER, KINTNER.
- 410 Seminar (1-2) f, w.**  
Study of researches in animal diseases. Open to graduate students in veterinary medicine and to graduate students specializing in animal and dairy husbandry. ELDER.
- 420 Advanced Histo-Pathology (5) f, w.**  
Advanced microscopical study of pathological tissue. Open to graduates in veterinary medicine. MEMBERS OF THE STAFF.
- 430 Advanced Clinical Pathology (4) f.**  
Laboratory techniques and their interpretation in relation to animal diseases. Open to graduates in veterinary medicine. MEMBERS OF THE STAFF.
- 490 Research (credit to be arranged) f, w, s.**  
Experimental investigation of animal disease and of measures of prevention and treatment. Open to graduate students who have the requisite preparation. MEMBERS OF THE STAFF.

**VETERINARY PHYSIOLOGY AND PHARMACOLOGY**

- 120 Veterinary Physiology (5) w.**  
The normal physiological functions of nervous, circulatory, and respiratory systems. DALE, ALLEN.
- 121 Animal Physiology (3) w.**  
Prerequisite, Veterinary Anatomy 101. Introduction to the physiology of the nervous, circulatory, respiratory, digestive, excretory, and reproductive systems. For undergraduates not in the School of Veterinary Medicine. ALLEN.
- 130 Veterinary Physiology (5) f.**  
The normal physiological functions of nutrition, reproduction, and the special senses. DALE, ALLEN.
- 138 Veterinary Pharmacology (3) w.**  
A study of pharmacy and pharmacodynamics. UREN.
- 146 Veterinary Pharmacology and Therapeutics (3) f.**  
A study of drugs important in veterinary medical practice and their actions. UREN.
- 200 Problems (credit to be arranged) f, w, s.**  
Assignment of problems for training in research in veterinary physiology and pharmacology. UREN, DALE, ALLEN.
- 220 Veterinary Physiology (5) w.**  
The functions of the nervous, circulatory, respiratory, and excretory systems. Demonstrated with laboratory animals and man. DALE, ALLEN.
- 230 Veterinary Physiology (5) f.**  
Continuation of 220. Digestion, metabolism, glands of internal secretion, and reproduction. DALE, ALLEN.
- 401 The Internal Environment (3) f.**  
Volume, composition, and exchange of body fluids. MEMBERS OF THE STAFF.
- 402 Homeostatic Mechanisms (3) w.**  
Reactions of the animal body to environmental changes. MEMBERS OF THE STAFF.
- 450 Research (credit to be arranged) f, w, s.**  
Experimental investigations of the physiology of domestic animals. Open to graduate students who have the requisite preparation. MEMBERS OF THE STAFF.
- 490 Research (credit to be arranged) f, w, s.**  
Experimental investigations of the physiology of domestic animals. Open to graduate students who have the requisite preparation. MEMBERS OF THE STAFF.

**ZOOLOGY**

- 1 General Zoology (5) f, w, s.**  
Animal form, function, evolution, and interrelationships. The social implications of scientific attitudes and of zoological technology. HAGGIS.
- 50 Experimental Zoology (3) f.**  
Prerequisite, course 1. An introduction to experimental methods including laboratory participation in examples of classical experiments in different branches of zoology. FLEMING, MEMBERS OF THE STAFF.
- 140 General Genetics (3) f (Same as Botany 140).**  
Prerequisites, 5 hours zoology or botany. The principles of inheritance in plants and animals. Heredity and environment; linkage, crossing over, and chromosome maps. Genes and development; heredity in populations; natural and artificial selection. WHITE.

- 141 Genetics Laboratory (2) f (Same as Botany 141).**  
Prerequisite or concurrent, Zoology 140 lectures. Genetic ratios, linkage, and crossing over. Sex-linked inheritance. Use of plant and animal materials in genetical experiments. GOWANS.
- 150 Human Heredity (3) f.**  
Prerequisite, 5 hours in biology. The principles of human inheritance as encountered in the study of families and pedigrees and of large populations. WHITE.
- 200 Comparative Anatomy of Vertebrates (5) w.**  
Prerequisite, course 1. A comparative study of the organ-systems of a series of vertebrates. CONAWAY.
- 222 Vertebrate Embryology (5) f.**  
Prerequisites, course 1; course 200, Comparative Anatomy, of Vertebrates, recommended. A comparison of the basic patterns of development in vertebrates. CONAWAY.
- 230 Invertebrate Zoology (5) f.**  
Prerequisite, course 1. Structure, ecology, and phylogeny of the more important invertebrates.
- 300 Problems (1-5) f, w, s.**  
Individual work under supervision designed to supplement regularly organized courses in zoology and as an introduction to research. MEMBERS OF THE STAFF.
- 302 Evolution (3) w.**  
Prerequisites, Zoology 1 or Botany 1 and five additional hours from zoology, botany, or geology; or upperclass standing. A survey of the various processes involved in organic evolution and the underlying genetic mechanisms. WHITE.
- 303 Microtechnique (3) f.**  
Prerequisite, junior standing. Methods and techniques used in the preparation of tissues for microscopic examination. CONAWAY.
- 304 Problems and Materials in the Teaching of Zoology (2) f.**  
Prerequisites, course 1 and senior or graduate standing. Objectives and organization of general zoology and related courses. Problems, materials, and techniques particular to the teaching of zoology.
- 310 Parasitology (3) f.**  
Prerequisite, 8 hours in zoology. A general survey of animal parasites with emphasis on morphology, life history, and host-parasite relationships.
- 322 Experimental Embryology (3) w.**  
Prerequisite, course 222 or equivalent training. A study of the developmental processes as revealed by experimental methods. FLEMING.
- 331 Comparative Animal Physiology (3) w.**  
Prerequisite, course 1. Functional differentiation of animal groups, its adaptive and evolutionary significance. FLEMING.
- 333 Histology of Vertebrates (4) w.**  
Prerequisites, 5 hours of zoology and junior standing. Microscopic anatomy of vertebrate tissues and organ-systems. CONAWAY.
- 355 Biology of Animal Populations (3) w.**  
Prerequisites, course 1 and senior or graduate standing. Principles and problems of population ecology with illustrations of basic research techniques used. A large segment of the course will consist of an examination of original publications.
- 360 Biometry (3) f.**  
Prerequisite, Mathematics 7 or 10. An introduction to the statistical methods most commonly used in biology.



- 365 Comparative Endocrinology (3) f.**  
Prerequisites, 8 hours zoology and senior or graduate standing. An examination of endocrine systems and their functions as they occur throughout the animal kingdom, with special emphasis on the invertebrates. FLEMING.
- 371 Cellular Physiology (3-5) f.**  
Prerequisites, biology, 10 hours; organic chemistry, 5 hours; physics, 5 hours. The cell as a functional unit. Lectures alone may be taken by graduate students or by consent of the instructor. FLEMING.
- 380 Chromosome Cytology (3-4) f (Same as Botany 380).**  
Prerequisite, course 140 or 150, or equivalent. Mitosis and meiosis; chromosome structure; salivary gland chromosomes. Chromosomal rearrangements, natural and induced, and their role in populations. Cytotaxonomy in plants and animals. Polyploidy. Sex chromosomes and the cytology of sex determination. Apomixis and parthenogenesis. WHITE.
- 400 Problems (1-5) f, w, s.**  
Research not expected to terminate in a thesis or advanced study in special subjects. MEMBERS OF THE STAFF.
- 410 Seminar in Zoology (1) f, w.**  
Discussions of investigations in zoology by qualified students, instructors and guests. CONAWAY, MEMBERS OF THE STAFF.
- 412 Seminar in Genetics (1) f, w (Same as Botany 412).**  
Discussion of current investigation in genetics. A reading knowledge of German and French is desirable. WHITE.
- 420 Endocrinology (3) f (Same as Dairy Husbandry 420.)**  
The hormones of the pituitary and the endocrine glands with special reference to their influence upon growth, reproduction, and milk secretion. TURNER.
- 422 Advanced Experimental Embryology (3) f.**  
Prerequisites, courses 322 and 330, or equivalent training. Recent developments in cellular structure and physiology as applied to developmental processes.
- 423 Advanced Experimental Embryology Laboratory (3) w.**  
Development of special techniques for research in experimental embryology.
- 470 Advanced Cellular Physiology (3) w.**  
Prerequisite, course 330 or equivalent training. Intensive discussion of special topics in continuation of course 330. FLEMING.
- 471 Advanced Cellular Physiology Laboratory (3) w.**  
Prerequisite, course 330 or equivalent training. Designed to give the student training in the common techniques used in cellular physiology. FLEMING.
- 490 Research in Zoology (credit to be arranged) f, w, s.**  
Investigation of unsolved problems undertaken with the expectation that the work will terminate in a thesis. A reading knowledge of French and German is essential. MEMBERS OF THE STAFF.

## Field Zoology

### *Including Wildlife Conservation and Management*

Students who expect to specialize in wildlife conservation and management should confer with Mr. Elder or Mr. Campbell in their freshman year.

- 5 Ornithology (3) w.**  
Prerequisite, 5 hours in biology or consent of instructor. Structure, identification, habits, and importance of birds of this region. Field work, lectures, and laboratory study. ELDER.

- 60 Principles of Wildlife Conservation (3) f.**  
The biological principles involved in the conservation of animal life under natural conditions. CAMPBELL.
- 210 Field Zoology (3) f.**  
Prerequisites, 10 hours in zoology, junior standing. An introduction to the field and systematic study of the local fauna both invertebrate and vertebrate. WITT.
- 215 Conservation for Teachers (3) s.**  
Methods and source materials effective in teaching conservation. Emphasis is given to our use and misuse of the renewable resources and the effect upon wildlife and man. MEMBERS OF THE STAFF.
- 301 Problems (1-5) f, w, s.**  
Individual work under supervision. MEMBERS OF THE STAFF.
- 305 Animal Ecology (4) w.**  
Prerequisites, Zoology 1 and either Botany 1 or Zoology 230. Biological principles governing the distribution of animals and their relations to their environment. WITT.
- 309 Mammalogy (3) f.**  
Prerequisite, 8 hours in zoology or equivalent training. Taxonomy, distribution, structure, habits, and importance of mammals with special emphasis upon those of the central United States. ELDER.
- 311 Ichthyology (3) w.**  
Prerequisite, 8 hours in zoology or equivalent training. The taxonomy, distribution, life history, and ecology of fishes with emphasis upon those occurring in Missouri. WITT.
- 318 Research Methods in Hydrobiology (4) f.**  
Prerequisites, zoology 10 hours, chemistry 10 hours, physics 5 hours. Field and laboratory techniques in limnology and fisheries investigations. WITT.
- 401 Problems (1-5) f, w, s.**  
Research not expected to terminate in a thesis or advanced study in special aspects of field zoology or of wildlife conservation and management. MEMBERS OF THE STAFF.
- 405 Limnology (3) f.**  
Prerequisite, graduate standing or consent of instructor. Biology, physics, and chemistry of inland waters. CAMPBELL.
- 411 Seminar in Wildlife Conservation and Management (1) f, w.**  
Presentation and discussion of biological problems related to this field by instructors and students. MEMBERS OF THE STAFF.
- 415 Wildlife Management (5) f.**  
Prerequisites, Zoology 305 and Botany 306 or equivalent. Backgrounds of land use and ecological forces basic to wildlife management. ELDER.
- 418 Fisheries Management (2-3) w.**  
Prerequisite, Zoology 318 or consent of instructor. Theory and practice in present day fisheries management. The student may elect to take lectures alone. CAMPBELL.
- 491 Research in Field Zoology (credit to be arranged) f, w, s.**  
Investigation of unsolved problems in field zoology or in wildlife conservation and management, undertaken with the expectation that the work will terminate in a thesis. MEMBERS OF THE STAFF.





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