

# GRADUATE SCHOOL

HERMON L. SLOBIN, *Dean*

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## OBJECTIVES

The Graduate School is designed to meet the needs of superior students for a more advanced training than may be obtained in an undergraduate curriculum. Graduate work is offered by competent members of the University Departments of instruction and research. Administrative functions and supervision of advanced students are delegated to the Dean of the Graduate School and the Committee on Graduate Study.

The Graduate work of students in education is designed to supplement their undergraduate studies in such manner as to prepare them most effectively for the professions of elementary and secondary school teaching, and of public school administration and supervision.

Graduate Students are defined as those who meet the requirements for admission to the Graduate School (see Rules and Regulations under Admission) and are registered for *more than half their program for graduate credit.*

## ADMISSION

Admission to the Graduate School may be granted to graduates of all colleges and universities of approved standing provided their undergraduate records are satisfactory. Before entering upon graduate work in any division the applicant must present evidence to the effect that he has had the necessary prerequisite training that will enable him to pursue with profit the courses desired. A candidate for admission who intended to work for a Master's Degree must have had an undergraduate average of not less than  $2\frac{1}{2}$  honor points or the equivalent, throughout his entire program of study. This requirement may be waived upon petition to the Executive Council in the case of a mature college graduate who gives evidence of adequate professional experience or advanced study since graduation from an undergraduate program. Admission to the Graduate School does not imply admission to candidacy for the degree. A candidate for admission who does not intend to be a candidate for a degree may enroll in the Graduate School for any courses for which he has had sufficient preparation. No Graduate Student is admitted to candidacy for a degree until he has been in residence a sufficient time to enable his instructors to judge his ability to carry on graduate work. Generally,



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this period of time shall be not less than one semester or two summer sessions. Admission to candidacy for a degree will be determined by the Executive Council.

### REGISTRATION

A student desiring to register for Graduate study must submit to the Dean of the Graduate School the official application for admission to Graduate study. Blanks for this purpose may be obtained from the Dean's office. A student's program of courses must be approved by his Adviser and the Dean.

### TUITION\*

The tuition fee is \$160 a year for residents of New Hampshire and \$360 a year for non-residents.

Any student registering for 8 credits or more shall pay the full semester tuition. Any student registering for less than 8 credits shall pay \$6.00 per credit hour, if a resident; and \$13.00, if a non-resident. A Graduate Assistant registering for 9 credits or less shall pay \$3.00 per credit hour, and if registered for more than 9 credits, shall pay \$80 per year.

### DEGREES

*Requirements.*—The Graduate School will grant degrees as follows: Master of Arts, Master of Science, and Master of Education.

*Credits.*—For the degree in arts and in science, 30 semester credits must be earned. Of these, at least 18 must be taken in courses offered by the major department, and any major department may prescribe for its own students the subjects in which the remaining credits are to be earned. *For the degree of Master of Education see departmental statement.*

*Residence.*—A minimum of one full academic year, or five summer sessions of six weeks each will be required of all candidates for the Master's Degree. If the work is taken in the regular academic year no exception to this residence requirement will be permitted.

If the work is taken in summer sessions in this University, the following variations are permissible: The time occupied in earning 6 credits elsewhere in an approved graduate school may be accepted in lieu of one summer session of residence. These regulations make it possible to complete the residence requirements in three summer sessions.

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\*For tuition rates in Summer School see Summer Sessions Issue of the University Bulletin Series.

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If the candidate offers acceptable credits earned at this University in Saturday courses, or in extra-mural courses, two semester courses of such work will be counted as the equivalent of one summer session in residence.

*Examinations.*—A final oral or written examination may be demanded by any department of its candidates for the Master's Degree, but the details of the departments requirements in this matter must be approved by the Executive Council.

*Grades.*—The passing grade in the Graduate School is C. Candidates for a degree must earn a grade of B, or better, in three-fourths of the work for which a letter grade is given.

*Graduate Credits.*—Graduate credits may be earned only in courses numbered 51 to 199, but they will not be given in any courses so numbered which admit Freshmen or Sophomores. For any Master's Degree, except that of Ed.M., the candidates must earn not less than 12 semester credits in the courses primarily for Graduate Students, numbered 101-199, or thesis, and not more than 10 semester credits in courses outside of those offered by his "major" division.

*Graduate Credits for Senior Students.*—Senior students must register in the Graduate School for any work for which they may subsequently apply for graduate credit.

*Transfer credits.*—A candidate for any Master's Degree may present for credit a maximum of 6 credits earned elsewhere at an approved graduate school.

*Thesis.*—A thesis will be required of all candidates for the Master's Degree in Arts and in Science and may be submitted by the candidates for the Master's Degree in Education. The number of *thesis credits* may vary from 6 to 10, subject to the approval of the major department. (For *thesis regulations* see Bulletin of the Graduate School.)

*Special Requirements.*—The student must meet the special requirements of his major department, and his program must be approved by his adviser who will be designated by the Dean. (For the special Departmental Requirements see Bulletin of the Graduate School.)

### HONORARY FELLOWSHIPS FOR VISITING SCHOLARS

Properly qualified scholars who may desire temporarily the privileges of the library and research facilities of the University and who are not candidates for a degree may, upon recommendation of the Dean of the Graduate School and the approval of the President of the University, be appointed Honorary Fellows without stipend. Hon-



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orary Fellows shall not be required to pay any charges except, possibly, the cost of unusually expensive supplies or equipment.

### ASSISTANTSHIPS AND SCHOLARSHIPS

Graduate Students may be employed as Graduate Assistants for (a) Research, (b) Teaching, and (c) Service, at \$60, \$80, and \$100 per month, depending upon the student's program of hours of study and hours of service. Inquiries regarding Assistantships should be addressed to the Head of the Department concerned.

A limited number of superior students who are legal residents of New Hampshire are awarded exemption from tuition. These awards are subject to the maintenance of a high scholarship record in the Graduate School and may be revoked at the end of any semester if the student does not merit such exemption for the subsequent semester.

### SPECIAL REGULATIONS FOR VETERANS

Men and women released from the Armed Forces will be permitted to transfer not more than 12 of the 30 credits required for a degree under the following conditions:

1. The credits must be transferred from approved graduate schools or other approved official agencies.
2. In each case, transferred credits will be accepted and evaluated by a committee consisting of the Dean of the Graduate School, the Dean of Student Administration, and the Chairman of the Department concerned.
3. The remaining credits must be earned in residence.

### INFORMATION

For detailed information concerning admission, requirements for degrees, courses open to graduate students, and other matters not covered above, interested persons are invited to write to the Dean of the Graduate School.

# DESCRIPTION OF COURSES

(Departments Alphabetically Arranged)

The title of the course is given in small capital letters. The numeral designates the particular course. Odd numerals indicate courses normally offered in the first semester; even numerals indicate courses normally offered in the second semester. Numerals enclosed in parentheses indicate that a course is repeated in the semester following. Thus course 1 (1) is offered in the first semester and is repeated in the second semester.

Courses numbered 1-50 cannot be counted for graduate credit. Courses numbered 51-100 are for undergraduate and graduate students.

Following the title is the course description and the name of the instructor.

The next paragraph gives the following information in the order indicated: (1) prerequisites, if any; (2) the number of hours of recitations or laboratory periods required each week; (3) the number of semester credits the course will count in the total required for graduation. Lectures and recitations are fifty-three minutes in length. Laboratory periods are usually two and one-half hours in length.

Abbreviations have been employed to indicate the number of hours of work required of students in lecture, recitation, and laboratory, and the number of credits given for satisfactory completion of each course. These abbreviations should be interpreted as follows:

Cr. ....	Semester hour credit
Lab. ....	Laboratory
Lec. ....	Lecture
Prereq. ....	Prerequisite
Rec. ....	Recitation

All courses (unless otherwise marked) are open to students who have passed the prerequisites.

An elective course will be given only when there is a minimum of five students registered therefor.

If the numerals designating a course running through both semesters are connected by a hyphen, the first semester, or its equivalent, is a prerequisite for the second semester. If the numerals are separated by a comma, properly qualified students may take the second semester without having had the first.

Students must register for the number of credits or within the range of credits shown in the Catalogue description of a course.



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## ACCOUNTING

(See ECONOMICS, page 201.)

### AGRICULTURAL AND BIOLOGICAL CHEMISTRY

THOMAS G. PHILLIPS, *Professor*; STANLEY R. SHIMER, *Associate Professor*; HELEN J. PURINTON, *Assistant Professor*; ARTHUR E. TEERI, *Assistant Professor*; MARGARET E. LOUGHLIN, *Assistant*.

1. ORGANIC AND BIOLOGICAL CHEMISTRY. An introduction to Organic Chemistry and a brief survey of Biological Chemistry. Mr. Shimer, Mr. Phillips. Prereq.: Chem. 2. 3 lec.; 2 lab.; 5 cr.

2. PLANT CHEMISTRY. The chemistry of plant growth, soils, and fertilizers. Mr. Phillips. Prereq.: Agr. Chem. 1 or its equivalent. 2 lec.; 1 lab.; 3 cr.

4. ANIMAL NUTRITION. The chemistry of animal nutrition. Mr. Shimer. Prereq.: Agr. Chem. 1 or its equivalent. 2 lec.; 1 lab.; 3 cr.

6. CHEMISTRY OF FOOD AND NUTRITION. The chemistry of food materials and of digestion, absorption, metabolism, and excretion. Mr. Shimer, Miss Purinton. Prereq.: Agr. Chem. 5 or its equivalent. 2 lec.; 1 lab.; 3 cr.

51-52. PHYSIOLOGICAL CHEMISTRY. The chemistry of fats, carbohydrates, and proteins; colloids, enzyme action, digestion, metabolism, and excretion. The qualitative and quantitative examination of blood and urine. Mr. Shimer, Mr. Teeri. Prereq.: Satisfactory preparation in Organic Chemistry and Quantitative Analysis. 3 lec.; 2 lab.; 5 cr.

53-54. AGRICULTURAL ANALYSIS. A study of the methods of analysis of soils, fertilizers, feeding stuffs, and other products important in Agriculture. Mr. Phillips, Mr. Shimer. Prereq.: Satisfactory preparation in Organic Chemistry and Quantitative Analysis. 1 lec.; 3 lab.; 4 cr. (Given in alternate years; not offered in 1947-1948.)

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. ADVANCED BIOCHEMISTRY. The preparation, composition, and analysis of carbohydrates, fats, and proteins. Discussions and laboratory. Mr. Phillips and Mr. Shimer. Prereq.: Satisfactory preparation in Analytical, Organic, and Biological Chemistry. 4 cr.

103, 104. SPECIAL PROBLEMS. Conferences and library and laboratory work on special phases of chemistry in its relation to agriculture and biology. Mr. Phillips, Mr. Shimer, Miss Purinton, Mr. Teeri. Prereq.: Satisfactory preparation in Analytical, Organic, and Biological Chemistry. Subject matter and credits to be arranged.

# AGRICULTURAL ECONOMICS

## AERONAUTICS

(See MECHANICAL ENGINEERING, page 253.)

## AGRICULTURAL ECONOMICS

HARRY C. WOODWORTH, *Professor*; HAROLD C. GRINNELL, *Associate Professor*; WILLIAM BREDO, *Assistant Professor*.

7. FARM ACCOUNTING. The principles of double-entry accounting applicable to the farm business. Mr. Grinnell. Elective for Juniors and Seniors in Agriculture. 1 lab.; 2 cr.

11. ECONOMICS OF THE AGRICULTURAL INDUSTRY. Production and distribution problems of the agricultural industry, the nature of farming costs, agricultural prices, farm credit, land utilization, Federal and State action programs, and agricultural policy. Mr. Woodworth. Elective for Juniors and Seniors. 3 lec.; 3 cr.

14. FARM MANAGEMENT. Business aspects concerned with the organization and management of a farm as a business unit. Practical problems of reorganization will be carried out on at least two near-by farms. Mr. Grinnell. Elective for Seniors in Agriculture. 2 lec.; 1 lab.; 3 cr.

52. CO-OPERATIVE BUSINESS. Stress is placed on the organizational, legal, and financial problems of farmers' business corporations engaged in buying and selling. Selected problems of general agricultural marketing are integrated with the course content. Mr. Grinnell. Elective for Juniors and Seniors. 3 lec.; 3 cr.

56. AGRICULTURAL MARKETING. The market structure responsible for the distribution of agricultural products will be reviewed briefly. Primary emphasis will be placed on the theory of price determination, public and private administration of prices, and analysis of agricultural prices. Mr. Bredo. 3 lec.; 3 cr.

60. AGRICULTURAL POLICY. Public policies involving conservation and agriculture will be studied and appraised. Production and price control, land-use problems, soil conservation, forest regulation, the objectives and effect of various action programs. Mr. Woodworth. Elective, subject to approval of instructor. 3 lec.; 3 cr.

67, 68. SPECIAL PROBLEMS. Special assignments in readings and problems to satisfy students' needs. Mr. Woodworth, Mr. Grinnell. 1 to 3 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101-102. ADVANCED FARM MANAGEMENT. Principles and problems



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of farm management as applied to the organization and operation of individual farms. Mr. Grinnell. 3 cr.

103. **ADVANCED AGRICULTURAL PRICES.** The history of agricultural prices and the major factors determining prices. Methods of price analysis. Assigned readings and conferences. 3 cr.

106. **ADVANCED LAND UTILIZATION AND AGRICULTURAL POLICY.** An appraisal of national and local policies and proposed action programs affecting American agriculture. Assigned readings and conferences. Mr. Woodworth. 3 cr.

181-182. **READING AND RESEARCH IN AGRICULTURAL ECONOMICS.** With the advice and consent of the instructor, a student prepared by training and experience to do independent work may register for a reading and research course. The student will undertake assigned problems and readings under the guidance of the instructor.

### AGRICULTURAL ENGINEERING

GEORGE M. FOULKROD, *Associate Professor*; PAUL A. GILMAN, *Instructor.*

5-6. **BASIC APPLICATIONS.** The principles and methods used in the solution of farm problems. Land measurement, drainage, erosion control, clearing, farmstead planning, elementary mechanics, and basic structures are considered during the first semester; water supply, irrigation, sanitation, power, machinery, and electrification during the second semester. Mr. Foulkrod. 1 rec.; 1 lab.; 2 cr.

17, 18. **FARM SHOP.** The selection, care and use of tools needed for modern farm operation and maintenance, with practice in basic tool operations. The development of skills in handling tools for maintenance and construction work on the farm. Mr. Gilman. 2 lab.; 2 cr.

19-20. **THE AGRICULTURAL ENGINEERING THESIS.** An original treatise dealing with resident research, field problems, commercial investigation, or some combination of these will be presented by the student. The student must evidence ability to analyze a problem and express his findings on paper.

22. **FARM POWER APPLICATIONS.** The application of power to modern farm practices with emphasis on gasoline engines, tractors, electric motors, wind and water power units. Mr. Foulkrod. 1 lec.; 1 lab.; 2 cr. (Alternate years; not offered in 1947-1948.)

23. **FARM MACHINERY AND EQUIPMENT.** A study of modern farm equipment with emphasis on its adaptability to New England farms. Mr. Foulkrod. 1 lec.; 1 lab.; 2 cr. (Alternate years; offered in 1947-1948.)

## AGRONOMY

24. FARM STRUCTURES. Lectures, drafting room practice, and field studies of the design, construction, and maintenance of all farm structures. Mr. Foulkrod. 1 lec.; 1 lab.; 2 cr. (Alternate years; offered in 1947-1948.)

A.E. 25, 26, 27, 28. STUDENT BRANCH OF AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS. An organization of Junior and Senior students. Student officers assume responsibility for conducting one meeting each week with suitable technical programs by members and others. Discussion of material and criticism of student contributions will be led by the instructor. Delivery, subject-matter and descriptive terms are subjects of appraisal.

37. HOME BUILDING. The principles involved in selecting a home which is best fitted to the needs, desires, and activities of the whole family group are considered. A study of existing homes and published plans is supplemented by practice in original design, through simple sketch plans. Mr. Foulkrod. 2 lec.; 1 lab.; 3 cr.

38. HOUSEHOLD MECHANICS. The application of engineering principles and practices to the problem of making the home more comfortable, convenient, and livable is covered in theory and demonstration. Electrical appliances, water supply, sewerage disposal, gas, telephone, and fuels are considered. The selection, care, and maintenance of cooking, heating, refrigeration, cleaning, and other equipment are studied. Mr. Foulkrod. 2 lec.; 1 lab.; 3 cr.

## AGRONOMY

FORD S. PRINCE, *Professor*; LEROY J. HIGGINS, *Associate Professor*;  
PAUL T. BLOOD, *Assistant Professor*; LOUIS T. KARDOS, *Assistant Professor*.

1. SOILS. The nature and properties of soils; fundamental physical, chemical, and biological processes and characteristics of productive soils. Mr. Higgins. 2 lec.; 1 lab.; 3 cr.

4. FERTILIZERS AND SOIL FERTILITY. The manufacture and use of fertilizers, the production, composition, and care of farm manure and the relationship to crop response and soil fertility. Mr. Prince. 2 lec.; 1 lab.; 3 cr.

10. CROP PRODUCTION. Production of agronomic crops, distribution, choice, growth processes, cropping practices, seed beds, care, improvement, and breeding. Mr. Higgins. 2 lec.; 1 lab.; 3 cr.

17. SEED TESTING. Official method of analysis of agricultural seeds for purity and germination, the identification of seeds, and the technique used in weighing, germinating, counting, and recording. Mrs.



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Sanborn in charge. Prereq.: Bot. 1 and permission of instructor. Hours arranged; 1 lab.; 1 cr.

18. POTATOES AND CEREAL CROPS. Potatoes and potato production in the Northeast; cereal grains such as corn, oats, and barley. Mr. Higgins. Prereq.: Agron. 1, 4, and 10 or permission of instructor. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered in 1947-1948.)

20. FORAGE AND PASTURE CROPS. Forage grasses and legumes, forage production, pasture crops and swards, and pasture management practices. Mr. Higgins. Prereq.: Agron. 1, 4, and 10 or permission of instructor. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered in 1947-1948.)

57. SOIL PHYSICS. The physical constitution and colloidal properties of soils; their measurement and relation to structure, water movement, aeration and temperature in soils. Mr. Kardos. Prereq.: Agron. 1, 4, and Phys. 4. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered in 1947-1948.)

58. SOIL CLASSIFICATION AND MAPPING. The origin, morphology, classification, and mapping of soils. Relationships of the Great Soil Groups of the world to crop production. Special emphasis is devoted to the soils of New Hampshire. Mr. Kardos. Prereq.: Agron. 1 and other courses at the discretion of the instructor. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered in 1947-1948.)

59. SOIL CHEMISTRY. A study of the methods of evaluating nutrient levels in soils and of principles underlying the liberation, absorption, and fixation of nutrient elements in soils. Mr. Kardos. Prereq.: Agr. Chem. 1, 2, and Agron. 1, 4. 8 lec.; 1 lab.; 3 cr. (Alternate years; not offered in 1947-1948.)

60. SOIL CONSERVATION. The causes and effects of soil erosion. Cropping systems, fertilizer practices and structural devices used in erosion control. Mr. Kardos. Prereq.: Agron. 1, 4, 10. 1 lec.; 2 lab.; 3 cr. (Alternate years; not offered in 1947-1948.)

71, 72. AGRONOMY SEMINAR. Library and reference work on special phases of soil and crop problems. Practice in looking up literature and in preparation of reports and abstracts. Mr. Prince and staff. Prereq.: Agron. 1, 4, 10. Elective for Seniors. 1 to 3 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. AGRONOMY. Studies in Comparative Agronomy. The forage crops of the temperate zone. Origin and classification of the varieties grown. Germination, growth, and maturation of crops; modifications induced by climate and management. Mr. Prince. Prereq.: A major in Agronomy or its equivalent. Conferences, laboratory, and field work. Hours to be arranged. 3 cr.

# ANIMAL HUSBANDRY

## ANIMAL HUSBANDRY

LORING V. TIRRELL, *Professor*; FRED E. ALLEN, *Assistant Professor*.

2. TYPES AND MARKET CLASSES OF LIVESTOCK. Origin, history, development, characteristics, and adaptability of the different types of horses, cattle, sheep, and swine, with practice in judging. Mr. Tirrell. 2 lec.; 1 lab.; 3 cr.

11. LIVESTOCK JUDGING. The principles and practice of judging horses, beef cattle, sheep, and swine. It includes trips to some of the best New England breeding establishments and is required of candidates for judging team. Mr. Tirrell. 1 lab.; 1 cr.

13. FEEDS AND FEEDING. The character, composition, and digestibility of feed stuffs and the principles and methods of feeding different kinds of farm animals. Mr. Tirrell. 3 lec.; 3 cr.

14. ADVANCED LIVESTOCK JUDGING. A continuation of Animal Husbandry 11. It serves as a basis for the selection of a livestock team for competition such as held at the Eastern States Exposition and the International at Chicago. Mr. Tirrell. Prereq.: Animal Husbandry 11. 1 lab.; 1 cr.

15. SYSTEMATIC ANATOMY. The general anatomy and physiology of domestic animals. Dr. Allen. 3 lec.; 3 cr.

16. ANIMAL DISEASES. The prevention, control, and treatment of the bacterial and parasitic diseases of domestic animals. Dr. Allen. 3 lec.; 3 cr.

18. MEAT AND ITS PRODUCTS; LIVESTOCK MARKETS. A study of meat, farm slaughter, curing and identification of cuts; livestock, markets, stockyards, and transportation, with occasional trips to slaughter houses and packing plants. Mr. Tirrell. 1 lec.; 1 lab.; 2 cr.

19. MANAGEMENT OF HORSES AND BEEF CATTLE. Selection, feeding, breeding management, and preparation for the show ring of horses and beef cattle with special reference to New England conditions. Mr. Tirrell. 2 lec.; 1 lab.; 3 cr.

20. SHEEP AND SWINE HUSBANDRY. Selection, breeding, feeding, management, and preparation for the show ring of sheep and swine, with special reference to New England conditions. Mr. Tirrell. 2 lec.; 1 lab.; 3 cr.

51. ANIMAL BREEDING. The principles and practices of breeding farm animals, including cross-breeding, in-breeding, selection, inheritance, breed analysis, reproductive efficiency, fertility and sterility. Mr. Tirrell. 3 lec.; 3 cr.



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52. ANIMAL HUSBANDRY SEMINAR. Library and reference work and preparation of papers on various Animal Husbandry subjects of timely importance. Mr. Tirrell. 1 to 3 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS.

105. PROBLEMS IN ANIMAL BREEDING. Studies in practical breeding problems with beef and dual-purpose cattle, sheep, horses, and hogs. The genetic principles important to successful livestock production will be emphasized. Mr. Tirrell. Prereq.: A major in Animal Husbandry or Dairy Husbandry. 2 lec.; 1 lab.; 3 cr.

106. MEATS, LIVESTOCK MARKETS AND PRODUCTS. The essential factors in meat selection, cutting, curing, and smoking; study and discussion relative to the problems of livestock marketing, and the procedure in the large central markets. Trips are taken to various packing plants. Mr. Tirrell. Prereq.: A major in Animal Husbandry or Dairy Husbandry. 2 lec.; 1 lab.; 3 cr.

### THE ARTS

GEORGE R. THOMAS, *Associate Professor*; IRMA G. BOWEN, *Associate Professor*; PAUL L. GRIGAUT, *Associate Professor*; VERA E. MOULTON, *Assistant Professor*; EDWIN SCHEIER, *Instructor*; WESLEY F. BRETT, *Instructor*; WENDOVER NEEFUS, JR., *Instructor*; DORIS F. WILKINS, *Instructor*; CORNELIA SCHOOLCRAFT, *Instructor*; MARION MOODY, *Assistant*.

ROBERT B. KERR, M.A., M.D.; LOUISA M. NORTON, A.B., M.D.; ANNA L. PHILBROOK, A.B., M.D., M.D.C.M.; THOMAS F. REID, M.D.; ROBERT R. RIX, B.A., F.A.C.S.; URSULA J. SANDERS, A.B., M.D.; JOHN S. WHEELER, A.B., M.D., M.P.H.; LESTER R. WHITAKER, M.D.; *Visiting Lecturers in Clinical Subjects.*

CRAFT COTTAGE.—Devoted to the pursuit of a variety of handicrafts suitable for avocational or leisure-time hobbies. Classes open to all students; laboratories scheduled at various times throughout the week to meet the differences in individual programs.

STUDENT WORKSHOP.—An experimental arts laboratory located in Hewitt Hall, open to any student in the University, whether or not enrolled in art courses. Equipped with woodworking tools and machinery, a printing-press, silk screen printing equipment, air brush, facilities for block printing, model making, making of decorations, repairing of skis and other sports' equipment, woodcarving, plastics, and other hobby interests. Supervised by Mr. Brett.

All laboratory courses listed in this section are limited in enroll-

## THE ARTS

ment. Students should consult the instructor in charge before registering.

In those courses where the students retain finished products, they pay the cost of materials used.

### GENERAL COURSES IN THE ARTS

3, 4. **HANDICRAFTS.** A course offering opportunity to become acquainted with elementary work in fifteen or more crafts such as leatherwork, chip carving, weaving, Viennese stenciling, embroidery, and others. Miss Bowen. Elective by permission only. 1-3 lab.; 1-3 cr.

5, 6. **HANDICRAFTS.** A continuation of Arts 3 or 4 covering other crafts, or more advanced work. Miss Bowen. Elective by permission only. Prereq.: Arts 3 or 4. 1-3 lab.; 1-3 cr.

11, (11). **MODELING.** Modeling in relief and the round figure. An introduction to ceramic sculpture and to the processes of casting in plaster and papier-mâché. For students in the Occupational Therapy Curriculum, a project in the design and construction of hand puppets, marionettes, and shadow puppets will be assigned. Mr. Scheier. 2 lab.; 2 cr.

15, 16. **CERAMICS (Pottery).** Design and construction. Studio practice in throwing, casting, modeling, decorating, glazing, and firing of pottery, tiles, and figures. Modeling in ceramic clay and plasticine. Study of casting problems. Mr. Scheier. 2-3 lab.; 2-3 cr.

17, 18. **CERAMICS (Pottery).** A further study of design and construction, with special emphasis on decoration and the preparation and application of glazes. Mr. Scheier. Prereq.: Arts 15, 16. 2-3 lab.; 2-3 cr.

20. **ELEMENTARY DRAFTING.** Elementary drafting procedures, including lettering and use of instruments. Study of architectural symbols. Interpretation of typical hotel plans and statistical data by graphical representation. 2 lab.; 2 cr. For Hotel Administration students only.

23. **ELEMENTARY DRAWING AND DESIGN.** Studio exercises in graphical representations designed to stimulate and develop the student's expression of creative thought. Original ideas will be guided through the process of development by criticism and suggestions only. Mrs. Schoolcraft and Mr. Thomas. 2-3 lab.; 2-3 cr.

24. **ELEMENTARY DRAWING AND DESIGN.** Elementary drawing in various media from casts, still-life, and nature, aiming at the stimulation and development of creative thought through the study of fundamental forms. Lettering, block printing, and color. Mrs. Schoolcraft and Mr. Thomas. 2-3 lab.; 2-3 cr.

25, 26. **ADVANCED DRAWING AND DESIGN.** Advanced studio exercises



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in various media from casts and from life. Composition, proportion, perspective, and the expression of mass by means of line and simple light and shade. Theories of color, scientific and aesthetic, and their application. Outdoor sketching. Mr. Thomas. 2-3 lab.; 2-3 cr.

29, 30. **ADVANCED PAINTING.** A general advanced study of special types, depending upon the student's previous training. A variety of studio work under individual supervision and criticism. This course may be taken a second time. Mr. Thomas. Elective by permission only. Credits to be arranged.

31, 32. **INTRODUCTION TO THE ARTS.** A broad historical survey of man's creative efforts in their relation to contemporary cultural and social movements, presented as a background for interpreting the place of the arts in individual and community life of today. Illustrated lectures with assigned readings. Mr. Thomas. For Sophomores, Juniors, and Seniors. 3 lec.; 3 cr.

33. **SURVEY OF EUROPEAN ART.** The development of art, especially painting, in Europe from the Renaissance to the present, with particular emphasis on French art of the nineteenth and twentieth centuries. Illustrated lectures, assigned reading, and reports. Mr. Grigaut. For Sophomores, Juniors, and Seniors. 3 lec.; 3 cr.

35, (35). **STAGECRAFT.** A laboratory course in the technical phases of play production, including a study of the design of scenery, methods of execution and lighting. Practice in design, construction, painting and lighting of scenery; practical experience in the handling of properties, manipulation of scenery, lighting and mechanical effects. Mr. Brett.  $\frac{1}{2}$ —1 cr.

39, (39). **ELEMENTARY PHOTOGRAPHY.** The theory and technique of photography, covering camera operation, developing, printing and enlarging. Projects stress imaginative solutions to problems concerning portrait, campus life, fashion, and advertising. Mr. Neefus. Open to Sophomores, Juniors, and Seniors with permission of the instructor. 1 lec.; 2 lab.; 3 cr. Laboratory fee: \$7.50.

40. **ADVANCED PHOTOGRAPHY.** Each student will be assigned a special project, or part of a class project upon which he will do considerable experimenting and research during the semester, *e.g.*, color, advertising, portraits. A term paper will be required including a series of photographs representative of his progress. Permission of the instructor. Mr. Neefus. 1 rec.; 2 lab.; 3 cr.

Arts 43. **HISTORIC COSTUME.** A study of the costume changes from the primitive to the present and something of the historical events that influenced such changes. Miss Moulton. 3 lec. or rec.; 3 cr.

Arts 44. **COSTUME DESIGN.** Adaptation of period costume to modern

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use, including designing and making garments for individual students. Miss Moulton. Prereq.: Arts 43. 2 lab.; 2 cr.

Art-Education (Art-Ed) 91. PROBLEMS OF TEACHING ART IN ELEMENTARY SCHOOLS. 2 rec.; 1 lab.; 3 cr.

Art-Education (Art-Ed) 92. PROBLEMS OF TEACHING ART IN SECONDARY SCHOOLS. 2 rec.; 1 lab.; 3 cr.

Education-Art (Ed-Art) 94. SUPERVISED TEACHING IN SECONDARY SCHOOL ART. Prereq.: Art-Ed 92. One semester of Supervised Teaching. An assigned paper will be required at the conclusion of the semester's work. 12 cr.

Selection from the following courses offered by several departments within the University may, with the consent of the Head of the Department, be counted toward a major program in the Arts:

CLOTHING CONSTRUCTION. See HOME ECONOMICS 5-6.

DOMESTIC ARCHITECTURE. See B-C.E. 11, 12.

ELEMENTARY LANDSCAPE GARDENING. See HORTICULTURE 28.

FLORAL ARRANGEMENT. See HORTICULTURE 38.

FURNITURE AND TEXTILES. See HOME ECONOMICS 45.

HOME BUILDING AND FURNISHING. See AGRICULTURAL ENGINEERING 31 and HOME ECONOMICS 32.

TEXTILES. See HOME ECONOMICS 4.

For courses in Music, Dramatic Art, and Dancing, see Departments of Music, English, Physical Education for Women.

The Department promotes on the Campus a series of exhibitions and lectures treating the arts. Visits to near-by museums and points of interest are arranged from time to time, and published lists of these visits are available. The following are a few of the art centers within a convenient radius of Durham: Addison Gallery of American Art, Currier Gallery of Art, Museum of Fine Arts of Bowdoin College, and several excellent museums and galleries in Boston, including the Boston Museum of Fine Arts, the Gardner Museum, and the Fogg Museum at Harvard University.

## BACTERIOLOGY

(See page 184.)

## BIOLOGY

C. FLOYD JACKSON, *Professor*; LAWRENCE W. SLANETZ, *Associate Professor*; ALBION R. HODGDON, *Associate Professor*; CHARLES B. DOBROVOLNY, *Associate Professor*; GEORGE M. MOORE, *Associate Professor*; EDYTHE T. RICHARDSON, *Assistant Professor*; MARIAN E. MILLS, *Assistant Professor*; STUART DUNN, *Assistant Professor*; M. C. RICHARDS,



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*Assistant Professor*; PAUL E. SCHAEFER, *Assistant Professor*; CLARA H. BARTLEY, *Assistant Professor*; ELEANOR S. HARRINGTON, *Instructor*; ERMA L. JACKSON, *Instructor*; RICHARD C. JONES, *Instructor*.

Biol. 1-2. MAN AND THE LIVING WORLD. This is a basic course in Biology, designed to give the student fundamental facts about himself and a broad understanding of his relation to the living world, both plant and animal, of which he is a part. 3 lec. or rec.; 1 lab. 4 cr. *This course cannot be used to satisfy major requirements.*

BIOLOGY-EDUCATION (BI-ED) 91. PROBLEMS IN THE TEACHING OF HIGH SCHOOL BIOLOGY. Objectives and methods of teaching. The selection and organization of materials; visual aids; setting up aquaria and other projects will be stressed. Mr. Schaefer. Prereq.: See page 210. 2 rec.; 1 lab. or field trip; 3 cr.

EDUCATION-BIOLOGY (ED-BI) 93, 94. SUPERVISED TEACHING IN HIGH SCHOOL BIOLOGY. See page 211.

## BACTERIOLOGY

Mr. SLANETZ, *In Charge*

1. GENERAL BACTERIOLOGY. Principles of Bacteriology; morphology, physiology, and classification of bacteria and other microorganisms, and their relationships to agriculture, industry, sanitation, and infectious diseases. Mr. Slanetz. Prereq.: Chem. 1-2 or equivalent; 2 lec.; 2 lab.; 4 cr.

2. FOOD AND SANITARY BACTERIOLOGY. Relation of microorganisms to food production; food preservation; food infections and intoxications; standard laboratory methods for the bacteriological examination of foods. Bacteriology and sanitation of water, sewage, air, and eating utensils. Disinfection and disinfectants. Mrs. Bartley. Prereq.: Bact. 1. 2 lec.; 2 lab.; 4 cr.

3. ELEMENTS OF MICROBIOLOGY. Lectures and recitations or laboratory demonstrations on the nature and characteristics of bacteria, viruses, yeast and molds; the relationships of these microorganisms to agriculture, industry, sanitation, and infectious diseases. For students who, as part of their cultural training, desire some knowledge of microbes and their role in everyday life. Mr. Slanetz. 3 lec. or rec.; 3 cr. (Not open to Freshmen.)

4. PUBLIC HEALTH AND SANITATION. A consideration of the causal agents, prevalence, transmission, and control of the communicable diseases. Sanitation of water, sewage, food, and air. Community hygiene and public health administration. Mr. Slanetz. Prereq.: Biol. 1-2, or consent of instructor. 3 lec. or demonstrations; 3 cr.

6. AGRICULTURAL AND SOIL BACTERIOLOGY. Study of important soil

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bacteria and their role in soil fertility; characteristics of bacteria and viruses causing plant disease. Prereq.: Bact. 1. 2 lec.; 1 lab.; 3 cr.

8. PATHOGENIC BACTERIOLOGY. A study of the morphological, cultural, biochemical, serological, and pathogenic characteristics of microorganisms causing human and animal diseases. Mr. Slanetz and Mrs. Bartley. Prereq.: Bact. 1. 2 lec.; 2 lab.; 4 cr.

53. IMMUNOLOGY AND SEROLOGY. The theories of infection and immunity; production of vaccines, toxins, and antiserums; serological techniques of disease diagnosis and identification of bacteria, including agglutination, precipitating, and complement fixation tests. Mrs. Bartley. Prereq.: Bact. 8. 2 lec.; 2 lab.; 4 cr.

55, 56. PROBLEMS IN BACTERIOLOGY. Special problems, depending upon the training and desire of the student. Elective only upon consultation. Mr. Slanetz and members of the staff. Credits to be arranged. 3-4

57, 58. BACTERIOLOGY SEMINAR. Reports and discussions on current literature and recent developments in bacteriology. Mr. Slanetz and members of the staff. Prereq.: Bact. 2 or 8 and consent of instructor. One 2-hour period; 1 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101. PHYSIOLOGY OF BACTERIA. A study of the growth, nutrition, and metabolism of bacteria; influence of physical and chemical environment on growth; bacterial enzymes; protein decomposition and fermentation. Prereq.: Bact. 2 or 8, or equivalent. 3 lec.; 3 cr.

104. SYSTEMATIC BACTERIOLOGY. A study of the development of a systematic classification of bacteria; modern methods of nomenclature and classification; problems encountered in the classification of bacteria. Mr. Slanetz. Prereq.: Bact. 2 or 8, or equivalent. 2 lec.; 2 cr.

## BOTANY

Mr. HODGDON, *In Charge*

1. GENERAL BOTANY. The principal plant groups with emphasis on structure, function, and economic importance stressing agricultural applications. Mr. Hodgdon. Required of Freshmen in Agriculture. 2 lec.; 2 lab.; 4 cr.

2. GENERAL BOTANY. A general survey of the entire plant kingdom with emphasis on development, reproduction, and evolutionary trends. Mr. Hodgdon. Prereq.: Bot. 1 or Bot. 3. 2 lec.; 2 lab.; 4 cr.

3. THE PLANT WORLD. The structure and function of plant parts. The application of basic biological principles to plant life. Mr. Hodgdon. Prereq.: Biol. 1-2. 3 lec.; 1 lab.; 4 cr.



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5. **PLANT ANATOMY AND CYTOLOGY.** The anatomy of seed plants as revealed by free-hand and sliding microtome sections and simple staining. A brief review of cell structure as shown by cytological methods. Mr. Dunn. Prereq.: Bot. 1 or Bot. 3. 2 lab.; 2 cr.

6. **SYSTEMATIC BOTANY.** The identification and classification of our native trees, shrubs, and wild flowers. Mr. Hodgdon. Prereq.: Biol. 1-2 or Bot. 1; 1 lec.; 2 lab.; 3 cr.

40. **PLANT PHYSIOLOGY.** Structure and properties of the cell; absorption and movement of water; metabolism; growth and irritability. Mr. Dunn. Prereq.: Bot. 1 or Bot. 3, and one year of Chemistry. 2 lec.; 2 lab.; 4 cr.

51. **PLANT PATHOLOGY.** The nature of disease in plants, the etiology, symptomatology, and classification of plant diseases. Mr. Richards. Prereq.: Bot. 1 or Bot. 3. 1 lec.; 2 lab.; 3 cr.

52. **PRINCIPLES OF PLANT DISEASE CONTROL.** Exclusion, eradication, protection and immunization, and the specific, practical methods used to control plant diseases. Mr. Richards. Prereq.: Bot. 1 or Bot. 3. 1 lec.; 2 lab.; 3 cr.

55. **ADVANCED SYSTEMATIC BOTANY.** The principles and laws of plant classification and nomenclature; study of plant families, field and herbarium work. Mr. Hodgdon. Prereq.: Bot. 6. Hours to be arranged. 4 cr.

57, 58. **PROBLEMS IN (a) SYSTEMATIC BOTANY, (b) PLANT PHYSIOLOGY, (c) PLANT PATHOLOGY, AND (d) PLANT ANATOMY AND CYTOLOGY.** Elective only upon consultation with Head of Section. Mr. Hodgdon, Mr. Dunn, Mr. Richards, and Mr. Jones. Hours to be arranged. 2 to 6 credits.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

102. **PLANT ECOLOGY.** Requirements for growth; specialization and adaptation; geographic and physiographic relations. Regional floras. Interpretation and classification of habitat. Specific problems are assigned. Mr. Hodgdon. Prereq.: Bot. 55. Incidental lectures, laboratory and field work. 4 cr.

103. **MYCOLOGY.** Studies of the parasitic and saprophytic fungi, their growth, reproduction, and identification. Mr. Richards. Laboratory and assigned reading. 1 lec.; 2 lab.; 3 cr.

105. **ADVANCED PLANT PHYSIOLOGY.** Absorption, translocation, transpiration, and excretion of water, and effect on environmental factors upon these phenomena; permeability and mineral nutrition. Mr. Dunn.

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Prereq.: Bot. 56 or equivalent. Conferences, laboratory, and assigned reading. 3 cr. (*Note:* Both Bot. 105 and 106 should be taken for a complete covering of the subject.)

106. **ADVANCED PLANT PHYSIOLOGY.** Photosynthesis; respiration, growth; reproduction; and movement; effect of environmental factors on these phenomena. Mr. Dunn. Prereq.: Bot. 56 or equivalent. Conferences, laboratory, and assigned reading. 3 cr.

107. **ADVANCED PLANT HISTOLOGY.** A methods course in embedding, sectioning, and staining the fungi and tissues of higher plants. Mr. Richards. Prereq.: Bot. 1. Laboratory and assigned reading. 3 cr.

### ZOÖLOGY

MR. JACKSON, *In Charge*

7-8. **GENERAL ZOÖLOGY AND COMPARATIVE ANATOMY.** Basic course for Zoölogy majors and pre-medical students, dealing with anatomy of invertebrates and vertebrates. Fundamental principles of Zoölogy. Selected invertebrate and vertebrate types dissected in the laboratory. Mr. Moore. Prereq.: Biol. 1-2. 2 lec. or rec.; 2 lab.; 4 cr.

17-18. **HUMAN ANATOMY AND PHYSIOLOGY.** The structure and function of the human body, with a detailed study of the different systems. Collateral reading, written reports, and conferences. Mrs. Richardson. Prereq.: Biol. 1-2. 3 lec.; 3 cr.; optional laboratory, 4 cr.

19. **KINESIOLOGY.** A study of bodily movement. Special emphasis is given to the relation of skeleton, muscles, nerves, and joints in movement. Mrs. Richardson. Prereq.: Zoöl. 17-18. 3 lec. or rec.; 3 cr.

### ADVANCED COURSES IN ZOÖLOGY

*All the following courses require Junior standing*

51. **PARASITOLOGY.** An introductory course concerned with some of the more important parasites causing diseases of man and animals. Living materials will be used as far as possible. Mr. Dobrovolny. Prereq.: Biol. 1-2 and permission of the instructor. 2 lec.; 2 lab.; 4 cr.

52. **PATHOLOGY.** The principles of general pathology of vertebrates including man. The course is designed for students in the fields of Laboratory Technique, Nursing, and Applied Biology. Pre-medical students are strongly advised not to elect this course. Mr. Dobrovolny. Prereq.: Zoöl. 53, Bact. 1, and permission of the instructor. 2 lec.; 2 lab.; 4 cr.

53. **HISTOLOGY.** This course gives the student a familiarity with the microscopical anatomy of the principal tissues and organs of ver-



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tebrates. Mr. Dobrovolny. Prereq.: Biol. 1-2, one year of Biol., and permission of the instructor. 2 lec.; 2 lab.; 4 cr.

54. EMBRYOLOGY. A study of the fundamental principles of development. The developmental process from the egg to the formation of the body and the establishment of the principal organs and systems. Mr. Dobrovolny. Prereq.: Biol. 1-2 and one year of Zoöl. 2 lec.; 2 lab.; 4 cr.

*to be offered Sem. II only* 55. INVERTEBRATE ZOÖLOGY. A survey of the major invertebrate groups, exclusive of insects, with emphasis on free-living forms. Evolution of various phyla and their ecological relationships. Mrs. Harrington. Prereq.: Biol. 1-2 and permission of the instructor. 2 lec.; 2 lab.; 4 cr.

*to be offered Sem. II only* 57, 58. LABORATORY TECHNIQUE. Methods in histologic technique and examination of blood, urinary sediments, parasites, and zoölogical preparations. Mr. Dobrovolny. Prereq.: Zoöl. 53 or equivalent and permission of the instructor. 1 lec.; 2 lab.; 3 cr.

59, 60. ADVANCED PHYSIOLOGY. Human physiology with special emphasis on nutrition, circulation, respiration, excretion, and secretion. Lectures, assigned topics, and laboratory experiments. Mrs. Richardson. Prereq.: Biol. 1-2 and one year of Zoöl. 3 lec. or rec.; 3 cr.; 3 lec. or rec.; 1 lab.; 4 cr., by permission of the instructor.

*not offered combined with Zool. 49* 61. HEREDITY AND VARIATION. A study of the physical basis of inheritance, expression, and interaction of the hereditary units, linkage, and variation. Mrs. Richardson. Prereq.: Biol. 1-2 and one year of Zoöl. 3 lec. or rec.; 3 cr.; optional lab., 4 cr.

64. NEUROLOGY. Practical study of morphology, physiology, and histology of the human nervous system. Mrs. Richardson. Prereq.: Biol. 1-2 and one year of Zoöl. 3 lec. or rec.; 1 lab.; 4 cr.

71, 72. ECOLOGY OF THE LAND VERTEBRATES. The habits, habitat, life history and economic importance of the land vertebrates with emphasis on their conservation and ecological relationships. Field methods and techniques as applied to these groups will be considered. For students preparing for fish and game management positions, work in the field of conservation, or teaching biology, and for those interested in the study of birds and mammals as an avocation. Mr. Jackson. Prereq.: 12 hrs. of Biology; 2 lec.; 1 lab.; 3 cr.

73, 74. ECOLOGY OF THE FRESH-WATER VERTEBRATES. The habits, habitat, and life history of the fresh-water vertebrates of North America with special emphasis on those forms occurring in eastern United States. Special consideration will be given to their conservation and ecological relationships. Field methods as applied to aquatic

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forms will be considered. For students preparing for fish and game management positions, work in the field of conservation, or teaching biology, and for others interested in aquatic biology. Mr. Jackson. Prereq.: 12 hrs. of Biology; 2 lec.; 1 lab.; 3 cr.

75, 76. MARINE BIOLOGY AND OCEANOGRAPHY. A study of marine life with special emphasis on the economic species of fish and shellfish of the northeastern Atlantic coast. Problems concerning their utilization and conservation, together with special methods in oceanography, will be considered. Mr. Jackson. Prereq.: 12 hrs. of Biology. 2 lec.; 1 lab.; 3 cr. (Not offered during regular college year 1947-1948.)

95. LIMNOLOGY. Factors affecting biological productivity of freshwater lakes and streams. Adapted primarily for students interested in fish and game management, wild life conservation, and in teaching of Biology. Mr. Moore. Prereq.: Permission of the instructor. 2 lec.; 2 lab.; 4 cr.

97, 98. SPECIAL PROBLEMS AND SEMINAR. Seminar discussions on current zoölogical literature conducted each week. Advanced students may elect a special problem provided they present a detailed outline of the subject and can furnish adequate proof of their ability to carry it out with equipment available. Head of the Department and members of the staff. Prereq.: Permission of the Department Chairman. 1-4 cr.

### SERVICE COURSES

48. GENERAL ZOÖLOGY. The principles of animal life, with special emphasis on human anatomy and physiology; the general principles of physiology, embryology, and genetics as applied to various forms of animals. Required of Freshmen in Agriculture. Open only to students in Agriculture. Mrs. Harrington. 3 lec.; 3 cr. *2 lec. 1 lab. 3 cr.*

49. GENETICS. The physical basis of inheritance; laws governing Mendelian inheritance and their application to plant and animal breeding. Mrs. Richardson. For Agricultural students. 2 lec. or rec.; ~~2 cr.~~ 3 cr. - *combined with Zool. 61.*

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. ADVANCED VERTEBRATE TAXONOMY AND ECONOMIC FIELD ZOÖLOGY. A critical examination of select groups of vertebrates with special reference to local forms, their classification, distribution, and general ecology and conservation. The laboratory work will deal with economic field Zoölogy and will consist of life history studies, detailed ecological surveys of local areas, control of injurious animals, food habit studies, census taking, and studies of factors controlling animal populations. Mr. Jackson. Prereq.: 3 years' work in Biology. 2 lec.; 2 lab.; 4 cr.



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107, 108. **BIOLOGY OF DEVELOPMENT.** A study of the factors involved in the structure of the cell, histogenesis, and in organogeny. The problems related to cell structure and function will be discussed. Cell specificity, physiological maturity, symmetry, organization, rate of development and maturation will be considered. Mr. Dobrovolny. Prereq.: Three years' work in Biology, including Histology and Embryology. 2 rec.; 2 lab.; 4 cr.

111, 112. **PROBLEMS IN BIOLOGY.** This course involves reading, laboratory work, and conferences on special problems approved by the staff. Head of Department and staff. Prereq.: Permission of the Head of the Department. 1 to 4 cr.

### *BUILDING CONSTRUCTION*

E. T. HUDDLESTON, *Professor of Architecture*

(Register the following subjects as: B-CE 11, 12 etc.)

11, 12. **DOMESTIC ARCHITECTURE.** A comprehensive view of the architectural profession and the building construction industry to the end that the relationships of the architect, engineer, contractor, materials producer, and client may be better understood. A brief history of domestic architecture with special emphasis on early American housing, and its present-day influence. The solution of modern housing problems to develop the relation of the house plan to family requirements, individual site, garden, accessory buildings, and the community. 11, 2 rec.; 2 cr. 12, 1 rec.; 1 lab.; 2 cr. Elective by permission of instructor.

21-22. **BUILDING CONSTRUCTION.** Basic modern building materials and their use in the construction of walls, columns, floors, roofs, doors, windows, etc., illustrating their varied application to contemporary architectural usage. Principles of structural design and an analysis of structural systems as applied to wood frame house, light and heavy timber, steel and reinforced concrete construction. The relation of structural systems in the solution of various types of building problems with special emphasis given to building code requirements for safety. 21, 3 rec.; 3 cr. 22, 2 rec.; 1 lab.; 3 cr.

31-32. **PROFESSIONAL PRACTICES.** The personal, ethical, business, and legal relations of the architect and consulting engineers with clients, contractors, etc. Procedure in the conduct of an architect's office with the preparation of complete contract documents for an assigned construction job, including advertisement, bond, form of proposal, information for bidders, agreement form, and general conditions covering the operational relations of the various parties to the contract. The fundamentals of specification writing and methods of estimating and appraising buildings. 3 rec.; 3 cr.

# CHEMISTRY

## BUSINESS ADMINISTRATION

(See page 201)

### CHEMISTRY AND CHEMICAL ENGINEERING

HAROLD A. IDDLER, *Professor*; OSWALD T. ZIMMERMAN, *Professor*; ALBERT F. DAGGETT, *Professor*; MELVIN M. SMITH, *Associate Professor Emeritus*; JAMES A. FUNKHOUSER, *Associate Professor*; EDWARD R. ATKINSON, *Associate Professor*; JOHN L. TORGESEN, *Assistant Professor*; HELMUT M. HAENDLER, *Assistant Professor*; EDWARD R. GRILLY, *Assistant Professor*; DONALD W. BRECK, *Instructor*; RUSSELL L. CLARK, *Instructor*; FRANK B. MARCOTTE, *Instructor*.

1-2. GENERAL CHEMISTRY. A broad course in Elementary Chemistry with many lecture demonstrations and some laboratory practice. Topics of interest to the professional student and of general interest are presented. For Liberal Arts and Agriculture students. Messrs. Torgesen, Breck, and assistants. 2 lec.; 1 rec.; 1 lab.; 4 cr.

3-4. GENERAL CHEMISTRY. The fundamental laws and conceptions of Chemistry, including a study of the non-metals and metals and their compounds. The theoretical principles are illustrated by many lecture demonstrations, and the applications of Chemistry in the professions are explained. Messrs. Iddles, Daggett, Funkhouser, Haendler, Grilly, Clark, and assistants. For students who plan to take further courses in the Department of Chemistry. 2 lec.; 1 rec.; 1 lab.; 4 cr.

6. INORGANIC CHEMISTRY. A continuation of Chemistry 3 covering the fundamental laws and conceptions of Chemistry involved in a study of the non-metals and metals and their compounds. Mr. Iddles, and assistants. Prereq.: Chem. 3, Mathematics 5, and permission of instructor. 2 lec.; 1 rec.; 3 lab.; 6 cr.

11-12. SURVEY OF CHEMISTRY. Lectures and demonstrations on general Chemistry, designed for the pursuit of Chemistry as an element of general culture rather than as professional training, and for a knowledge of the spirit of a branch of science on which much of our present-day civilization is based. Textbook: Findlay, *The Spirit of Chemistry*. Mr. Iddles. Elective for Sophomore, Junior, and Senior students. 3 lec.; 3 cr.

21. SEMI-MICRO QUALITATIVE ANALYSIS. The fundamental theories of solutions and colloids as applied to the reactions of qualitative analysis. Problem work is required. The laboratory work uses the semi-micro technique and provides ample experience in the analysis of simple and complex mixtures. For Chemistry majors. Mr. Haendler and assistant. Prereq.: Chem. 4 or 6. 2 lec.; 2 lab.; 4 cr.



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22. QUANTITATIVE ANALYSIS. The theory and laboratory technique of the more common determinations of gravimetric and volumetric analysis. Emphasis on the solution of problems. A comprehensive study of the more common analytical methods. Mr. Daggett, Mr. Marcotte, and assistants. Prereq.: Chem. 21. 2 lec.; 3 lab.; 5 cr.

25, 26. INTRODUCTORY QUANTITATIVE AND QUALITATIVE ANALYSIS. First semester: The theory, problems, and technique involved in some of the common procedures in both gravimetric and volumetric quantitative methods. Second semester: The theory and problems of qualitative analysis. The laboratory work is conducted on a semi-micro scale and presents the special methods of technique involved. For Pre-medical and Pre-dental students, as a preparation for various sciences, and as a preparation for secondary school teaching. Messrs. Daggett, Haendler, Marcotte, and assistants. Prereq.: Chem. 4. 1 lec.; 2 lab.; 3 cr.

31. STOICHIOMETRY AND TECHNICAL QUANTITATIVE ANALYSIS. The laboratory portion provides sufficient experience to develop the skill and special technique necessary for the analysis of alloys, gaseous, liquid, and solid fuels, gas mixtures, oils, and lubricants. The lectures interpret the results of technical analyses and their application to the calculation of heat and material balances in industrial processes. Mr. Daggett. Prereq.: Chem. 22. 3 lec.; 2 lab.; 5 cr.

45, (45). ORGANIC CHEMISTRY. An introductory but comprehensive study of the chemistry of carbon compounds with emphasis on the particular phases of the subject needed by students preparing to be technicians, nurses, majors in Biological Sciences, and others, where a brief course is desired. Mr. Atkinson. Prereq.: Chem. 3-4. (Elective for medical technicians, nurses, majors in Biology, Pre-dental students.) 3 lec.; 2 lab.; 5 cr.

47-48. ORGANIC CHEMISTRY. Lectures on the principal classes of organic compounds, aliphatic and aromatic, with emphasis on class reactions and structural theory. Laboratory exercises in the preparation and purification of selected organic compounds; also the use of group reactions for the identification of organic substances in a systematic scheme of qualitative organic analysis. Mr. Iddles. Prereq.: Chem. 22. 3 lec.; 2 lab.; 5 cr.

53-54. ORGANIC CHEMISTRY. Lectures on the chief divisions of Organic Chemistry, aliphatic and aromatic, with the needs of the preprofessional student in mind. A more detailed consideration of carbohydrates and proteins follows. The laboratory technique of organic chemical methods as illustrated in the preparation and purification of typical organic compounds. Mr. Funkhouser. Prereq.:

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Chem. 3-4, and 25, 26. Chem. 53 alone does not meet the Pre-medical and Pre-dental requirements. 3 lec.; 2 lab.; 5 cr.

55, 56. **STRUCTURAL AND THEORETICAL PROBLEMS OF MODERN ORGANIC CHEMISTRY.** An intensive review of the methods of preparation and reactions of the principal classes of organic compounds. Emphasis is on the working of assigned problems. The electron theory of Organic Chemistry is used to correlate the chemical behavior of unsaturated compounds, free radicals, and other classes. Mr. Atkinson. Prereq.: Chem. 48 or 54. 3 lec.; 3 cr.

62. **ADVANCED METHODS OF QUANTITATIVE ANALYSIS.** The theory and technique of special and recently developed methods of analysis such as colorimetry, turbidimetry, potentiometry, and spectography. Sufficient experience is obtained to allow the development of considerable skill in even the more complex methods. Mr. Daggett. Prereq.: Chem. 22. 3 lec.; 2 lab.; 5 cr.

71-72. **UNIT PROCESSES.** The important inorganic and organic industrial chemical processes from the point of view of the basic chemical reactions and physical operations involved. Mr. Zimmerman. Prereq.: Chem. 22. 2 lec.; 2 cr.

74-75. **UNIT OPERATIONS.** The theory and practice of the fundamental chemical engineering unit operations, including flow of fluids, flow of heat, evaporation, distillation, drying, filtration, gas absorption, extraction, humidification and air conditioning, crystallization, crushing and grinding, and size separation. Mr. Zimmerman. Prereq.: Chem. 71, 83. 3 lec.; 3 cr.

76. **CHEMICAL ENGINEERING ECONOMICS.** The economic factors involved in industrial chemical processes and the application of economic balances to the design and selection of chemical engineering equipment. Mr. Zimmerman. Prereq.: Chem. 75, 77. 3 lec.; 3 cr.

77. **UNIT OPERATIONS LABORATORY.** Experiments based upon the unit operations are performed on typical chemical engineering equipment. Mr. Zimmerman. Prereq.: Chem. 74, 84. 3 lab.; 3 cr.

78. **CHEMICAL PLANT DESIGN.** The design and layout of chemical plants and equipment. The assigned problems are of a practical nature, such as the manufacture of some chemical product, and their solution will include the design or selection of all equipment and drawings of equipment, plant, and layout. Mr. Zimmerman. Prereq.: Chem. 75, 77. 3 lab.; 3 cr.

79. **CHEMICAL ENGINEERING THERMODYNAMICS.** A study of the fundamental laws of energy and their application to chemical engineering problems. Mr. Zimmerman. Prereq.: Chem. 84 and Chem. 74. 2 lec.; 1 rec.; 3 cr.



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80. CHEMICAL ENGINEERING PROJECT. Each student selects a research problem which he carries out independently under Faculty supervision. Intensive study in both the library and the laboratory and a satisfactory thesis at the completion of the work are required. Mr. Zimmerman. Prereq.: Chem. 75, 77. 4 lab.; 5 cr.

82. PRE-MEDICAL AND PRE-DENTAL PHYSICAL CHEMISTRY. A brief review and survey of the more important fundamental topics of Physical Chemistry; thereafter, those topics of Physical and Theoretical Chemistry which have application in the medical, biological, and agricultural sciences. Mr. Torgesen. Prereq.: Chem. 2, Phys. 2, 6, or 8, Math. 6 or equivalent. 3 lec.; 3 cr.

83-84. ELEMENTARY PHYSICAL CHEMISTRY. The properties of gases, liquids, and solids; thermochemistry and thermodynamics; solutions, chemical equilibria, reaction rates, conductance and electromotive force. Mr. Torgesen. Prereq.: Chem. 22, Math. 18, Phys. 8. 3 lec.; 2 lab.; 5 cr.

85, 86. ADVANCED PHYSICAL CHEMISTRY. A complete review of elementary Physical Chemistry followed by a study of the structure and properties of matter. In the latter part of the course the subject matter will include radioactivity, atomic structure, crystal structure, and related topics. Mr. Grilly. Prereq.: Chem. 84 or equivalent. 3 lec.; 3 cr.

87, 88. CHEMICAL LITERATURE AND SEMINAR. Use of the Chemical Library; student reports on topics of interest. Mr. Atkinson. Prereq.: Chem. 62 and Chem. 48. 1 lec.; 1 cr.

89-90. THESIS. A thesis covering the related background and experimental observations of the year's investigation in some selected subject is required. Members of the staff. For Seniors in Chemistry, who have completed Chem. 48, 62, and 84. 5 lab.; 5 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

111. ORGANIC CHEMISTRY. The chemistry of the polynuclear compounds and heterocyclic systems. Mr. Iddles. 3 rec.; 3 cr.

112. ORGANIC CHEMISTRY. The chemistry of natural products. Mr. Iddles. 3 rec.; 3 cr.

115. ORGANIC CHEMISTRY LABORATORY. Qualitative Analysis. The reactions and properties of organic compounds. Use of group reactions in the identification of organic substances. Mr. Atkinson. 1 rec.; 2 lab.; 3 cr.

116. ORGANIC CHEMISTRY LABORATORY. Micro-Quantitative Analysis. The combustion for carbon and hydrogen, Dumas nitrogen, Kjeldahl

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nitrogen, estimation of halogens, of sulphur, and of organic radicals. Mr. Atkinson. 1 rec.; 2 lab.; 3 cr.

121. PHYSICAL CHEMISTRY. CHEMICAL THERMODYNAMICS. The application of thermodynamics to chemistry. The principles of thermodynamics will be thoroughly reviewed. These principles will be applied in detail to the phase rule, chemical equilibrium, electromotive force, theory of solutions, specific heats, and similar topics. Mr. Grilly. Prereq.: One year of Physical Chemistry. 3 rec.; 3 cr.

122. PHYSICAL CHEMISTRY. CHEMICAL KINETICS. A study of the kinetics of homogeneous and heterogeneous reactions in gaseous and liquid systems, including an introduction to photo-chemistry. Mr. Daggett. Prereq.: One year of Physical Chemistry. 3 rec.; 3 cr.

124. ADVANCED PHYSICAL CHEMISTRY LABORATORY. The more modern experimental technique of physical chemistry. Emphasis on the needs and interests of each individual student. Topics will include the measurement of refractive index, molecular rotation, activity coefficients by vapor pressure, and E. M. F. methods, heterogeneous and homogeneous equilibrium constants, and kinetic constants. Mr. Torgesen. 1 lec.; 2 lab.; 3 cr.

131-132. COLLOQUIUM IN CHEMISTRY. A description of the series of lectures to be presented will be announced for each semester. *Colloids*, Mr. Torgesen; *Advanced Inorganic Chemistry*, Mr. Haendler; *History of Chemistry*, Mr. Funkhouser; *Organic Chemistry*, Mr. Atkinson; *Physical Chemistry*, Mr. Grilly; *Analytical Chemistry*, Mr. Daggett. 3 lec.; 3 cr.

135. UNIT OPERATIONS—FLUID FLOW, HEAT FLOW, AND EVAPORATION. An advanced course dealing with the fundamental theory and applications of these operations. Mr. Zimmerman. Prereq.: Chem. 74 or equivalent. 2 lec. or rec.; 2 cr.

136. UNIT OPERATIONS—DIFFUSION OPERATIONS. An advanced study of the principles of diffusion and their application to the unit operations of distillation, absorption, drying, humidification and extraction. Mr. Zimmerman. Prereq.: Chem. 75 or equivalent. 2 lec. or rec.; 2 cr.

141, 142. SEMINAR. Presentation and discussion of recent investigations in the field of chemistry. No credit.

151, 152. PROBLEMS IN CHEMISTRY. Conferences, library and experimental work in some field of chemistry. *Analytical Chemistry and Photo-Chemistry*, Mr. Daggett; *Inorganic Chemistry*, Mr. Haendler; *Organic Chemistry*, Mr. Iddles, Mr. Funkhouser, Mr. Atkinson; *Physical Chemistry*, Mr. Grilly, Mr. Torgesen; *Chemical Engineering*, Mr. Zimmerman. Prereq.: Special permission. Credits to be arranged.



# UNIVERSITY OF NEW HAMPSHIRE

## CIVIL ENGINEERING

EDMOND W. BOWLER, *Professor*; RUSSELL R. SKELTON, *Associate Professor*; CHARLES O. DAWSON, *Associate Professor*; PAUL A. TOWNSEND, *Instructor*.

2. SURVEYING. The theory and use of surveying instruments and methods, including measurement of angles, direction and distance, differential leveling, land surveying, note keeping, and calculations and plotting relating to traverses. Mr. Townsend. Prereq.: Math. 5, or Math. 2 carried in parallel. 1 rec.; 1 lab.; 2 cr.

3-4. SURVEYING. Theory and use of surveying instruments and methods on plane, precise, and topographic surveys, including: the use and adjustment of tapes, transits, levels, and plane tables, topographic mapping, solution of miscellaneous problems in topographic surveying, highway and railway curves, observations and reduction of observations on the sun and Polaris for latitude, time, and direction, profile leveling, city surveying, base line measurements, triangulation, and mapping programs in the United States. Some time is spent in the practice of the execution of topographic symbols and lettering. A topographic survey of a small area is completed in the field by the transit and stadia method and a map of the same area is plotted in the drafting room. A topographic map of a small area is also made by the plane table method. Mr. Dawson. Prereq.: C.E. 2. C.E. 3: 3 rec; 3 lab.; 6 cr. C.E. 4: 1 rec.; 2 lab.; 3 cr.

6. ROUTE SURVEYING. Theory and practice relating to preliminary and final location surveys for highways, railways, and pipe lines. Theory and problems in earthwork, the mass diagram, grade lines, vertical curves, cross sectioning and slope stakes. Mr. Skelton. Prereq.: C.E. 4 either in parallel or as a prerequisite. 1 rec.; 2 lab.; 3 cr.

9, (9). SURVEYING. The theory and use of tape, level, and transit in making plane surveys, computations and drafting exercises necessary to plot field notes, surveys for record, and the economics and use of surveys for all purposes. Mr. Townsend. Prereq.: Math. 6. 1 rec.; 1 lab.; 2 cr.

11. SURVEYING. Topographic surveys, determination of earthwork quantities, location of structures, layout of buildings before and during construction, and other special surveying problems pertaining to building construction. Mr. Townsend. Prereq.: C.E. 2 or C.E. 9: 1 lec or rec.; 2 lab.; 3 cr.

15. ENGINEERING MATERIALS. Methods of manufacture, physical properties, and the application of the various materials used in engineering works, including timber, steel, stone, brick, cement, concrete,

## CIVIL ENGINEERING

and bituminous materials. Laboratory experiments and reports on the testing of cements and concrete specimens. Mr. Skelton. Prereq.: Geol. 7 and M.E. 9 either in parallel or as a prerequisite. 2 rec.; 1 lab.; 3 cr.

23, (23). FLUID MECHANICS. Properties of fluids; statics of fluids; theorems and criteria of fluid motion; fluid flow through orifices, tubes, nozzles and pipes; flow over weirs; flow in open channels; dynamics of fluids in motion; a brief treatment of hydraulic turbines. Mr. Bowler and Mr. Dawson. Prereq.: M.E. 7 or 9. 3 rec.; 3 cr.

27-28. THEORY OF STRUCTURES. The graphical and analytical methods of determining reactions, moments and shears in beams, girders and trusses under fixed and moving loads, and the stresses in various structures including simple, subdivided and multiple trusses, portals, viaducts, cantilevers, and three-hinged arches. The computation of deflections and the application of the method of least work to statically indeterminate structures. Mr. Bowler. Prereq.: Math. 8, and M.E. 9 and 10 as prerequisites or in parallel. 3 rec.; 1 lab.; 4 cr.

31. COMMUNITY PLANNING. An introduction to the subject of Community Planning, especially designed for those students having a major interest in Civil Engineering or Building Construction, having the following purposes: (1) to acquaint the student with planning programs and processes, (2) to study the content and extent of desirable planning programs, (3) to indicate to the engineer, his place in the preparation and execution of a planning program. For Seniors. Elective by permission of the instructor. Mr. Dawson. 3 lec. or rec.; 3 cr.

38. THESIS. The student selects a subject of engineering, scientific, or commercial interest for investigation or design and presents his results as a thesis in which equal emphasis is placed upon composition and accuracy of subject matter. Mr. Bowler, Mr. Skelton, and Mr. Dawson. Prereq.: English 41. 1 conference each week; 3 cr. Students passing this course will receive a grade of Cr.

41, 42, 43, 44. STUDENT CHAPTER OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS. Junior and Senior students in Civil Engineering are required to join the student chapter of the American Society of Civil Engineers. In addition to its ordinary life under the guidance of student officers, the chapter meets once a week under the direction of an instructor, when prepared addresses by the student members are presented. Mr. Dawson.  $\frac{1}{2}$  credit. Students passing this course will receive a grade of Cr.

52. FLUID MECHANICS. Properties of fluids; statics of fluids; theorems and criteria of fluid motion; fluid flow through orifices, tubes,



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nozzles and pipes; flow over weirs; flow in open channels; dynamics of fluids in motion. Laboratory exercises and stream gaging practice. Mr. Bowler. Prereq.: Math. 8. 4 rec.; 1 lab.; 5 cr.

61. HIGHWAY ENGINEERING AND TRANSPORTATION. The economics of location and design of highways and city streets; methods of construction, maintenance, and specifications governing the various types of surfaces; administration and financing of highway systems; special emphasis on highway transportation. Field location and the complete design of a section of highway are included. Mr. Skelton. Prereq.: C.E. 4, 6, and 15. 2 rec.; 2 lab.; 4 cr.

62. SOIL MECHANICS AND FOUNDATIONS. The principles underlying the behavior of various soils when subjected to structural loads. Problems and methods encountered in foundation design and construction, building codes and legal aspects of foundation construction, also test borings and other underground exploration methods. Mr. Skelton. Prereq.: C.E. 65. 2 lec.; 1 lab.; 3 cr.

63-64. HYDRAULIC AND SANITARY ENGINEERING. Precipitation, water losses, run-off, drainage areas, stream flow, water power estimates, hydraulic turbines, dams and waterways; the sources, quantity, quality, and sanitary aspects of public water supplies; the methods of purification and distributing systems; the theory and problems of sewerage, the principles governing the disposal of sewage and the various methods of sewage treatment. Mr. Bowler. Prereq.: C.E. 52. 3 rec.; 1 lab.; 4 cr.

65. STRUCTURAL DESIGN. Theory and problems relating to the design of steel and timber structures. A steel girder and steel roof truss are completely designed and working drawings prepared. Individual parts of steel bridge trusses and buildings are studied and designed. Emphasis on economy of design, accuracy of results, clarity of vision, and analytical thought. Mr. Skelton. Prereq.: C.E. 28. 2 rec.; 2 lab.; 4 cr.

66. REINFORCED CONCRETE STRUCTURES. Theory and design of reinforced concrete structures, such as beams, slabs, columns, footings, retaining walls, and small bridges. Mr. Skelton. Prereq.: C.E. 65. 2 rec.; 2 lab.; 4 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. ADVANCED HYDRAULICS. Dimensional analysis, dynamic similarity, mechanics of viscous fluids, fluid flow in pipes, non-uniform flow, alternate stages of flow in open channels, hydraulic jump, and their application to engineering practice. Mr. Bowler. Prereq.: C.E. 64. 3 rec.; 3 cr.

## DAIRY HUSBANDRY

103, 104. SOIL MECHANICS. The physical and mechanical properties of soil in relation to engineering structures. The theory of consolidation, shearing resistance, bearing capacity, settlement, earth pressure, and their applications. Mr. Skelton. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

105. SOIL TESTING FOR ENGINEERING PURPOSES. This course is arranged to cover the essential soil tests for engineering purposes. Identification of soils, determination of water content, void ratio, specific gravity, grain size distribution, and Atterberg limits. Tests for the physical properties include: permeability, capillarity, compressibility, rate and magnitude of consolidation, and shearing resistance. Mr. Skelton. Prereq.: C.E. 103 in parallel or as a prerequisite. 1 lec.; 3 lab.; 4 cr.

### DAIRY HUSBANDRY

KENNETH S. MORROW, *Professor*; HERBERT C. MOORE, *Associate Professor*; HARRY A. KEENER, *Associate Professor*; NICHOLAS F. COLOVOS, *Assistant Professor*.

6. FUNDAMENTALS OF DAIRYING. A general survey of the dairy industry; the composition and properties of milk and other dairy products, dairy manufacturing processes, market milk, the selection and judging of dairy cattle. Mr. Morrow, Mr. Moore. 2 lec.; 1 lab.; 3 cr.

23. DAIRY CATTLE. Purebred dairy cattle; breed history; pedigrees; family lines and methods of outstanding breeders; the application of the principles of genetics to the improvement of dairy cattle; herd analysis. Mr. Morrow. 2 lec.; 1 lab.; 3 cr.

27. BUTTER AND CHEESE. (1) The secretion and the chemical and physical properties of milk; pasteurization; cream ripening; starters; churning; organization and operation of factories. (2) The manufacturing and marketing of more important types of cheese. Mr. Moore. 2 lec.; 1 lab.; 3 cr.

29. DOMESTIC DAIRYING. Nutritive value of milk and milk products. Laboratory exercises in the manufacture of dairy products. Mr. Moore. 2 lec.; 1 lab.; 3 cr.

30. DAIRY BACTERIOLOGY. The application of bacteriological principles to the production and processing of milk and other dairy products. Mr. Moore. 2 lec.; 2 lab.; 4 cr.

33, 34. DAIRY CATTLE AND DAIRY PRODUCTS JUDGING. (1) Comparative judging of dairy cattle, using animals in the University herd and in near-by herds. (2) The various standards and grades of dairy



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products with practice in judging milk, butter, cheese, and ice cream. Mr. Morrow, Mr. Moore. 1 lab.; 1 cr.

36. **ADVANCED DAIRY CATTLE JUDGING.** Continuation of Dairy Husbandry 33, 34. Emphasis on training for participation on dairy cattle judging teams. Mr. Morrow. Prereq.: Dairy Husbandry 34. 1 lab.; 1 cr.

60. **DAIRY SEMINAR.** A study of Experiment Station and other literature covering recent research in the field of dairy production. Mr. Morrow, Mr. Keener. 2 lec.; 2 cr.

62. **ADVANCED DAIRY SCIENCE.** Basic data, fundamental observations, and discussions of research contributing to the present status of the dairy industry. Mr. Moore. 2 lec.; 2 cr.

64. **MILK PRODUCTION.** Feeding and management of dairy animals; calf feeding; raising young stock; feeding for economical milk production. Mr. Keener. 2 lec.; 1 lab.; 3 cr.

65. **MARKET MILK.** The producing, handling, and distributing of market and certified milk; dairy farm inspection; control of milk supply. Mr. Moore. 2 lec.; 1 lab.; 3 cr.

66. **ICE CREAM.** The making, handling, and marketing of ice cream and ices. Mr. Moore. 2 lec.; 1 lab.; 3 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101. **ANIMAL NUTRITION.** Incidental lectures, assigned reading, laboratory practice in methods of research with major emphasis on basal metabolism. Mr. Colovos. Prereq.: A major in Animal or Dairy Husbandry, or equivalent. 3 cr.

102. **ADVANCED DAIRY CATTLE.** Special emphasis will be given to the analysis and formulating of breeding programs and to milk secretion and factors influencing the quantity and quality of milk. Mr. Morrow. Prereq.: A major in Animal Husbandry or Dairy Husbandry. 2 lec.; 1 lab.; 3 cr.

107. **TECHNICAL CONTROL.** Chemical and bacteriology laboratory methods used in the technical control of milk and milk products. Mr. Moore. Prereq.: Dairy Husbandry 10, or equivalent. 2 lec.; 1 lab.; 3 cr.

109, 110. **SPECIAL PROBLEMS IN DAIRY MANUFACTURE.** Detailed study of some special phase of dairy manufacturing. Mr. Moore. Prereq.: A major in Dairy Husbandry. Conferences and special assignments. 3 cr.

111, 112. **SPECIAL PROBLEMS IN DAIRY PRODUCTION.** Study of some

# ECONOMICS AND BUSINESS ADMINISTRATION

special phase of breeding or feeding as related to dairy-herd management. Mr. Morrow, Mr. Keener. Prereq.: A major in Animal Husbandry or Dairy Husbandry. Conferences and special assignments. 3 cr.

## DRAMATICS

(See page 220)

## ECONOMICS AND BUSINESS ADMINISTRATION

JOSEPH E. SHAFER, *Professor*; ARTHUR W. JOHNSON, *Professor*; RUTH J. WOODRUFF, *Associate Professor*; CARROLL M. DEGLER, *Associate Professor*; DORIS E. TYRRELL, *Associate Professor*; JOHN D. HÄUSLEIN, *Assistant Professor*; MYRA L. DAVIS, *Instructor*; WILLIAM J. JOSKO, *Instructor*; BARBARA A. REYNOLDS, *Assistant*.

### BUSINESS ADMINISTRATION

Note—Students who have completed two or more years of book-keeping in preparatory school will be permitted to register for Intermediate Accounting 3-4 upon passing an examination covering the material of Beginning Accounting. 1-2. Schedule the following courses as B.Ad. 1, etc.

1-2. PRINCIPLES OF ACCOUNTING. The fundamentals of Accounting. Theory of debit and credit; functions and classification of accounts; modern accounting records including special and columnar books. Adjusting entries, work sheets, and financial statements. Single proprietorships, partnerships, and an introduction to corporations. Mr. Häuslein, Mr. Josko. 2 lec or rec.; 2 lab.; 4 cr.

3-4. INTERMEDIATE ACCOUNTING. Comprehensive study of Corporation Accounting, principles and objectives of valuation, consignments, installment selling, depreciation and depletion, funds and reserves, application of funds, and analysis of financial statements. Mr. Johnson. Prereq.: B.Ad. 2. 2 lec. or rec.; 1 lab.; 3 cr.

5. ADVANCED ACCOUNTING. Advanced theory of Accounting, corporate consolidations, insolvencies, realization and liquidation problems, estate accounting. Mr. Johnson. Prereq.: B.Ad. 4 or equivalent. 2 lec. or rec.; 1 lab.; 3 cr.

6. FEDERAL TAX ACCOUNTING. The Federal Income Tax Laws and accounting procedure in connection therewith. Social security taxes, estate and gift taxes. Mr. Johnson. Prereq.: B.Ad. 4, or permission of the instructor. 2 lec. or rec.; 1 lab.; 3 cr.

7-8. COST ACCOUNTING. The relation of Cost Accounting to general Accounting. The place of Cost Accounting in modern business. Types of cost systems and their application to particular lines of business.



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Careful analysis of methods of computing costs. Principles of cost control. Mr. Johnson. Prereq.: B.Ad. 4, or permission of the instructor. 2 lec. or rec.; 1 lab.; 3 cr.

9-10. HOTEL ACCOUNTING. Theory and practice of keeping accounting and financial records for hotels. Mr. Häuslein. Prereq.: B.Ad. 1-2. 2 lec.; 1 lab.; 3 cr. (Given in alternate years; offered in 1947-1948.)

11. AUDITING. Study of procedure and practice in the verification of records, analysis of accounts and the presentation of conclusions. Attention is given to the responsibilities of the auditor and the procedure and practice of preparing reports. Prereq.: B.Ad. 4 or equivalent. 2 lec. or rec.; 3 cr. (Not offered in 1947-1948.)

12. ACCOUNTING SYSTEMS. Study of underlying principles of building accounting systems. Designing of systems for various types of business enterprises. Prereq.: B.Ad. 4 or equivalent. 2 lec. or rec.; 1 lab.; 3 cr. (Not offered in 1947-1948.)

21-22. COMMERCIAL LAW. The law of contracts, agency, sales, negotiable instruments, partnerships, and corporations. Elective for Juniors and Seniors. 3 lec. or rec.; 3 cr.

23. BUSINESS COMMUNICATION. Report writing, including preparation of charts, forms, and graphs. Methods of intra-office, inter-office, and inter-business communication. Preparation of instruction data for employees, minutes of meetings and manuals of company practices and procedures. Business letters of various types. Open to Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

24. INTRODUCTION TO BUSINESS. The course is designed to acquaint the student with general business problems and procedures and to provide an introduction to advanced courses. 3 lec. or rec.; 3 cr.

28. PERSONNEL ADMINISTRATION. A study of methods and techniques employed in personnel administration from the standpoint of the executive. Open to Juniors and Seniors. 3 lec. or rec.; 3 cr. (Not offered in 1947-1948.)

34. BUSINESS MANAGEMENT. Fundamental principles and techniques of successful organization, management and operation of business activities. Open to Juniors and Seniors. 3 lec. or rec.; 3 cr. (Not offered in 1947-1948.)

40. GENERAL INSURANCE. The field of Insurance; social value; physical and moral hazards; risk, its nature and economic significance; reinsurance; types of insurance coverages; fire, casualty, life, social. Fidelity and surety bonds. Open to Juniors and Seniors or by permission of the Instructor. Mr. Johnson. 3 lec. or rec.; 3 cr.

# ECONOMICS AND BUSINESS ADMINISTRATION

45. **PRINCIPLES OF SELLING.** Principles and methods used by commercial and industrial concerns in selling to the ultimate consumer. Consideration of principles employed in personal selling both in retail establishments and elsewhere. Prereq.: Junior or Senior standing or permission of instructor. 3 lec. or rec.; 3 cr.

46. **PRINCIPLES OF RETAILING.** Methods and principles of operating chain, department, specialty and unit stores. Consideration of retail location, store layout and merchandise classification, sales and service policies, pricing, buying and organization. Prereq.: Econ. 24. 3 lec. or rec.; 3 cr.

52. **MARKET ANALYSIS AND RESEARCH.** The nature, procedures and applications of market research in business. Determination of sales quotas, market potentialities and the measurement of replacement demand. Prereq.: Econ. 24. 3 lec. or rec.; 3 cr. (Not offered in 1947-1948.)

## SECRETARIAL STUDIES

Schedule the following courses as Sec. St. 1, etc.

1-2. **SHORTHAND.** Principles of Gregg shorthand with practice in transcribing from shorthand plates and class notes. Sec. St. 7-8 must either be taken in conjunction with this course or precede it. Miss Tyrrell. 5 rec.; 3 cr.

3-4. **ADVANCED SHORTHAND.** A review of fundamental principles, the building of shorthand vocabulary, practice in taking dictation at increasing rates of speed, and practice in developing skill and speed in transcription. Miss Tyrrell. Prereq.: Sec. St. 2, or equivalent. 5 rec.; 3 cr.

5, (5). **PERSONAL USE TYPEWRITING.** Practice in acquiring correct typing techniques, arranging outlines, notes, themes, bibliographies, and simple tabulations. Open to any student who does not know how to typewrite. 5 lab.; 1 cr.

27. **TYPEWRITING.** Practice in acquiring correct typewriting techniques, and in arranging letters, tabulations, and simple manuscripts. This course is to be taken instead of Sec. St. 7 by Secretarial students who have had Sec. St. 5 or the equivalent. Miss Davis. 5 lab.; 1 cr.

7-8. **TYPEWRITING.** Practice in acquiring correct typewriting techniques, and in arranging letters, tabulations, and simple manuscripts. Miss Davis. 5 lab.; 2 cr.

9-10. **ADVANCED TYPEWRITING.** Practice in tabulating and in writing business letters, legal papers, and various business forms; and practice in transcribing shorthand notes. Miss Davis. Prereq.: Sec. St. 8 or the equivalent. 5 lab.; 2 cr.



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11. **FILING.** Various alphabetic, numeric, and geographic subject-matter systems of correspondence filing; cross reference; follow-up methods; filing supplies and equipment; practice in filing. Miss Davis. Prereq.: Sec. St. 7. 3 rec. or lec.; 2 cr.

13. **OFFICE MACHINES.** Duplicating methods; practice in typing master copies and stencils, and in operating a gelatin duplicator, a mimeograph, and a mimeoscope; practice in machine transcription; and an introduction to adding and calculating machines. Miss Davis. Prereq.: Sec. St. 8. 5 lab.; 2 cr.

17-18. **SECRETARIAL OFFICE PROCEDURE AND PRACTICE.** First semester, discussion of Secretarial duties and traits; problems in the discharge of various duties; and problems in office management. Second semester, 144 hours of practice Secretarial work in business offices. Miss Tyrrell. This course must be taken in conjunction with Sec. St. 3-4 and Sec. St. 9-10, or following these courses. 3 rec.; 3 cr.

19-20. **SECRETARIAL OFFICE PROCEDURE.** Discussion of Secretarial duties and traits; problems in the discharge of various duties; and problems in office management. Miss Tyrrell. For Two-Year Secretarial students holding part-time University clerical positions; not open to others except by permission of the instructor. 2 rec.; 2 cr. (Not given in 1947-1948.)

22. **ADVANCED DICTATION.** Speed building in dictation and transcription. Miss Tyrrell. Prereq.: Sec. St. 4. 3 rec.; 3 cr.

23-24. **BUSINESS WRITING.** Practice in writing various types of business letters and reports; proofreading; editing. Miss Tyrrell. 3 lec. or rec.; 3 cr.

### ECONOMICS

1-2. **PRINCIPLES OF ECONOMICS.** The fundamental principles which explain the organization and operation of the economic system. Mr. Shafer, Mr. Degler, Miss Woodruff. Not open to Freshmen. 3 lec. or rec.; 3 cr.

3. **ECONOMIC AND COMMERCIAL DEVELOPMENT OF THE UNITED STATES.** Miss Woodruff. 3 lec. or rec.; 3 cr.

**ECONOMIC GEOGRAPHY.** (See Geog. 4, page 225.)

5. **ECONOMIC AND COMMERCIAL DEVELOPMENT OF EUROPE.** Not open to Freshmen. 3 lec. or rec.; 3 cr. (Not given in 1947-1948.)

10. **TRANSPORTATION.** Development and organization of transportation agencies. Prereq.: Econ. 2. 3 lec. or rec.; 3 cr.

24. **MARKETING.** The economics of the marketing functions, agencies, and special problems of marketing. Mr. Degler. Prereq.: Econ. 2. (May be taken concurrently.) 3 lec. or rec.; 3 cr.

## ECONOMICS AND BUSINESS ADMINISTRATION

31, (31). **ECONOMIC AND BUSINESS STATISTICS.** The collection, analysis, interpretation, and presentation of statistical data as applied to economic and business problems. Frequency distributions, index numbers, time series, simple correlations. Emphasis is upon the interpretation and use of statistics. Required of all students majoring in Economics and Seniors in the Business Administration Curriculums. Prereq.: Econ. 2. 2 lec. or rec.; 1 lab.; 3 cr.

51. **LABOR ECONOMICS.** Historical background and present status of labor organizations and problems. Prereq.: Econ. 2. 3 lec. or rec.; 3 cr.

52. **PUBLIC FINANCE.** Theory and practice of public expenditures and collection of public revenues; problems and policies in financial administration, national, state, and local; taxation problems in the state of New Hampshire. Prereq.: Econ. 2. 3 lec. or rec.; 3 cr.

53. **MONEY AND BANKING.** Theory and practice of money and banking. Mr. Degler. Prereq.: Econ. 2. 3 lec. or rec.; 3 cr.

54. **ADVANCED MONEY AND BANKING.** Advanced monetary theory and some of the more practical aspects of modern banking. Prereq.: A satisfactory grade in Econ. 53. Mr. Degler. 3 lec. or rec.; 3 cr.

55. **CORPORATIONS.** Development and forms of business organization and combination. Mr. Degler. Prereq.: Econ. 2. 3 lec. or rec.; 3 cr.

56. **CORPORATION FINANCE.** Methods of financing corporate enterprise. Mr. Degler. Prereq.: Econ. 2. 3 lec. or rec.; 3 cr.

59, 60. **SEMINAR IN CURRENT ECONOMIC PROBLEMS.** Elective for Seniors majoring in Economics who have attained a satisfactory standing in the Department. Recitations and reports; 3 cr.

62. **PUBLIC REGULATION OF BUSINESS.** The Government control of business organizations and their activities with special reference to recent legislation affecting business. Mr. Alexander. Open to Juniors and Seniors who have completed Economics 2 or Government 2. 3 lec. or rec.; 3 cr.

63. **INTERNATIONAL TRADE AND FINANCE.** Theory of international trade, foreign exchange, balance of international payments, tariffs and protection; the economic aspects of international relations, with particular reference to recent policies. Miss Woodruff. Prereq.: Econ. 2. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

64. **COMPARATIVE STUDY OF ECONOMIC SYSTEMS.** An examination of socialism, communism, capitalism, and modifications of these types, particularly as exemplified by leading nations. Prereq.: Econ. 2 or



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permission of the instructor. Miss Woodruff. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

76. VALUE AND DISTRIBUTION. An advanced course in economic theory. Emphasis is upon the theory of price and the distribution of income. Prereq.: Econ. 2. 3 lec. or rec.; 3 cr.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

157-158. HISTORY OF ECONOMIC THOUGHT. A critical study of the development of economic concepts and ideas. Attention is given to the various schools of economic thought. Prereq.: 18 hours of major credit in economics and the consent of the instructor. 3 lec. or rec.; 3 cr.

181, 182. READING AND RESEARCH IN ECONOMICS. With the advice and consent of the instructor, a student prepared by training and experience to do independent work may register for a reading and research course. The student will undertake assigned problems and readings under the guidance of the instructor. Hours and credits by arrangement. *Economic History*, Miss Woodruff; *International Trade*, Miss Woodruff; *Corporations*, Mr. Degler; *Money and Banking*, Mr. Degler; *Economic Theory*, Mr. Shafer.

## EDUCATION

A. MONROE STOWE, *Professor*; HARLAN M. BISBEE, *Associate Professor Emeritus*; EVERETT B. SACKETT, *Associate Professor*; WAYNE S. KOCH, *Assistant Professor*; AUSTIN L. OLNEY, *Assistant Professor*.

HERBERT A. CARROLL, *Professor (Educational Psychology)*; HELEN F. McLAUGHLIN, *Professor (Home Economics-Education)*; CLIFFORD S. PARKER, *Professor (Language-Education)*; CARL LUNDHOLM, *Professor (Physical Education)*; MARION C. BECKWITH, *Associate Professor (Physical Education)*; HAROLD I. LEAVITT, *Associate Professor (General Science)*; JOHN S. WALSH, *Associate Professor (Latin-Education)*; HARRY D. BERG, *Assistant Professor (History-Education)*; GEORGE R. THOMAS, *Associate Professor (Art-Education)*; \*EARL H. LITTLE, *(Agriculture-Education)*; PAUL E. SCHAEFER, *Assistant Professor (Biology-Education)*; DONALD M. PERKINS, *Assistant Professor (Mathematics-Education)*; LEWIS C. GOFFE, *Instructor (English-Education)*; RAYMOND I. BEAL, JOHN N. COTTON, AUSTIN J. McCAFFREY, HAROLD T. RAND, CHARLOTTE SMITH, and MURRAY H. WATSON, *Consultants in Teacher Education*.

\*Representing the State Department of Education in the administration of the Smith-Hughes Act.

# EDUCATION

## COURSES IN EDUCATION

41, (41). PRINCIPLES OF EDUCATIONAL PSYCHOLOGY. A study of such principles of behavior as are of service to teachers in their efforts to influence intelligently the intellectual, emotional, social, and personality development of their pupils. Mr. Stowe and Mr. Koch. Open to Sophomores, Juniors, and Seniors. Not open to students who have completed Psych. 11. 3 rec.; 3 cr.

(42), 42. EDUCATIONAL PSYCHOLOGY OF ADOLESCENCE. The purpose of this course is to help students to acquire an appreciative understanding of adolescents and their educational needs, and of the most effective way of meeting those needs. Mr. Stowe. 3 rec.; 3 cr.

45, (45). NEW HAMPSHIRE STATE PROGRAM OF STUDIES AND SCHOOL LAW. The aims and purposes, the plan of organization, and administration of the secondary school as outlined in the New Hampshire State Program of Studies and School Law. Mr. Koch and Mr. Bisbee. Open to Juniors and Seniors. Preparatory for state examinations in secondary program and in school law. 2 rec.; 2 cr.

51. SOCIAL BACKGROUNDS OF AMERICAN EDUCATION. The educationally significant aspects and needs of modern democratic society. Mr. Stowe. Open to Juniors, Seniors, and Graduate students. 3 rec.; 3 cr.

(52), 52. PRINCIPLES OF AMERICAN SECONDARY EDUCATION. The development and place of the secondary school in the American system of education; aims and functions of secondary education in our democracy; upward and downward extension of secondary education; articulation with lower and higher educational institutions, and with the community; the secondary school pupil; adjustment of the work of the school to meet individual needs; the offerings, both curricular and extra-curricular, of the secondary school; place and relationships of school board, superintendent, headmaster, and teachers. Mr. Stowe. Open to Juniors, Seniors, and Graduate Students. 3 rec.; 3 cr.

61, (61). PRINCIPLES AND PROBLEMS OF TEACHING IN THE SECONDARY SCHOOL. (1) Secondary-school objectives and the objectives in the teaching of secondary-school subjects; (2) principles of teaching and of directing learning incorporated in teaching which meets the needs of high-school students and attains the objectives of the secondary school; (3) secondary-school tests and the ways in which teachers are endeavoring to ascertain the extent to which their objectives are being attained; (4) class management, the purpose of which is to insure conditions favorable to the attainment of the objectives of the secondary school. Mr. Koch. Prereq.: Ed. 41 and 42. 3 rec.; 1 two-hour lab.; 4 cr.



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65. EDUCATIONAL TESTS AND MEASUREMENTS. The nature of measurement. Classification and evaluation of tests. Standardized tests in subject-matter fields. The construction of tests in classroom practice. Diagnosis and prognosis of pupils' aptitudes, achievements, attitudes, and interests in the public-school program with particular emphasis upon the role of tests. Mr. Carroll. Prereq.: Psych. 1. 3 rec.; 3-cr. *2 or 3 cr. apt. = 2 cr.*

75. CHARACTER EDUCATION IN THE SCHOOLS. Environmental factors which exert an important influence upon pupils of adolescent and pre-adolescent age; the development of wholesome ideals, attitudes, habits, personality and character traits; direct and indirect methods of character development through school subjects, co-curricular and extra-curricular activities. Open to Seniors and Graduate Students who have satisfactorily completed Ed. 42. 2 rec.; 2 cr.

76. PHILOSOPHY OF EDUCATION. A study of current educational objectives and practices and the philosophical foundations upon which they are based. Mr. Koch. Prereq.: Ed. 42, 51, 52. 3 rec.; 3-cr. *2-3 cr.*

89. MENTAL HYGIENE FOR TEACHERS. A study of the fundamental needs of human beings, with special emphasis on the mental and emotional conflicts of secondary-school students arising from the thwarting of these needs. Ways of recognizing these conflicts by their manifestations, and of helping students to resolve them will be treated extensively in the course. Attention will also be given to the mental hazards of the teaching profession. Mr. Stowe. Prereq.: General course in Psychology. Not open to students who have completed Psych. 47 or 81. 3 rec.; 3 cr.

*(83) Education and Vocational Guidance - 2 cr.*  
*S. 8-10*

### COURSES PRIMARILY FOR GRADUATE STUDENTS

102. PUBLIC SCHOOL ADMINISTRATION. This course is intended for Graduate Students who have had teaching or administrative experience and are looking forward to further work as superintendent, principal, or department head. The course will consider the practical applications of approved practices and modern methods of administration in medium-sized school systems. The following selected topics illustrate the nature of the course: Purposes of School Administration; Personal Qualities Essential for Success; Public Relations; Business Aspects; Finance; Program and Curricula Making; Essential Records and Reports; Care of School Property; Teachers' Meetings; Selecting Teachers; and some Unsolved Problems of Administration. Prereq.: 3 rec.; 3 cr.

111-112. WORKSHOP IN ADMINISTRATION IN THE JUNIOR AND SENIOR HIGH SCHOOLS. This course will be devoted to a study of basic princi-

## EDUCATION

ples of Educational Administration with their application to the following types of problems in the junior and senior high schools: The internal organization of the school, administering the program of studies, direction of extra-curricular activities, organization and direction of guidance, making the school schedule, selection of the staff, discipline and control, buildings and grounds, equipment and supplies, office organization, records and reports, administering finance, public relations and publicity. The course will be so organized as to permit students to specialize on problems of administration in the junior high schools as well as in the senior high schools. As the workshop technique of discussing practical problems will be utilized in the course, it is hoped that members of the group will bring problems for further discussion and study. Designed for individuals preparing for positions as principals and headmasters. Mr. Koch. 6 cr.

114. WORKSHOP IN SECONDARY-SCHOOL CURRICULUM DEVELOPMENT. 3 cr.

117. WORKSHOP IN MATERIALS OF GUIDANCE. 3 cr.

118. WORKSHOP IN PROBLEMS OF ORGANIZATION AND ADMINISTRATION OF GUIDANCE. 3 cr.

122. PROBLEMS IN THE SUPERVISION OF HIGH SCHOOL TEACHING. This course is designed to be of service to supervising classroom teachers, headmasters, and superintendents. It will be devoted to the consideration of the meaning of supervision, its organization, and methods and techniques for evaluating and improving instruction in secondary schools. 3 cr.

131-132. RESEARCH PROBLEMS IN SECONDARY EDUCATION. 2-6 cr.

### COURSES IN PROBLEMS IN THE TEACHING OF HIGH-SCHOOL SUBJECTS

\*The following courses are devoted to a study of problems of objectives, selection and organization of subject matter, teaching and testing techniques, and classroom management in the teaching of the respective subjects. To be admitted into one of these courses the student must have completed, with a grade of at least C, Ed. 61† and, in addition, the courses in the subject and related subjects designated as prerequisites to the respective courses in this group. A student desiring to be considered for Supervised Teaching must complete with a grade of at least C one of these courses in the subject in which he

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\*For details concerning prerequisites and nature of these courses, see descriptions given under respective subject-matter departments.

†Except for Ag.-Ed. 92, Art.-Ed. 91, Art.-Ed. 92, and Home Ec.-Ed.91.



## UNIVERSITY OF NEW HAMPSHIRE

hopes to do supervised teaching. The satisfactory completion of two of these courses is required of students completing the University Teacher Preparation Program.

AGRICULTURE-EDUCATION (AG-Ed) 92. PROBLEMS IN THE TEACHING OF HIGH-SCHOOL AGRICULTURE. MR. LITTLE. Open only to Seniors in Agricultural Teacher Preparation. 3 lec.; 3 cr.

ART-EDUCATION (ART-ED) 91. PROBLEMS OF TEACHING ART IN ELEMENTARY SCHOOLS. 3 cr. Mr. Thomas.

ART-EDUCATION (ART-ED) 92. PROBLEMS OF TEACHING ART IN SECONDARY SCHOOLS. 3 cr. Mr. Thomas.

BIOLOGY-EDUCATION (BI-ED) 91. PROBLEMS IN THE TEACHING OF HIGH-SCHOOL BIOLOGY. 3 cr. Mr. Schaefer.

ENGLISH-EDUCATION (ENG-ED) 91. PROBLEMS IN THE TEACHING OF HIGH-SCHOOL ENGLISH. 3 cr. Mr. Goffe.

GENERAL SCIENCE-EDUCATION (GS-ED) 91. PROBLEMS IN THE TEACHING OF GENERAL SCIENCE. 3 cr. Mr. Leavitt.

HISTORY-EDUCATION (HIST-ED) 91. PROBLEMS IN THE TEACHING OF HIGH-SCHOOL HISTORY. 3 cr. Mr. Berg.

HOME ECONOMICS-EDUCATION (HE-ED) 91. PROBLEMS IN THE TEACHING OF HIGH-SCHOOL HOME ECONOMICS. 3 cr. Mrs. McLaughlin.

LANGUAGE-EDUCATION (LANG-ED) 91. PROBLEMS IN THE TEACHING OF FOREIGN LANGUAGES IN THE HIGH SCHOOL. 3 cr. Mr. Parker.

LATIN-EDUCATION (LAT-ED) 91, 92. PROBLEMS IN THE TEACHING OF HIGH-SCHOOL LATIN. 3 cr. Mr. Walsh.

MATHEMATICS-EDUCATION (MATH-ED) 91. PROBLEMS IN THE TEACHING OF HIGH-SCHOOL MATHEMATICS. 3 cr. Mr. Perkins.

PHYSICAL EDUCATION (P.E.-ED.) 91. PROBLEMS IN THE TEACHING OF PHYSICAL EDUCATION FOR WOMEN. 4 cr. Miss Beckwith.

PSYCHOLOGY-EDUCATION (PSYCH.-ED.) 91. PROBLEMS IN THE TEACHING OF HIGH-SCHOOL PSYCHOLOGY. 3 cr. Mr. Stowe.

### COURSES IN SUPERVISED TEACHING

This work is required in the Teacher Preparation Program. It is open only to students whose applications are approved by the Head of the Department of Education and the Supervisor of Student Teaching in the subject or subjects in which the applicant desires to do

## EDUCATION

supervised teaching. Applications should be filed in the office of the Department of Education, on or before November 15 of the academic year in which the supervised teaching is to be done. No applications will be considered unless the applicant has completed with a grade of at least C the following courses in Education: 42, 51, 52, and 61, and, with an average grade of C or better, at least 18 semester credits in the subject-matter field in which he desires to teach under supervision. The applicant must also complete with a grade of at least C a course in the problems of teaching the subject in which he desires to do supervised teaching.

Students may be enrolled for from 6 to 12 credits of work in Supervised Teaching in the second semester of the academic year. Students registered in the College of Liberal Arts may count no more than 9 semester credits in Supervised Teaching toward the fulfillment of the major requirements in Education.

EDUCATION-AGRICULTURE (ED-AG) 93. SUPERVISED TEACHING IN HIGH-SCHOOL AGRICULTURE. Prereq.: Senior standing in Ag-Ed Curriculum.

EDUCATION-ART (ED-ART) 94. SUPERVISED TEACHING IN SECONDARY-SCHOOL ART. Prereq.: ART-Ed 92.

EDUCATION-BIOLOGY (ED-BI) 93, 94. SUPERVISED TEACHING IN HIGH-SCHOOL BIOLOGY. Prereq.: BI-Ed 91.

EDUCATION-COMMERCE (ED-CS) 94. SUPERVISED TEACHING IN HIGH-SCHOOL COMMERCIAL SUBJECTS.

EDUCATION-ECONOMICS (ED-ECON) 94. SUPERVISED TEACHING IN HIGH-SCHOOL ECONOMICS. Prereq.: HIST-Ed 91.

EDUCATION-ENGLISH (ED-ENG) 94. SUPERVISED TEACHING IN HIGH-SCHOOL ENGLISH. Prereq.: ENG-Ed 91.

EDUCATION-<sup>Language</sup>FRENCH (ED-FR) 94. SUPERVISED TEACHING IN HIGH-SCHOOL FRENCH. Prereq.: LANG-Ed 91.

EDUCATION-<sup>Foreign Languages</sup>GENERAL SCIENCE (ED-GS) 94. SUPERVISED TEACHING IN GENERAL SCIENCE. Prereq.: GS-Ed 91.

EDUCATION-HISTORY (ED-HIST) 94. SUPERVISED TEACHING IN HIGH-SCHOOL HISTORY. Prereq.: HIST-Ed 91.

EDUCATION-HOME ECONOMICS (ED-HE) 94. SUPERVISED TEACHING IN HIGH-SCHOOL HOME ECONOMICS. Prereq.: HE-Ed 91.

EDUCATION-LATIN (ED-LAT) 94. SUPERVISED TEACHING IN HIGH-SCHOOL LATIN.



Elementary School Music - 3-6 cr.  
Ed. Mus. 94 - Supervised Teaching in  
Secondary School Music - 3-6 cr.

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EDUCATION-MATHEMATICS (ED-MATH) 94. SUPERVISED TEACHING IN HIGH-SCHOOL MATHEMATICS. Prereq.: MATH-ED 91.

EDUCATION-PHYSICAL EDUCATION (ED-PE) 93, (93). DIRECTED TEACHING IN PHYSICAL EDUCATION.

EDUCATION-PHYSICAL EDUCATION (ED-PE) 94. SUPERVISED TEACHING OF PHYSICAL EDUCATION IN THE FIELD.

EDUCATION-SOCIOLOGY (ED-SOC) 94. SUPERVISED TEACHING IN HIGH-SCHOOL SOCIOLOGY. Prereq.: HIST-ED 91.

*ELECTRICAL ENGINEERING*

LEON W. HITCHCOCK, *Professor*; WILLIAM B. NULSEN, *Associate Professor*; JAMES C. MACE, *Associate Professor*; GILBERT B. GOULD, *Instructor*; GEORGE W. WALSH, *Instructor*.

1-2. ELECTRICAL ENGINEERING. Direct current circuits and machinery. Mr. Gould. Prereq.: Math. 6. Required of Sophomores in E.E. E.E. 1: 2 rec.; 1 lab.; 3 cr. E.E. 2: 3 rec.; 1 lab.; 4 cr.

12. ILLUMINATION. Photometry, light sources, lighting applications, wiring methods, and National Electrical Code Rules. Mr. Nulsen. Required of Seniors in E.E. Elective for students who have completed E.E. 33, or 38. 2 rec.; 2 cr.

13. CIRCUIT THEORY. Single phase and polyphase circuits, network theorems, and wave analysis. Mr. Nulsen. Prereq.: E.E. 2. Required of Juniors in E.E. 2 rec; 2 cr.

14. ELECTRONICS. Fundamental principles of electronics, thermionic emission, characteristics of vacuum tubes, Class A amplifiers, and harmonic analysis. Mr. Mace. Prereq.: E.E. 13. Required of Juniors in E.E. 2 rec.; 1 lab.; 3 cr.

15, 16, 17, 18. STUDENT BRANCH OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. A student organization conducted in accordance with the by-laws of the Institute with meetings given a place on the student's class schedule. Each student is required to present and discuss an approved subject. At times the meeting may take the form of a debate, an address by an outside lecturer, or a motion picture of an instructive nature. Students in this course must become student members of the A.I.E.E. or the I.R.E. and must subscribe to a magazine selected by the Department. Required of Juniors and Seniors in E.E. Elective for Freshmen and Sophomores majoring in E.E. 1 rec.; no cr.

## ELECTRICAL ENGINEERING

19, 20. **THESIS.** An original investigation offering opportunity for a better understanding of the fundamental principles and theory underlying Electrical Engineering practice and the design and operation of electrical equipment. Apparatus constructed as a part of a thesis becomes the property of the Department. A statement of progress must be submitted at the conclusion of each scheduled period. A thesis may be discontinued at any time if there appears to be a lack of interest or ability, or for failure on the part of the student to report at the periods scheduled. Staff members. Elective for Seniors in E.E. 3-5 lab.; 3-5 cr.

23-24. **LABORATORY.** Operation and test of direct and alternating current equipment; laboratory practice and report presentation. Mr. Nulsen. Prereq.: E.E. 2. Required of Juniors in E.E. 1 lab.; 2 cr.

25. **LABORATORY.** A continuation of E.E. 24. Mr. Nulsen. Prereq.: E.E. 24. Required of Seniors in E.E. 2 lab.; 4 cr.

31. **CIRCUITS AND APPLIANCES.** Electric circuit theory, wiring methods, efficiency, protection of circuits and equipment, national electrical code, meters, motors, illumination, signal circuits, and telephones. Mr. Hitchcock. Prereq.: Hotel Administration 21, 22 or Physics 2. 3 rec.; 1 lab.; 4 cr.

33, (33). **FUNDAMENTALS OF ELECTRICITY.** Direct and alternating current circuits, machines, and equipment. Mr. Hitchcock and Mr. Nulsen. Prereq.: Phys. 8. Required of Juniors in C.E. and Seniors in Chem. E. 3 rec.; 1 lab.; 4 cr.

37-38. **ELECTRICAL MACHINERY.** Direct and alternating current circuits, theory and characteristics of electric motors and generators, starting and control equipment. Mr. Walsh. Prereq.: Phys. 8. Required of Juniors in Mech. E. 3 rec.; 1 lab.; 4 cr.

42. **PRINCIPLES AND APPLICATIONS OF ELECTRON TUBES.** Vacuum tubes, vacuum tube amplifiers, gaseous triodes, photo-electric cells and their application in industry. Mr. Mace. Prereq.: E.E. 33, or 37. Elective for students not registered in the Electrical Engineering Curriculum. 3 rec.; or 2 rec. and 1 lab.; 3 cr.

53-54. **ELECTRICAL ENGINEERING.** Alternators, transformers, induction motors, regulators, synchronous motors, converters, and rectifiers. Mr. Hitchcock. Prereq.: E.E. 2. Required of Juniors in E.E. 3 rec.; 3 cr.

55. **ELECTRICAL ENGINEERING.** Transmission line fundamentals, T and Pi sections, and filters. Mr. Nulsen. Prereq.: E.E. 13. Required of Seniors in E.E. 3 rec.; 3 cr.



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57. ELECTRONICS. Modulation, detection, Class B and Class C amplifiers, thyatron control circuits, and power supplies. Mr. Mace. Prereq.: E.E. 14. Required of Seniors in E.E. 2 rec.; 1 lab.; 3 cr.

58. RADIO AND WIRE COMMUNICATION. Telephone measurements, long line measurements, oscillators, radio transmitters and receivers. Mr. Mace. Prereq.: E.E. 57. Elective for Seniors in E.E. 3 rec.; 1 lab.; 4 cr.

60. ADVANCED CIRCUIT THEORY. Steady state and transient analysis, derivation of fundamental formulas and constants. Mr. Nulsen. Prereq.: E.E. 55. Elective for Seniors in E.E. 3 rec.; 1 conference period; 4 cr.

76. LABORATORY. Advanced laboratory testing and special problems. The student works on problems of his own selection which have been outlined by him and have received approval. This may be in the form of a semester thesis, or a series of original experiments. Mr. Nulsen. Prereq.: E.E. 25. Elective for selected Seniors in E.E. 4 lab.; 4 cr.

78. ADVANCED ELECTRONICS. Frequency modulation, U.H.F. tubes, U.H.F. measurements, special wave forming circuits, and problems in transients. Mr. Mace. Prereq.: E.E. 57. Elective for Technology Seniors with permission of Department. 3 rec.; 1 lab.; 4 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. ELECTRIC AND MAGNETIC CIRCUITS. A treatment of unbalanced circuits by the use of symmetrical components. Transformer and reactor analysis. Mr. Nulsen. 3 rec.; 3 cr.

103, 104. PROPAGATION OF ELECTRO-MAGNETIC WAVES. Antennas and waveguides. Mr. Mace. 3 rec.; 3 cr.

105. ADVANCED COMMUNICATION. Circuit Theory. Mr. Mace. 3 rec.; 1 lab.; 4 cr.

107-108. THESIS. Credits to be arranged. Mr. Mace and Mr. Nulsen. 3-5 cr.

### ENGLISH

SYLVESTER H. BINGHAM, *Associate Professor*; HAROLD H. SCUDDER, *Professor*; WILLIAM G. HENNESSY, *Professor*; LUCINDA P. SMITH, *Associate Professor Emeritus*; CARROLL S. TOWLE, *Associate Professor*; EDMUND A. CORTEZ, *Associate Professor of Speech*; ROBERT G. WEBSTER, *Assistant Professor*; G. HARRIS DAGGETT, *Assistant Professor*; J. DONALD BATCHELLER, *Assistant Professor of Speech*; JOHN H. SCHULTZ, *Assistant Professor*; JOHN G. RIDEOUT, *Assistant Professor*; BEACH

## ENGLISH

LANGSTON, *Assistant Professor*; SALLY LOOMIS, *Instructor*; MAX SINGLETON MAYNARD, *Instructor*; ARTHUR EASTMAN, *Instructor*; JOHN C. RICHARDSON, *Instructor*; LEWIS C. GOFFE, *Instructor*; F. VERNON GETTY, *Instructor*.

### REMEDIAL COURSES

*Engl. A, offered Sem. II MW 7-9 - mk. 208 - permission required*

\*A. REMEDIAL WORK IN WRITING. Required of all students whose attainments in this subject are found to be unsatisfactory. Assignment to classes from which the students may be excused either at mid-semester or at the end of the year. 3 rec.; no credit.

B. REMEDIAL WORK IN SPEECH. See the section headed *Speech*.

\*C. REMEDIAL WORK IN READING. Intensive drill in reading skills for six weeks. Offered twice each semester. 3 rec.; no credit. Mr. Webster.

### COURSES IN ENGLISH

1-2. FRESHMAN ENGLISH. The training of students to write correctly and with force and to read with appreciation and discernment the chief types of literature. The entire staff of the Department. 3 rec.; 3 cr.

12. THE BIBLE AS LITERATURE. A study of the various literary types found in the Bible and a survey of the influence of the Bible on English literature. For Sophomores, Juniors, and Seniors. 3 rec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

13, 14. AN INTRODUCTION TO ENGLISH LITERATURE. The development of English literature from its beginnings to the twentieth century by means of selected readings. Mr. Webster and other members of staff. For Sophomores, Juniors, and Seniors. (Not recommended for English majors. Will not count for major credit.) 3 rec.; 3 cr.

15, 16. SURVEY OF AMERICAN LITERATURE. Mr. Scudder. For Sophomores, Juniors, and Seniors. 3 rec.; 3 cr.

22. WRITING FOR THE NEWSPAPER. Mr. Webster. For Sophomores, Juniors, and Seniors. 3 rec.; 3 cr.

23, (23). WRITING OF TECHNICAL REPORTS. Mr. Webster and Mr. Schultz. Required of Seniors in Agriculture and in Mechanical, Electrical, and Civil Engineering, and Building Construction. 1 rec.; 1 lec.; 2 cr.

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\*Any student may be recalled and reassigned to an instruction group at any time in his four years in college upon report of any member of the Faculty that his work in composition or in reading is deficient.



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25-26. **ADVANCED COMPOSITION.** Practice with compositions of varying lengths. Class discussions with illustrative readings. Weekly conferences. Mr. Towle and Miss Loomis. For Sophomores, Juniors, and Seniors. Prereq.: Eng. 1-2. 3 lec. or rec.; 3 cr.

27. **ENGLISH GRAMMAR.** Mr. Goffe. 3 rec.; 3 cr.

43, 44. **READING FOR THOUGHT.** Analysis of the thought and structure of three forms of writing: exposition, description, and narration. Mr. Bingham. For Sophomores, Juniors, and Seniors. 3 rec.; 3 cr.

53, 54. **WRITING AS AN ART.** The study and practice of forms of writing, together with an examination of the history of literary philosophy. Practice in mutual criticism through class workshop discussions and written comment. Freedom in selection and pursuance of writing interests. Individual conferences. Mr. Towle. For Juniors, Seniors, and Graduate Students. Prereq.: Eng. 25 or its equivalent. 2 lec.; 1 rec.; 3 cr. (Given in alternate years; offered in 1947-1948.)  
(Formerly Eng. 65, 66.)

### *Great Figure Group*

55, 56. **CHAUCER.** Mr. Rideout. For Juniors, Seniors, and Graduate Students. 3 rec.; 3 cr.

\*57, 58. **SHAKESPEARE'S PLAYS.** The major histories, comedies, and tragedies. Mr. Hennessy. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr.

59. **MILTON.** The minor poetry and the *Paradise Lost*. Mr. Schultz. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

60. **BOSWELL'S JOHNSON.** Mr. Scudder. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

61. **WORDSWORTH.** Mr. Rideout. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

62. **BROWNING.** Mr. Daggett. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

### *The Century or Period Group*

63, 64. **ENGLISH LITERATURE IN THE SIXTEENTH CENTURY.** Mr. Schultz. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

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\*English 57, 58 is a required course for English majors and may not be used in fulfillment of the requirement of one semester in the Great Figure group.

## ENGLISH

65, 66. ENGLISH LITERATURE IN THE SEVENTEENTH CENTURY. Mr. Towle. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

67, 68. ENGLISH LITERATURE IN THE EIGHTEENTH CENTURY. Mr. Bingham. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

69, 70. THE ENGLISH ROMANTIC PERIOD. Wordsworth, Coleridge, Lamb; Byron, Shelley, Keats, Hazlitt, DeQuincy. Mr. Daggett. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

71, 72. VICTORIAN PROSE AND POETRY. Major non-fictional prose from Carlyle to Stevenson and major poetry from Tennyson to Hardy. Mr. Hennessy. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

73, 74. BRITISH LITERATURE OF THE TWENTIETH CENTURY. Mr. Daggett. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

### *The Advanced American Literature Group*

75. NEW ENGLAND RENAISSANCE. Emerson, Thoreau, and other transcendentalists. Mr. Scudder. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

76. AMERICAN NOVEL IN THE NINETEENTH CENTURY. Mr. Scudder. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

77. AMERICAN POETRY OF THE NINETEENTH CENTURY. Mr. Scudder. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

78. AMERICAN HUMOR. Mr. Scudder. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

79, 80. AMERICAN LITERATURE OF THE TWENTIETH CENTURY. Mr. Towle. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

### *The Type Group*

81, 82. INTRODUCTION TO ENGLISH DRAMA. The development of English drama, exclusive of Shakespeare, from the Middle Ages to



## UNIVERSITY OF NEW HAMPSHIRE

the present. Mr. Hennessy. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

83, 84. THE ENGLISH NOVEL OF THE EIGHTEENTH AND NINETEENTH CENTURIES. Mr. Bingham. For Juniors, Seniors, and Graduate Students. 3 lec.; 3 cr.

\*85, 86. A SURVEY OF ENGLISH AND AMERICAN LITERATURE. The Department, under the direction of the Chairman. For Seniors and Graduate Students. 3 lec.; 3 cr.

91. ENGLISH-EDUCATION. PROBLEMS IN THE TEACHING OF HIGH SCHOOL ENGLISH. Principles and methods of teaching English literature and composition in secondary schools. Prereq.: three years of English courses approved by the Head of the Department, and a demonstration of proficiency in English grammar, either by the satisfactory completion of Eng. 27, or by examination and Education 61. For all students who plan to teach English in secondary schools and for students majoring in Language, History, or Education. Mr. Goffe. 3 lec. or rec.; 3 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

A student taking a course primarily for Graduate Students must register for the graduate course and pass, in partial fulfillment, with a grade of B or better, the corresponding 51-90 undergraduate course; at the same time, he must do additional work assigned by his instructor and prepare a paper on an agreed subject connected with his study. An account of the additional work must be turned in to the Chairman of the Department no later than two weeks after the commencement of the course, and the paper must be in the hands of the Chairman at least two weeks before the end of the course. A student may not register for a graduate course if he has previously taken the corresponding undergraduate course.

155, 156. CHAUCER. 3 lec.; 3 cr.

157, 158. SHAKESPEARE. 3 lec.; 3 cr.

159. MILTON. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

160. BOSWELL'S JOHNSON. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

161. WORDSWORTH. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

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*\*This course does not carry major credit and cannot be counted toward the master's degree.*

## ENGLISH

162. BROWNING. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

163, 164. ENGLISH LITERATURE IN THE SIXTEENTH CENTURY. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

165, 166. ENGLISH LITERATURE IN THE SEVENTEENTH CENTURY. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

167, 168. ENGLISH LITERATURE IN THE EIGHTEENTH CENTURY. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

169, 170. THE ENGLISH ROMANTIC PERIOD. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

171, 172. VICTORIAN PROSE AND POETRY. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

173, 174. BRITISH LITERATURE OF THE TWENTIETH CENTURY. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

175. THE NEW ENGLAND RENAISSANCE. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

176. THE AMERICAN NOVEL IN THE NINETEENTH CENTURY. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

177. AMERICAN POETRY OF THE NINETEENTH CENTURY. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

178. AMERICAN HUMOR. 3 lec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

179, 180. AMERICAN LITERATURE OF THE TWENTIETH CENTURY. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

181, 182. AN INTRODUCTION TO ENGLISH DRAMA. 3 lec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

183, 184. THE ENGLISH NOVEL OF THE EIGHTEENTH AND NINETEENTH CENTURIES. 3 lec.; 3 cr.



# UNIVERSITY OF NEW HAMPSHIRE

## SPEECH

Mr. Cortez, *in charge.*

THE SPEECH CLINIC. For any member of the University who wishes to have his voice and speech examined and corrected.

\*B. REMEDIAL WORK IN SPEECH. Required of all students whose speech is found to be unsatisfactory.

33, 34. DISCUSSION AND DEBATE. First semester: the proposition and its main issues, sources and tests of evidence, construction of the argumentative brief, laws of reasoning. Second semester; practice in discussion and debate, varsity debating, parliamentary procedure. For Sophomores, Juniors, and Seniors. Mr. Batcheller. Prereq.: Eng. 35 or its equivalent. 3 rec.; 3 cr.

35, (35). PUBLIC SPEAKING. The fundamental basic appeals and audience psychology; extemporaneous and impromptu speaking for every occasion. Mr. Cortez, Mr. Batcheller. For Sophomores, Juniors, and Seniors. 3 rec.; 3 cr.

36. SPEECH FOR TEACHERS. Constant practice in reading announcements, short stories, and selections of prose and verse. Emphasis upon oral interpretation. Prepared talks on methods of reading before the class. Mr. Cortez. Permission of the instructor. Recommended prereq.: Eng. 35 or 47. 3 rec.; 3 cr.

39. RADIO SPEAKING. Practice in the preparation and delivery of radio continuity, readings, skits, talks, and announcements; microphone technique. Mr. Cortez. For Sophomores, Juniors, and Seniors. Prereq.: permission of the instructor. 3 rec.; 3 cr.

47, 48. DRAMATICS WORKSHOP. First semester: the fundamentals of acting, stage direction, stage department, and the analysis, and development of roles in plays. Second semester: the methods of choosing, casting, and directing plays. Practical experience in productions. Mr. Batcheller. For Sophomores, Juniors, and Seniors. Prereq.: permission of the instructor. 1 rec.; 2 lab.; 3 cr.

## ENTOMOLOGY

JAMES G. CONKLIN, *Professor*; WALTER C. O'KANE, *Professor*; ROBERT L. BLICKLE, *Assistant Professor*.

2. ELEMENTARY ENTOMOLOGY. An introduction to Entomology in its

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\*Any student may be recalled and reassigned to an instruction group at any time in his four years at college upon report of any member of the Faculty that his work in speech is deficient.

## ENTOMOLOGY

broad aspects. The structure, biology, and classification of insects. Each student is required to make an insect collection. Mr. Conklin. 2 lec.; 1 lab.; 3 cr.

41. INSECTS OF ORCHARD AND GARDEN. Studies of the life histories and habits of important insect pests of orchard, garden, and certain field crops. Methods of control. Apparatus for applying insecticides. Mr. Conklin. 2 lec.; 1 lab.; 3 cr.

54. MEDICAL ENTOMOLOGY. Insects and arachnids in relation to public health. The more important disease carriers, their biologies, and means of control. Adapted especially for students interested in public health or medicine. Mr. Blickle. Elective for Juniors and Seniors. 2 lec.; 1 lab.; 3 cr.

55. HOUSEHOLD INSECTS, STORED PRODUCTS INSECTS. The problems of pest prevention and control in buildings. Pests of fabrics and clothing. Insects affecting foodstuffs. Termites and other insects attacking wooden structures. Mr. Conklin. 1 lec.; 1 lab.; 2 cr. (Given in alternate years; offered in 1947-1948.)

56. FOREST INSECTS. Principles of Forest Entomology. Life histories and habits of the more destructive forest insects. Forest insect control. Adapted especially for forestry students. Mr. Conklin. Prereq.: Ent. 2. 1 lec.; 1 lab.; 2 cr.

57-58. ADVANCED ENTOMOLOGY. The anatomy and physiology of insects. Systematic Entomology. Mr. Conklin, Mr. Blickle. Open to others than Ent. majors by permission of the Head of Department. 2 lec.; 2 lab.; 4 cr.

59-60. ADVANCED ECONOMIC ENTOMOLOGY. Problems in applied Entomology. The literature of Economic Entomology. Investigational methods. Studies of the specialized phases of Entomology. Mr. Conklin, Mr. Blickle. Required of Ent. majors. Open to others than Ent. majors by permission of the Head of the Department. 1 to 3 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. GRADUATE ENTOMOLOGY. Mr. Conklin, Mr. Blickle. Hours and credits to be arranged.

103, 104. GRADUATE ENTOMOLOGY. Mr. Conklin, Mr. Blickle. Hours and credits to be arranged.

### FINE ARTS

(See THE ARTS, page 180.)



# UNIVERSITY OF NEW HAMPSHIRE

## FORESTRY

CLARK L. STEVENS, *Professor*; LEWIS C. SWAIN, *Assistant Professor*;  
CHARLES M. MATTHEWS, *Instructor*.

1. MANAGEMENT OF FARM WOODLANDS. Forestry principles as applied to the orderly handling of farm woodlots. Mr. Swain. Elective for all students, except Forestry majors. 2 lec.; 1 lab.; 3 cr.

2, 3, 4, 5, 6, 7, 8. FORESTRY PRACTICE. Practical work in the University Forest, expected of all foresters. The student gains experience in various forestry operations, and progresses from laborer to supervisor. Mr. Stevens and others. 1 lab.; 1 cr.

21. FOREST ECOLOGY. Summer camp course.\* Composition of the forest association; effect of environment on growth of stands; studies of forest vegetation. Mr. Stevens. Elective for all students. Forty hours per week for 8 weeks. 10 cr.

26. WOOD IDENTIFICATION. The uses of lumber; physical properties and identification of the commercially important woods. Mr. Swain. 2 lec.; 1 lab.; 3 cr.

27-28. MENSURATION AND SURVEYING. Theory and practice in the elementary principles of land measurement, mapping, and timber measurements, as they apply to the field of forestry. Mr. Matthews. 2 lec.; 2 lab.; 4 cr. Prereq.: Math. 2 or 6. *effective 2/48*

29-30. SILVICULTURE. The art of producing and tending a forest. Seed collection, storage, and testing; nursery practice; forest plantations; natural regeneration, intermediate cuttings; silvicultural practice. Mr. Stevens. For foresters. Elective for others with approval of the instructor. 2 lec.; 1 lab.; 3 cr.

31, 32. FOREST UTILIZATION. Methods of logging and milling in the chief lumber-producing regions of the United States; forest products, their manufacture and marketing; with special problems of the lumber business. Mr. Swain. 2 lec.; 1 lab.; 3 cr.

33. FOREST PROTECTION. Protection of the forest from such enemies as fire, insects, fungi, trespass, and climatic extremes; also the construction of forest improvements associated with protection plans. Mr. Swain. Recommended for Sophomores in Forestry. Elective for others with approval of the instructor. 2 lec.; 1 lab.; 3 cr.

34. FISH AND GAME MANAGEMENT. Designed to acquaint the student with the fundamental principles underlying the management of wild life as a forest crop. Mr. Stevens. For students in Game Man-

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\*See description of Summer Camp, page 44.

## FORESTRY

agement Group. Elective for others with approval of the instructor. 2 lec.; 1 lab.; 3 cr.

35-36. THESIS. Work to be arranged according to the needs of individual students. Mr. Stevens, Mr. Swain, Mr. Matthews. Prereq.: Forestry 26, 28, and 29. 2 lec.; 2 or 3 cr.

37. FOREST RECREATIONAL. Principles and methods for planning, designing, and administering public and semi-public forest recreational areas. Prereq.: Permission of the instructor. 2 lec.; 1 lab.; 3 cr. (Not offered in 1947-1948.) *offered Sem II - 1947-48*

39-40. FOREST MANAGEMENT. Management of woodlots and large forest tracts for the purposes of gaining the largest immediate and future returns. Preparation of working plans to coordinate forest operations. Mr. Matthews. Prereq.: Forestry 26; 27-28; 29-30; 42. 2 lec.; 2 lab.; 4 cr.

41. GAME MANAGEMENT FIELD PRACTICE. Summer Camp Course.\* Field work on the University Forest at Passaconaway, N. H., and on a game management area of the White Mountain National Forest. Mr. Stevens and others. For students in Game Management Group. Elective for others by permission of the instructor. Forty hours per week for 8 weeks. 10 cr.

42. SUMMER CAMP.\* Practice in forest mapping and surveying; measurement of forest products; timber estimating; and studies of growth and yield of the commercial tree species of New England. Mr. Stevens, Mr. Matthews, Mr. Swain. Forty hours per week for 8 weeks. 10 cr.

44. FOREST ECONOMICS AND FINANCE. Application of economics and finance to the forest business. Nature of forest investments, valuation of timber and forest lands, forest taxation, and forest insurance. Prereq.: Math. 2 or 6; Econ. 1; Agr. Econ. 11 or equivalent. Mr. Matthews. 3 lec.; 3 cr.

52. HISTORY OF FORESTRY. The history of forestry; its development and present status in different countries. Prereq.: Permission of the instructor. 3 lec.; 3 cr. (Not offered in 1947-1948.)

53. ADVANCED GAME MANAGEMENT. Summer Camp Course.\* Special problems in the management of fish and game. Open to advanced students or to those who show unusual promise in the field of research. Mr. Stevens and others. Prereq.: Permission of the instructor. Forty hours per week for 8 weeks. 10 cr.

## FRENCH

(See LANGUAGES, pages 243-244.)

\*See Camp description, page 44.



# UNIVERSITY OF NEW HAMPSHIRE

## GEOGRAPHY

(See page 225.)

## GEOLOGY

T. RALPH MEYERS, *Associate Professor*; DONALD H. CHAPMAN, *Associate Professor*; GLENN W. STEWART, *Assistant Professor*; WILLIAM W. HILDRETH, *Instructor*.

### GEOLOGY

1-2. PRINCIPLES OF GEOLOGY. The earth and its history. A consideration of land forms and a discussion of the materials and structures of the earth's crust. The interpretation of past geologic events, and their effect on the development of life forms. Messrs. Meyers, Chapman, and Stewart. 3 lec. or rec.; 1 lab.; 4 cr. *This course cannot be used to satisfy major requirements.*

7, (7). GENERAL GEOLOGY. A general introductory course in Physical Geology. The structures and materials of the earth's crust and the forces which have produced and altered them. Mr. Stewart. For students in Technology and Agriculture. Open to Liberal Arts students by permission only. 2 lec. or rec.; 2 cr.

31. PHYSIOGRAPHY. The forces producing the present aspect of the land surface, particularly that of New England. Special emphasis on the work of running water, glaciers, and marine agents. Field trips during the fall season. Mr. Chapman. Prereq.: Geol. 2 or Geog. 3. 3 lec. or rec.; 1 lab.; 4 cr.

32. GLACIAL GEOLOGY. A study of the characteristics of existing glaciers and an interpretation of Pleistocene glacial features. The abundant and varied evidence of glaciation in northeastern North America and Baltic Europe will be emphasized. New Hampshire examples of both Alpine and continental glaciation will be studied in the field. Mr. Chapman. Prereq.: Geol. 31. 2 lec.; 1 lab.; 3 cr.

33. STRUCTURAL GEOLOGY. An advanced study of the structures of the earth's crust and of the dynamics of their formation. Mountain systems, metamorphism, igneous structures, and theories of earth origin. Mr. Stewart. Prereq.: One course in Geol. 3 lec. or rec.; 1 lab.; 4 cr. (Formerly Geol. 12.)

34. ELEMENTS OF PETROLOGY. A systematic study of rock types together with their modes of occurrence and problems of origin. Mr. Stewart. Prereq.: Geol. 1 or 7. 2 lec.; 1 lab.; 3 cr.

35-36. MINERALOGY. The minerals that make up the earth's crust: crystals; minerals and their determination by means of physical and

## GEOLOGY

chemical characteristics; and mineral associations to form rocks. Mr. Meyers. Prereq.: One course in Geol. or one course in Chem. 2 lec. or rec.; 1 lab.; 3 cr.

53, 54. ECONOMIC GEOLOGY. First semester: the types of coal and their occurrence in the United States; petroleum, the structures in which it is found, and the distribution and geology of oil fields, especially in the United States; industrial minerals and their utilization. Second semester: the metals, their ores, and the geology of important ore deposits. Mr. Meyers. Prereq.: One year's work in Geol. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

39-40. PALEONTOLOGY. The history, development, and morphology of the various groups of animals, and, to a lesser extent, plants, as recorded by fossils found in the rocks of the earth's crust. Mr. Stewart. Prereq.: One year's work in Geol. or Zoöl. 2 lec. or rec.; 1 lab.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

57, (57). GEOLOGICAL PROBLEMS. Special problems by means of conferences, assigned readings, and field work, fitted to individual needs. Messrs. Meyers, Chapman, and Stewart. Prereq.: Permission of the instructor. 1-5 cr. This course may be taken more than once.

## GEOGRAPHY

Register for these courses as Geog. 1, etc.

*Geog. 1, 2 cannot be used to satisfy Science requirements, nor major requirements. Geog. 3 and Geog. 10 cannot be used to satisfy Science requirements.*

1, 2. GEOGRAPHY OF THE WESTERN AND EASTERN HEMISPHERES. A general survey of the geography of the earth, with emphasis upon its physical aspects. First semester: Western Hemisphere. Second semester: Eastern Hemisphere. Mr. Chapman. 2 lec. or rec.; 2 cr.

3. PHYSICAL GEOGRAPHY. A study of the physical elements of Geography and their relationship to man. Mr. Chapman. 3 lec. or rec.; 3 cr.

4. ECONOMIC GEOGRAPHY. The resources of the continents and the relationship of these with the principal activities of man. A study of fishing, agriculture, mining, industry, transportation, and commerce is included. With Geog. 3, this course completes a year's basic work in Geography. Open to all students. 3 lec. or rec.; 3 cr.

5. POLITICAL GEOGRAPHY. A study of the geographic foundations of the state, of the influence of geography on the political organization of the world in war and peace. Special emphasis on recent schools of thought, such as German geopolitics, British, French, and American



## UNIVERSITY OF NEW HAMPSHIRE

political geography. Prereq.: A college course in geography or permission of the instructor. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

10. GEOGRAPHY OF NORTH AMERICA. The North American continent and its physical aspects. The weather and climate of the continent. The countries, treated regionally. Intensive study of the physical geography of New England. Mr. Chapman. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

12. GEOGRAPHY OF LATIN AMERICA. The physical and economic geography of Mexico, Central America, and the South American countries, treated regionally. Mr. Chapman. Prereq.: A college course in geography or permission of instructor. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

### METEOROLOGY

Register for these courses as Met. 1, etc.

*Met. 1, 2 cannot be used to satisfy Science requirements, nor major requirements. Met. 25 cannot be used to satisfy Science requirements.*

1. THE WEATHER. The interpretation of atmospheric phenomena; the heating and circulation of the atmospheres and the nature and movement of the air masses which influence the weather of North America and particularly New England. Mr. Chapman. 2 lec. or rec.; 2 cr.

2. CLIMATES OF THE WORLD. Classification of climates of the world. Examples and brief descriptions of major climatic types, and their influence on the life of man. Mr. Chapman. 2 lec. or rec.; 2 cr.

25. METEOROLOGICAL OBSERVATIONS. Prompt and accurate determination of weather conditions, current methods of coding and transmission of weather data, and the care of weather instruments and records will be emphasized. 2 lec. or rec.; 2 cr.

26. WEATHER MAP PLOTTING. A training course, using modern methods, for the plotting and interpretation of observational data used in the preparation of weather maps. Prereq.: A course in Meteorology. 2 lec. or lab.; 2 cr.

57, (57). METEOROLOGICAL PROBLEMS. Special problems by means of conferences, assigned readings, and laboratory work, fitted to individual needs. Mr. Chapman. Prereq.: Permission of the instructor. 1-5 cr. *This course may be taken more than once.*

### GERMAN

(See LANGUAGES, pages 245-246.)



# GOVERNMENT

## GOVERNMENT

NORMAN ALEXANDER, *Professor*; JOHN T. HOLDEN, *Associate Professor*;  
DONALD E. DUNN, *Instructor*; CARL J. SCHNEIDER, *Instructor*.

1. (1). AMERICAN GOVERNMENT. A study of the nature and growth of the political institutions of the American people. A brief comparison of our political institutions with those of other present-day systems of government. The fundamentals of American government, popular control, lawmaking, and the administration of public affairs with frequent reference to current political development. Mr. Holden and Mr. Schneider. Open to all students. 3 lec. or rec.; 3 cr.

2. PROBLEMS OF AMERICAN GOVERNMENT. This course aims to acquaint the student with the principal problems and public policies of the American Government at its various levels — national, state, and local. Mr. Holden. Open to students who have had Govt. 1. 3 lec. or rec.; 3 cr.

4. AMERICA IN WORLD AFFAIRS. An intensive study of the major factors influencing international relations and America's position in the world of today. Special emphasis on the emergence of the United States as a world power, and on the development of U. S. foreign policy throughout World Wars I and II. Mr. Schneider. Open to all students. 3 lec. or rec.; 3 cr.

7. EUROPEAN GOVERNMENTS. A comparative study of the chief governments of Europe, of their recent problems and political development. Special attention is given to the governments of Great Britain, Soviet Russia, and Germany, and to differences in the procedures and principles of the democracies, and of the totalitarian governments. Mr. Schneider. Open to Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

8. GOVERNMENTS OF THE FAR EAST. A detailed survey of the recent governmental problems and political development of China, Japan, Siberia, India, the Dutch East Indies, and other portions of Eastern Asia. Mr. Schneider. Open to Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

10. LATIN AMERICAN GOVERNMENTS. A detailed survey of the recent governmental problems and political development of Mexico, Central America, and the South American countries, treated regionally. Mr. Schneider. Open to Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

13. LOCAL GOVERNMENT. A study of current problems in government

## UNIVERSITY OF NEW HAMPSHIRE

of local areas. Subjects covered are: political and administrative consequences of urbanization, characteristics of the various types of local government, centralization and decentralization as they affect modern democracy, forms of municipal government with intensive analysis of the Council-Manager Plan, and selected administrative activities of the town and city. Mr. Dunn. Prereq.: Govt. 1. 3 lec. or rec.; 3 cr.

15. **POLITICS AND PRESSURE GROUPS.** A study of the fundamental problems of popular control of government. The history, programs, and functions of political parties. Major pressure groups, their organization, methods, and objectives. Party finance, nomination procedures and elections, machines and bosses, political campaigns, problems of public control, and the current political situation. Mr. Alexander. Open to Sophomores, Juniors, and Seniors who have had Govt. 1. 3 lec. or rec.; 3 cr.

16. **PUBLIC OPINION AND PROPAGANDA.** An analysis of public opinion and of the opinion-forming process. Propaganda techniques and methods; the measurement of public opinion; the influence of the press and of the radio. Problems in the relationship of government to public opinion. Mr. Alexander. Open to Sophomores, Juniors, Seniors who have had Govt. 1. 3 lec. or rec.; 3 cr.

51, 52. **CONSTITUTIONAL LAW.** A case study of the American Constitution, stressing the powers of Congress and the President, The Bill of Rights, limitations upon state legislation, and the nature of the judicial process. Consideration is given to the economic and social aspects of constitutional law principles. Mr. Alexander. Open to Juniors and Seniors who have had Govt. 1, 2. 3 lec. or rec.; 3 cr.

53. **INTERNATIONAL LAW.** The rules governing the conduct of nations, states; national and international jurisdiction; pacific relations of states; relations of belligerent states; rights and duties of neutrals. Mr. Alexander. Open to Juniors and Seniors. 3 lec. or rec.; 3 cr.

55. **WORLD POLITICS.** A survey of the foundations of international relations, the major forces and factors which shape contemporary world politics. The influence of geography, economic nationalism, imperialism, nationalism, modern science and technology, minorities, the sovereign state and power politics, militarism, the techniques of total war. Attention is also given to the problems of international planning and the organization of the peace. Mr. Schneider. Open to Juniors and Seniors. 3 lec. or rec.; 3 cr.

56. **INTERNATIONAL ORGANIZATION.** A detailed study of existing organizations and plans for co-operation, including the analysis of United Nations as a new world organization, and a comparison with



Government 68. Problems in International Relations. A survey course of several basic problems in international relations. The problems will be discussed and the reading directed by men and women who are experts in international affairs. The course will consist of lectures, papers, reading assignments and conferences. For juniors, seniors, graduate students and others possessing an adequate background in international relations, at the discretion of the instructor. This course is intended for only a limited number of students who will be attending the New England Institute of International Relations in Durham, June 17-25, 1948. 1 cr.

This course is being established in cooperation with the American Friends Service Committee to supplement their New England Institute of International Relations scheduled to be held at the University June 17-25, 1948. We expect fifty to sixty qualified students to register. The course will be given by Dr. John T. Holden, Associate Professor of Government.

64. AMERICAN POLITICAL THOUGHT. This course is a survey of American political thought from Revolutionary days to the present, with special emphasis on constitutionalism, federalism, centralization, collectivism, and recent theories supporting present-day programs of government. Mr. Holden. Open to Juniors and Seniors. 3 lec. or rec.; 3 cr.

65, 66. RESEARCH IN GOVERNMENT PROBLEMS. An individual research project in one of the fields of government, *e.g.*, Local or State Administration, Comparative Government, International Relations, International Organization, Political Theory, Politics, or Public Law to be prepared under the direction of a member of the staff. Emphasis will be placed on the methods and sources of research in government. The department staff. Open to Senior majors in Government. 3 cr.

## GOVERNMENT

the League of Nations. Special attention is given to a discussion of the various plans for global co-operation in the postwar era. Open to Juniors and Seniors. Mr. Holden. 3 lec. or rec.; 3 cr.

57. PUBLIC ADMINISTRATION. An examination of concepts and relationships involved in getting the job done in government. Material will cover the expansion and present scope of government administration, the enlarged responsibility to the public which rests upon the modern administrator, organization and coordination as tools of management, personnel, finance, and selected administrative techniques. Mr. Dunn. Open to Juniors and Seniors who have had Govt. 1. 3 lec. or rec.; 3 cr.

60. GOVERNMENT APPRENTICESHIP. This course is designed to give the student a practical concept of local government administration. Two afternoons per week will be spent working in the office of a public official in a nearby local unit of government. The student will be assigned to Bureau of Government Research service projects suited to his background and personality, in which he engages in research or analysis designed to assist the public official with whom such apprenticeship is arranged. Periodic reports will be required. Mr. Dunn. Open to Juniors and Seniors. Prereq.; Govt. 13 or Govt. 57 and permission of the instructor. 4 crs.

PUBLIC REGULATION OF BUSINESS. (See Economics 62, page 205.)

63. HISTORY OF POLITICAL THOUGHT. A historical survey of the principal political theories from Plato and Aristotle to the present. The course is also designed to introduce the student to those movements of political thought which lie as the basis of modern theories of government, *e.g.*, liberalism, socialism, fascism, democracy. Mr. Holden. 3 lec. or rec.; 3 cr.

64. AMERICAN POLITICAL THOUGHT. This course is a survey of American political thought from Revolutionary days to the present, with special emphasis on constitutionalism, federalism, centralization, collectivism, and recent theories supporting present-day programs of government. Mr. Holden. Open to Juniors and Seniors. 3 lec. or rec.; 3 cr.

65, 66. RESEARCH IN GOVERNMENT PROBLEMS. An individual research project in one of the fields of government, *e.g.*, Local or State Administration, Comparative Government, International Relations, International Organization, Political Theory, Politics, or Public Law to be prepared under the direction of a member of the staff. Emphasis will be placed on the methods and sources of research in government. The department staff. Open to Senior majors in Government. 3 cr.



# UNIVERSITY OF NEW HAMPSHIRE

## COURSES PRIMARILY FOR GRADUATE STUDENTS

101. **THE LEGISLATIVE PROCESS.** An analysis of the law making process and the forces which shape legislation. The work in this course consists largely of an intensive study of one legislative measure. Special consideration will be given to the influence in the legislative process of such factors as the political traditions and beliefs of the American people, public opinion, rules and procedures, committee hearings and reports, the chief executive, party organizations, pressure groups. Mr. Alexander. Prereq.: 12 credits of work in Government. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

103. **THE CONSTITUTION AND CIVIL RIGHTS.** The concept of civil rights as expounded by the framers of the Constitution. An analysis of United States Supreme Court decisions interpreting the Bill of Rights. Consideration is given to the social, economic, and political implications of civil liberties. Mr. Alexander. Prereq.: 12 credits of work in Government. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1948-1949.)

104. **SEMINAR IN PROBLEMS OF PUBLIC ADMINISTRATION.** An advanced course testing and evaluating in the light of modern practice the theory examined in Government 57. The seminar will be devoted to an intensive investigation of selected problems in public management. Mr. Dunn. Prereq.: 12 credits of work in Government, including Govt. 57. 3 cr.

106. **SEMINAR IN WORLD POLITICS.** A detailed analysis of the major forces and factors influencing the development of modern world politics. Discussion of individual topics selected by students of the seminar; preparation of theses and oral reports in the field of international relations and world politics. Prereq.: 12 credits of work in Government or the equivalent. Mr. Schneider. 3 cr.

### GREEK

(See LANGUAGES, page 246.)

### HANDICRAFT

(See THE ARTS, page 181.)

### HISTORY

PHILIP M. MARSTON, *Associate Professor*; WILLIAM YALE, *Associate Professor*; ALLAN B. PARTRIDGE, *Assistant Professor*; GIBSON R. JOHNSON, *Assistant Professor*; HARRY D. BERG, *Assistant Professor*.

In these courses an important place is given to historical reading

## HISTORY

carried on in the reference room. Often a considerable part of the work is written.

The statements in regard to prerequisites are for Liberal Arts students. Agriculture and Technology students should consult the Head of the Department.

### SURVEY COURSE

*The following subject constitutes a basic course, required of all students in the College of Liberal Arts.*

1, 2. INTRODUCTION TO CONTEMPORARY CIVILIZATION. Designed to provide a background of appreciation of the social significance of man's environment, the nature of man, the cultural heritage from the past, recognition of historical allusions in literature and conversation, and knowledge of the general sequence of historic events. Prehistoric and historic social evolution. The historic explanation of modern life and an appreciation of the problems of contemporary society. Messrs. Berg, Johnson, Marston, Partridge, and Yale. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

### GROUP I. ANCIENT AND MEDÆVAL

This group includes many of the customary well-established courses in History. Students electing History courses with the general idea of rounding out their knowledge should include a selection from this group. History majors are expected to do a part of their work in it.

11. THE ANCIENT ORIENT. Pre-historic culture in the Near East; a consideration of the contributions of the many peoples and empires, from the Persian highlands to Egypt and the Ægean, in the making of the civilization handed on to the Mediterranean and Western world. Mr. Partridge. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

12. HISTORY OF GREECE. The deep-lying elements of Western civilization as developed by Greek thought and action. Hellenic culture and its influence, including adequate attention to the period after the death of Alexander the Great. Mr. Partridge. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

13. HISTORY OF ROME. The study of Roman civilization from the pre-literary foundations of Rome to the fourth century A.D. The aim is to deal with the life of society during the republican and imperial periods and to show the background of mediæval culture and the influence of the Romans upon later human affairs. Mr. Partridge. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

14. MEDÆVAL HISTORY. The story of things as they were from the



## UNIVERSITY OF NEW HAMPSHIRE

later Roman Empire to the Renaissance era in Europe. A leading purpose is to call attention to the dependence of the Middle Ages upon an earlier period, and another is to point out the mediæval foundations of Modern European history. Mr. Partridge. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

ENGLISH HISTORY. (See History 21.)

FAR EASTERN HISTORY. (See History 31.)

### GROUP II. MODERN

This group is planned in recognition of the practical importance and large place assigned by common practice to modern, recent, and present-day aspects of History.

19, 20. MODERN EUROPEAN HISTORY. Studies of: (1) That most important phenomenon, the modern national state; (2) Western civilization as it reached a peak in Europe; (3) European expansion and world leadership, from the late fifteenth to the early twentieth century. Eastern Europe, Asia, and Africa are referred to as backgrounds of the colonial movement. Because of its general importance, the course is open to all students; nevertheless, it is better, if possible, to study some of the earlier periods first. Mr. Yale. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

21, 22. HISTORY OF ENGLAND. The history of the British Isles from earliest times to the present, and a consideration of the British Empire and Commonwealth of Nations. A parallel to English literature, a background to American political history, and a study of English culture and institutions in the democratic and social integration of the world. Mr. Partridge. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

31, 32. THE FAR EAST. A study of the history of the peoples and cultures of Japan, China, India, and adjacent territories for the purpose of gaining a better understanding of their contemporary problems and ways of thinking and acting, especially as they relate to modern world developments. Mr. Johnson. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

63, 64. RECENT WORLD HISTORY. The world from the first World War, exclusive, for the most part, of American affairs, and stressing historical developments in Europe, the Near and Far East. Mr. Yale. For Juniors and Seniors. 3 lec. or rec.; 3 cr.

71, 72. HISTORY OF RUSSIA. A study of Tsarist Russia, its domestic and foreign affairs, and its collapse in 1917; followed by a study of Soviet Russia from the creation of the Soviet Union to the present. Mr. Yale. For Juniors and Seniors. 3 lec. or rec.; 3 cr.

# HISTORY

## GROUP III. AMERICAN HISTORY

This group addresses itself to (1) the responsibility of the American student to know his own country; (2) the widespread and well-established interest in New England's part in our history; (3) the developing Pan-American world; (4) some special aspects of American life, and American culture of the nineteenth and twentieth centuries.

7, 8. THE UNITED STATES FROM 1790 TO THE PRESENT. The administration of Washington, the great forces of nationalism, expansion, democracy, and sectionalism followed through the period of the second World War. Reference to such aspects of our national life as literary, artistic, scientific, and everyday life-ways, as well as the more usual political and economic events. Mr. Berg. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

9, 10. LATIN-AMERICAN HISTORY. The development and influence of Spanish and Portuguese culture as a wide-spread world force; the history of the Latin-American peoples; the relationship of Latin America to North America, particularly in view of recent growth in friendly and diplomatic relations. Mr. Partridge. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

51, 52. COLONIAL AND REVOLUTIONARY AMERICAN HISTORY. Colonial beginnings in America, national rivalries, the English colonies, the Revolution, and our national life to 1789. Early forms of Americanism in the making. Mr. Marston. For Juniors and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

59, 60. SOCIAL AND CULTURAL HISTORY OF NEW ENGLAND. From the settlements to the present. The material and intellectual aspects peculiar to New England's social and cultural life. The viewpoint is partly that of the antiquarian. Source materials figure considerably. It is assumed that the student is familiar with the general history of New England. Mr. Marston. For Juniors and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

81, 82. HISTORY OF THE WEST. The development of the United States as it was influenced by the successive "wests" in our history from Jamestown to the Pacific; the geography and economics of the westward movement. The frontier thesis will be considered in relation to the present-day position of the United States as a world power. Mr. Berg. For Juniors and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

83, 84. DIPLOMATIC HISTORY OF THE UNITED STATES. A study and re-appraisal of American foreign relations in the light of our present position and commitments. The course begins with American independence and will be brought up to date through the use of current



## UNIVERSITY OF NEW HAMPSHIRE

periodicals and newspapers. Mr. Berg. For Juniors and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

GROUP IV. HISTORY FROM AN EDUCATIONAL OR PHILOSOPHICAL VIEWPOINT  
PHILOSOPHY OF HISTORY. (See Philosophy 55, 56, page 000.)

87, 88. THE INTELLECTUAL HISTORY OF WESTERN CIVILIZATION. The history of ideas and of the great epochs in human thought. A study of the dominant characteristics of the leading cultures and of the transitions from one to the other. The content of the course will be selective rather than inclusive. Special attention will be given to a study of some of the major source writings of each period. Mr. Johnson. For Juniors and Seniors. 3 lec. or rec.; 3 cr.

HISTORY-EDUCATION (HIST-ED) 91. PROBLEMS IN THE TEACHING OF HIGH SCHOOL HISTORY. The purposes and objectives of teaching high school history; selection and organization of teaching material; teaching and testing techniques which may be advantageously used in teaching high school history and other social studies; experiments in studying and teaching history. Mr. Berg. Open to students who have satisfactorily completed Hist. 7-8, Govt. 1-2, Econ. 1 or 3, Soc. 1, and Ed. 61. 3 class meetings; 3 cr.

*The Departments of Agricultural Economics, Government, History, Mathematics, and Sociology offer jointly a course designed to meet the needs of those Social Science students who are interested primarily in Statistics as applied to the Social Science fields. See Social Science 51, page 279.*

### COURSES PRIMARILY FOR GRADUATE STUDENTS

111, 112. SEMINAR IN THE HISTORY OF NEW ENGLAND. For graduate students who wish to specialize in some phase of New England history or the history of New Hampshire. The work is concerned primarily with the study and interpretation of source material and can be correlated with the preparation of a thesis. Mr. Marston. Prereq.: Permission of the instructor. 3 cr.

113, 114. SOURCES FOR THE STUDY OF COLONIAL AMERICAN HISTORY. For students who have taken History 51, 52 or equivalent. Training in the methods of historical investigation and in the use of sources in the field of Colonial American History. The preparation of papers based on source materials alone. Mr. Marston. Prereq.: Permission of the instructor. 3 cr. (Not offered in 1947-1948.)

123, 124. HISTORIOGRAPHY. The lives and writing of some leading historians from earliest times to the present, and their contributions to scope, method, viewpoint, and literary achievement. Mr. Partridge. Prereq.: Permission of the instructor. 3 cr. (Not offered in 1947-1948.)

# HOME ECONOMICS

## HOME ECONOMICS

HELEN F. McLAUGHLIN, *Professor*; VERNA MOULTON, *Assistant Professor*; DOROTHY COUSENS, *Instructor*; FRANCES PLATTS, *Instructor*; SARAH THAMES, *Dietitian, University Dining Hall*

1, 2. **HOMEMAKING.** The various phases of homemaking and the vocational opportunities open to women. Mrs. McLaughlin. Exploratory course; 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements in Home Economics.*

Note: Further work than is offered in any of the following courses may be taken under H.Ec. 47, (47), Projects in Home Economics.

### CLOTHING AND TEXTILES

3. **CLOTHING SELECTION.** The selection of suitable and becoming clothing; color; good grooming; clothing budgets; care and repair of clothing. Miss Moulton. 3 lec. or rec.; 3 cr.

4. **TEXTILES.** A study of textiles with emphasis on their characteristics, utilization, care, and purchase from the point of view of the consumer. Miss Moulton. 2 lec. or rec.; 1 lab.; 3 cr.

5-6. **CLOTHING CONSTRUCTION.** Application of the principles of design and development of technique in garment construction including cotton and woollen garments, a renovation problem; pattern alteration, and children's clothes. Miss Moulton. 2 labs.; 2 cr.

61, (61). **ADVANCED PROBLEMS IN CLOTHING CONSTRUCTION.** A tailored suit or coat and one or more individual problems involving advanced techniques in the construction and renovation of clothing. Miss Moulton. Permission of instructor. 2 labs.; 2-3 cr.

(62), 62. **PROBLEMS IN SEWING FOR THE HOME.** Curtains, draperies, slip covers, and bedspreads. Miss Moulton. Permission of instructor. 2 labs.; 2-3 cr.

**HISTORIC COSTUME AND DESIGN.** (See Arts 43, 44, page 182.)

### FOOD AND NUTRITION

15-16. **FOODS.** The composition, selection, preservation, and preparation aspects of foods; meal planning and table service. Miss Platts. 1 lec.; 2 labs.; 3 cr.

21, 22. **ELEMENTARY MEAL SERVICE.** Planning, preparing, and serving simple, nutritious, and attractive meals. Miss Platts. For students not majoring in H.Ec. 1 lec.; 1 lab.; 2 cr.

71. **EXPERIMENTAL COOKERY.** The application of principles and



## UNIVERSITY OF NEW HAMPSHIRE

methods for organizing general and specific problems in food preparation, of an experimental nature, will be considered. Miss Platts. Prereq.: H.Ec. 15-16. 1 lec.; 1 lab.; 2 cr.

72. **ADVANCED PROBLEMS IN FOOD.** Selected problems in one or more phases of food study such as advanced food preparation, advanced meal planning and table service. Miss Platts. Prereq.: H.Ec. 15-16. 1 lec.; 1 lab.; 2 cr.

74. **DIETETICS.** Application of the principles of human nutrition to varying physiological, social, and economic conditions. Mrs. McLaughlin. 2 lec.; 1 lab.; 3 cr.

75. **DIET THERAPY.** Study of special diets used for the prevention and treatment of various diseases. Readings in the current literature of nutrition. Mrs. McLaughlin. Prereq.: H.Ec. 74. 3 rec.; 3 cr.

### CHILD DEVELOPMENT

25, 26. **CHILD DEVELOPMENT.** The normal development and care of the infant and child; physical, mental, social, and emotional development and guidance. Mrs. Cousens. Prereq. or parallel requirement: Psych. 1 or 51. 2 lec. or discussions; laboratory work with children in the play group. 3 cr.

81, (82), (81), 82. **PROJECTS IN CHILD DEVELOPMENT.** Principles of child guidance. Nursery school procedures and practice. Discussion and supplementary projects based upon the special interests of the students. Prereq.: H.Ec. 25, 26. 1 lec. or discussion; laboratory work with children in the play group: 2-3 cr.

### HOME MANAGEMENT

32. **HOME FURNISHING.** Historical survey of furniture; problems in decorating and furnishing a modern home. Miss Moulton. 3 lec., rec. or conferences; 3 cr.

33. **HOME MANAGEMENT.** Management of time, energy, and money in relationship to home living; skills and techniques for care of the home. Mrs. Cousens. Not open to Freshmen. 2 lec. or rec.; 1 lab.; 3 cr.

34. **CONSUMER PROBLEMS.** Problems of the consumer as related to market practices, quality and quantity standards, evaluation of advertising, and selection of goods and services for the home. Mrs. Cousens. 3 lec. or rec.; 3 cr.

35, (35). **HOME MANAGEMENT HOUSE.** Participation in homemaking; planning, buying, and preparing meals; care of the house; efficient work habits; problems of management. Residence in the Home Management House. Mrs. Cousens. Half semester. Permission of the Head of the Department. 3 cr.

## HOME ECONOMICS

83. HOME AND FAMILY LIFE. A study of the problems confronting the home today in everyday living, such as relationships between family members, desirable home atmosphere, and worthy home membership. Mrs. McLaughlin. 3 lec. or rec.; 3 cr.

HOME BUILDING. (See Agricultural Engineering 37, page 177.)

HOUSEHOLD MECHANICS. (See Agricultural Engineering 38, page 177.)

### INSTITUTIONAL MANAGEMENT

41. INSTITUTIONAL MANAGEMENT. The organization and management of institutional food service; personnel policies, plant sanitation, records, menu planning, food buying, production, and merchandising. Field trips to study organization and management. Miss Thames. 3 lec. or rec.; 3 cr.

43-44. INSTITUTIONAL PRACTICE. Practical experience in the kitchens and serving room of the University Commons. Miss Thames. 2 lab.; 2 cr.

45. FURNITURE AND TEXTILES. Problems in the purchase, care, and use of equipment, furniture, and textiles for institutions. Miss Moulton. 3 rec.; 3 cr.

48. FIELD WORK IN INSTITUTIONAL PRACTICE AND EXTENSION. Six to ten weeks' residence and practical experience in an approved hospital or other institution, or with extension groups, supplemented by readings and conferences. Mrs. McLaughlin and Extension staff. 4-6 cr.

49-50. QUANTITY COOKERY. Principles, methods, and standards of food planning, preparations, and serving as applied to institutional food service. Laboratory work in the quantity-cookery laboratory at the University Commons. Miss Thames. Prereq.: H.Ec. 15-16. 2 labs.;

3 cr.

*extra conference period*

### HOME ECONOMICS EDUCATION

47, (47). PROJECTS IN HOME ECONOMICS. Opportunities for students to work out projects supplementary to or in advance of other courses. Not more than 9 credits may be taken in this course. Members of Home Economics staff. Conferences and assignments; reference readings; 1-3 cr.

HOME ECONOMICS-EDUCATION (HE-Ed) 91. PROBLEMS IN THE TEACHING OF HIGH SCHOOL HOME ECONOMICS. Mrs. McLaughlin. 3 lec. or rec.; 3 cr.

HOME ECONOMICS-EDUCATION (HE-Ed) 94. SUPERVISED TEACHING IN HIGH SCHOOL HOME ECONOMICS. Mrs. McLaughlin. Twelve weeks' supervised teaching, 12 cr.



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HOME ECONOMICS-EDUCATION (HE-Ed) 96. SEMINAR IN THE TEACHING OF HIGH SCHOOL HOME ECONOMICS. Mrs. McLaughlin. Prereq.: HE-Ed 94. Three weeks' intensive work following period of supervised teaching. 3 cr.

HOME ECONOMICS-EDUCATION. (HE-Ed) 98. PRINCIPLES AND TECHNIQUES OF DEMONSTRATIONS. Fundamentals of demonstration methods. Experience in conducting demonstrations in foods, clothing, home management, equipment, and other fields. Home Economics staff. 1 conference; 1-2 lab.; 2-3 cr.

### HORTICULTURE

ALBERT F. YEAGER, *Professor*; J. RAYMOND HEPLER, *Associate Professor*; L. PHELPS LATIMER, *Assistant Professor*; WILLIAM W. SMITH, *Assistant Professor*; E. W. KALIN, *Assistant Professor*.

2. PLANT PROPAGATION. Discussion and practice including soil, sand, and peat media; seed treatments, seeding, watering, light, feeding, and temperatures; leaf, softwood and hardwood cuttings; hormone treatments; budding, root, top- and bridge-grafting; seedbed and nursery practice. Mr. Yeager, Mr. Smith. 1 lec.; 1 lab.; 2 cr.

13. JUDGING IN HORTICULTURE. Students are taught how to select fruits, vegetables, and flowers for exhibition, marketing, and domestic use. Instruction is also given in the management and judging of small fairs and exhibitions. A wide range of plants and varieties, both fresh and frozen, are used as class material. Required of all Horticulture majors and recommended for others who are training for such positions as County Agricultural Agents, Home Demonstration Agents, Club Leaders, or Smith-Hughes teachers. Mr. Yeager, Mr. Latimer, Mr. Helper. 2 lab.; 2 cr.

14. ELEMENTARY VEGETABLE GARDENING. Garden soils; testing and planting seeds, selection of varieties with reference to New Hampshire conditions; construction and management of hotbeds and cold frames; fertilization, cultivation, and irrigation of the garden. Mr. Helper. 2 lec.; 1 lab.; 3 cr.

28. LANDSCAPE GARDENING. The design and maintenance of small properties with emphasis on the principles of arrangement and the use and identification of plant materials in the beautification of home surroundings. 2 lec.; 1 lab.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

38. FLORAL ARRANGEMENT. Floral design and the use of flowers in the home; practice in floral arrangement. A laboratory fee of \$3 is charged. Prereq.: Permission of the instructor. Not open to Horticulture majors. 1 lab.; 1 cr.

## HORTICULTURE

39. GREENHOUSE MANAGEMENT. Modern methods of Greenhouse Management including soils, watering, costs of production and marketing, and fundamentals of plant behavior under glass. Varieties, culture, and enemies of greenhouse plants. Practical work in propagating, potting, and other greenhouse operations. 2 lec.; 1 lab.; 3 cr. (Given in alternate years; not offered in 1947-1948. Students may elect additional work on greenhouse crops under Hort. 51 and 52.)

40. FLORICULTURE, FUNDAMENTALS AND PRACTICE. The fundamentals underlying the growing of plants; culture and classification of greenhouse and outdoor plant materials; study of garden design and the use of garden flowers and deciduous plant materials in beautifying the home; practice work in propagating plants, sowing seeds, transplanting, and other garden work. Not recommended for Horticulture majors. 2 lec.; 1 lab.; 3 cr.

41. COMMERCIAL FLORAL DESIGN. The design and use of flowers in commercial flower shops including vase arrangements, baskets, corsages, sprays, and wedding decorations; principles of retail store management. For Juniors and Seniors majoring in Horticulture. 1 lec.; 1 lab.; 2 cr. (Given in alternate years; not offered in 1947-1948.)

44. HORTICULTURAL PRACTICE. Seasonal practice work in fruit production, ornamentals, or vegetable production. Mr. Yeager and staff. Prereq.: Hort. 14 and 28 or 40. 1 to 5 cr.

48. BEEKEEPING. Habits of honey bees, assembling and use of hives, practice in handling bees. Production of commercial crops of comb and extracted honey, care and protection of bees during fall and winter, extraction of honey and preparation of comb honey and wax. Mr. Hepler. 1 lec.; 1 lab.; 2 cr.

51, 52. ADVANCED HORTICULTURE. Courses to be elected by students majoring in Horticulture and special students to gain further knowledge and specialization in the field of fruit, flower, vegetable production, and beekeeping. Additional laboratory practice if desirable. Mr. Yeager and staff. Prereq.: Permission to register from Head of the Department. 1 to 3 cr. per semester.

53. POMOLOGY: ORCHARD FRUITS. Fundamental principles and experimental data and their applications to orchard problems including the establishment of orchards, soil management, water and fertilizer requirements, mineral deficiencies, training and pruning, fruit bud formation, pollination and fruit setting, thinning and winter injury. Mr. Latimer. Prereq.: Bot. 1. 3 lec.; 3 cr.

54. POMOLOGY: SMALL FRUIT CULTURE. The culture and economic uses of the strawberry, raspberry, blackberry, blueberry and grape. Each fruit is considered with relation to its history, propagation, plant-



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ing, pruning, harvesting, marketing, insects, and diseases, and domestic uses. Mr. Latimer. 2 lec.; 2 cr.

55. SYSTEMATIC SURVEY OF FRUITS. Important species of fruits and nuts of temperate regions and their botanical relationships. The history, distribution, and merits of each species, and the horticultural varieties developed from it. Mr. Latimer. Prereq.: Bot. 1. 2 lec.; 2 cr.

57. SYSTEMATIC SURVEY OF VEGETABLES. Important species of vegetables and culinary herbs and their botanical relationships. The history, distribution, and commercial merit of each species and the horticultural varieties developed from it. Mr. Hepler. 2 lec.; 2 cr.

65. COMMERCIAL VEGETABLE PRODUCTION. The management of commercial vegetable gardens. Important vegetables and their culture including a comprehensive review of recent experimental work. Mr. Hepler. Prereq.: Hort. 14. 2 lec.; 1 lab.; 3 cr.

91, 92. HORTICULTURE SEMINAR. A review of recent Horticultural literature and methods of investigational work. Students required to prepare and present papers on selected topics. Horticultural staff. For Seniors in Hort. Others by permission of Department Head. 1 lec.; 1 cr.

94. PLANT BREEDING. Application of the principles of genetics to practical plant breeding. Hybridization, chemical treatments, and selection as means of producing and improving varieties. Mr. Yeager. Prereq.: Zoöl. 49. 2 lec.; 1 lab.; 3 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101. FLOWER BUD FORMATION. The influence of soil management, orchard fertilization, and resultant chemical composition of fruit plants, on flower bud formation and alternate bearing. Mr. Latimer. Prereq.: Ag. Chem. 2, Hort. 53. 2 rec.; 2 cr.

102. METHODS OF PLANT RESEARCH. An examination of methods used in laboratory and field by horticultural investigators. Mr. Yeager and staff. Prereq.: Ag. Chem. 2, Bot. 4, Hort. 53 or 65, Math. 5-6 or 21-22. 2 rec.; 2 cr.

103. WINTER INJURY. The physiology of winter injury to plants. Mr. Latimer. Prereq.: Bot. 4, Hort. 53 or 65. 2 rec.; 2 cr.

104. PROPAGATION AND GROWTH. The problems of water relations, rest period, propagation, pruning, and thinning orchard fruits. Prereq.: Ag. Chem. 2, Bot. 4, Hort. 53 or 65. 2 rec.; 2 cr.

106. POLLINATION AND FRUIT SETTING. Genetical and environmental

## HOTEL ADMINISTRATION

factors affecting the production of fruit. Mr. Latimer. Prereq.: Bot. 4 (may be taken concurrently), Hort. 53, Zoöl. 49. 2 rec.; 2 cr.

108. VEGETABLE PROBLEMS. A study of the physiological problems involved in vegetable production. Mr. Hepler. Prereq.: Bot. 4 (may be taken concurrently), Hort. 53 or 65. 2 rec.; 3 cr.

125, 126. RESEARCH IN HORTICULTURE. Mr. Yeager and staff. Prereq.: Hort. 102 (may be taken concurrently). Credits to be arranged.

### HOTEL ADMINISTRATION

RAYMOND R. STARKE, *Professor.*

The courses listed below are given primarily for students in Hotel Administration. Other students are invited to elect these courses with the permission of the instructor provided they have the prerequisites.

1. ORIENTATION. An introduction to Hotel Administration, including a history of hospitality the world over. Particular attention is paid to the origin, development, and organization of the hotel business in the United States. Required of Freshmen in Hotel Administration. 2 lec.;  $\frac{1}{2}$  cr.

5. HOTEL OPERATION. This course deals with the problems of hotel management. Some subjects studied are the organization, personnel and work of the departments, front office procedure, rate structure, and the methods of securing and financing a hotel business. The point of view of the resort operator is constantly compared with that of the man in the year-around hotel. B.Ad 9-10 should precede or accompany this course. 3 rec.; 3 cr.

6. HOTEL PUBLIC RELATIONS. The relations of the hotel with the public, either as prospective or present guests; sales promotion media and advertising. For Juniors and Seniors. 2 lec. or rec.; 2 cr.

HOTEL ACCOUNTING. (See B. Ad. 1-2, 9-10.)

12. FINANCIAL STATEMENTS. A study of financial reports and statements directed towards costs and percentages in hotel operations. The work is based on the Uniform System of Accounts for hotels as recommended by the American Hotel Association. Prereq.: B. Ad. 10 or Hotel Admin. 5. 2 lec. or rec.; 2 cr.

ELEMENTARY DRAFTING. (See Arts 20, page 181.)

FOODS. (See Home Ec. 15-16, 49-50.)

21, 22. INTRODUCTORY HOTEL ENGINEERING. To give an engineering background with additional practical information, this course supplies much of the material of an elementary Physics course with an added



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study of practical hotel problems, for example, common laundry practices and kitchen planning. Laboratory work will supplement the recitations and three or more inspection trips are made during the year. 3 lec. or rec.; 1 lab.; 4 cr.

23. STEWARDING. The management of the steward's department of a hotel, comprising the purchasing, storage, and issuing of foods, beverages, and supplies with the proper records to keep in connection therewith. This course will be given by an experienced steward. Pre-req.: none. 2 lec. (One meeting on alternate weeks); 1 cr.

40, 42, 44, 46. LECTURES ON HOTEL MANAGEMENT. Delivered by representative and well-known men in the hotel business and allied fields.  $\frac{1}{2}$  cr. for each course.

## HUMANITIES

HUMANITIES 1-2. A course in general education involving the Departments of Languages, English, Music, The Arts, and Philosophy, and designed to give an appreciation of literature, the various arts, and philosophy. The course will operate within an historical framework, but is not intended to be an historical survey. Weekly lectures or demonstrations by different members of the Humanities Division, readings, study of slides, films, recordings, class recitations and discussions. Mr. Daggett. Open to Juniors and Seniors by permission of the instructor. 3 lec. or rec.; 3 cr.

## INSTITUTIONAL MANAGEMENT

(See page 237.)

## LANGUAGES

CLIFFORD S. PARKER, *Professor*; JOHN S. WALSH, *Associate Professor*; PAUL L. GRIGAUT, *Associate Professor*; JULIO BERZUNZA, *Assistant Professor*; JAMES T. SCHOOLCRAFT, *Assistant Professor*; GERTRUDE E. TELLER, *Instructor*; ERNEST A. BOULAY, *Instructor*.

### GENERAL LANGUAGE AND LITERATURE

LANGUAGES 1, 2. SURVEY OF GREEK AND ROMAN LITERATURE. The masterpieces of Greek and Roman literature in translations. Through the study of literature, the students will learn about the ancient civilizations from which much of our contemporary culture has come. A cultural course for the general student unprepared to read the original languages but desiring acquaintance with this important subject matter. A background course for majors in such subjects as English,

## LANGUAGES

History, Latin, or one of the modern languages and literatures. Continued in Languages 51, 52. Mr. Walsh. 3 rec.; 3 cr.

LANGUAGES 51, 52. SURVEY OF MODERN EUROPEAN LITERATURE. The Renaissance, classicism, romanticism, and realism studied as international movements. Stress will be laid, not upon the details of each national literature, but upon the interdependence of the literatures of the various countries. Conducted in English. Prereq.: Junior, Senior, or Graduate standing. 3 rec.; 3 cr. (Not offered in 1947-48.)

LANGUAGES 73-74. GENERAL INTRODUCTION TO THE SCIENCE OF LANGUAGE. Origins of language; languages of the world; phonology; morphology; syntax; semantics, etymology; comparative philology; dialect divergence; linguistic change; race, culture, and language; psychology of language. Open to all students. 3 lec.; 3 cr. (Not offered in 1947-1948.)

LANGUAGES-EDUCATION. (LANG-ED) (91.) PROBLEMS IN THE TEACHING OF MODERN LANGUAGES IN THE HIGH SCHOOL. The special objectives, methods, and devices of modern language teaching in high schools. For prospective teachers of French, German, and Spanish. Prereq.: Education 61 with grade of C or better and one of the following courses: French 6, German 4, Spanish 4. 3 rec.; 3 cr.

### FRENCH

*(Freshmen will be assigned to French 1, French 3, or French 5, on the basis of their performance in the French placement examination in Orientation Week.)*

1-2. ELEMENTARY FRENCH. Elements of French grammar, reading of simple prose, oral practice. 3 rec.; 3 cr. *Cannot be counted for major credit.*

3-4. INTERMEDIATE FRENCH. Review of most important rules of grammar; reading of a large amount of diversified French prose, partly in class, partly outside; oral practice. Principal objectives: (1) to give a solid foundation for further work in French; (2) to increase the facility and accuracy of students' reading and oral knowledge of French. Prereq.: French 2 or its equivalent. 3 rec.; 3 cr.

5-6. FRENCH CIVILIZATION AND LITERATURE. Principal objectives: (1) to study the history of French culture; (2) to increase students' ability to use and understand the French language; (3) to prepare for the study of French language and literature in more advanced courses; (4) to enable students to understand some of the forces which will influence the reconstruction of France. Prereq.: French 4. 3 rec.; 3 cr.

11-12. FRENCH LITERATURE OF THE SEVENTEENTH AND EIGHTEENTH CENTURIES. French Literature from 1600 to the French Revolution.



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Topics studied include: the rise and development of the classical ideal; the masterpieces of the great writers of the age of Louis XIV; the decline and disintegration of classicism in the eighteenth century; the work and influence of Voltaire and Rousseau; the writers who represent the beginnings of romanticism. Prereq.: French 6. 3 rec.; 3 cr.

13-14. FRENCH COMPOSITION AND CONVERSATION. The use of written and spoken French taught by careful attention to pronunciation, composition, and grammar. To provide as much oral practice as possible, the usual preparation for recitations will be partially replaced by three drill sessions per week. Prereq.: French 4 with grade A or B; or French 6. 6 rec.; 3 cr.

53. FRENCH ROMANTICISM AND REALISM. The period from 1800 to approximately 1870; Chateaubriand and Mme. de Stael; the Romantic School (Lamartine, Vigny, Victor Hugo, Dumas, Musset, etc.); the historical novel and drama; the intermingling of romanticism and realism in the work of Balzac; realism in the novel, the drama, and poetry (Flaubert, Augier, Dumas fils, Leconte de Lisle, etc.) Prereq.: French 6. 3 rec.; 3 cr. (Not offered in 1947-1948.)

54. FRENCH LITERATURE FROM 1870 TO THE PRESENT. The work of Zola, Maupassant, Daudet, Bourget, Verlaine, Becque, and other outstanding writers of the last part of the nineteenth century; the various trends, schools, and individual writers of the twentieth century. Prereq.: French 53. 3 rec.; 3 cr. (Not offered in 1947-1948.)

61-62. ADVANCED FRENCH GRAMMAR AND COMPOSITION. A systematic study of French grammar with much oral and written practice. For students who wish to perfect their command of written and spoken French. Prereq.: French 6. (Students are advised to have had French 13-14 or the equivalent.) 3 rec.; 3 cr.

63-64. FRENCH LITERATURE AND CIVILIZATION OF THE MIDDLE AGES AND THE RENAISSANCE. The various forms and masterpieces of French literature from the beginning to the year 1600. Recommended for Seniors and Graduate students. Prereq.: French 12 or 54. 2 lec.; 2 cr. (Not offered in 1947-1948.)

92. ORAL FRENCH. Accuracy and facility in the use of oral French will be attempted through the study of phonetics and the use of dictation, conversation, phonograph, and other devices. Prereq.: French 14 or 61. 2 rec.; 2 cr. (Not offered in 1947-1948.)

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. HISTORY OF FRENCH LITERATURE. This course is not an introduction to French literature, but complements what the student has previously learned. The work consists of individual conferences

## LANGUAGES

between instructor and student and a large amount of reading. In general, each student is expected to study more carefully the authors of whom he has some knowledge, to fill in the gaps between courses he has taken, and to obtain an integrated knowledge of all French literature. Prereq.: Permission of Head of Department. Mr. Parker. 3 cr.

103, 104. SPECIAL STUDIES IN FRENCH LITERATURE. An intensive study of one or two important authors each semester; their lives, works, and times. Molière and Alfred de Vigny, for example, might supply the material for an entire year's work. The particular authors studied, however, may be changed from year to year in accordance with the needs and tastes of the students electing the course. The work will be conducted largely in French. Mr. Grigaut. Prereq.: 18 credits in undergraduate courses in French literature. 3 cr.

### GERMAN

1-2. ELEMENTARY GERMAN. Elements of German grammar, reading of simple prose, oral practice. 3 rec.; 3 cr. *Cannot be counted for major credit.*

3-4. INTERMEDIATE GERMAN. Designed to increase students' facility in speaking and reading German. The conversational material will comprise idiomatic and colloquial German expressions. The reading material, which will include modern texts of varied content and progressive difficulty, will make the course of value for those who wish to use German in other academic fields, or who intend to take courses in German literature. Prereq.: German 2 or two years of high school German. 3 rec.; 3 cr.

5-6. SCIENTIFIC GERMAN. For Pre-Medical students and majors in Physics, Chemistry, Geology, Forestry, Agriculture, and Engineering. To facilitate the reading of German scientific treatises. Prereq.: German 2 or two years of high school German. 3 rec.; 3 cr.

11-12. GERMAN LITERATURE FROM 1750 TO THE END OF THE CLASSICAL PERIOD. The development of German literature during the epoch of the *Aufklärung* and the *Sturm und Drang* to the end of the classical period. Lessing, Goethe, and Schiller chiefly studied. Prereq.: German 4 or the equivalent. 3 class hours; 3 cr. (Not offered in 1947-1948.)

13-14. GERMAN CONVERSATION AND COMPOSITION. For students who desire a fluent practical command of spoken and written German. Class discussions conducted in German. Opportunity for informal conversation, for discussion in German of topics prepared in advance, and for free German composition. Prereq.: German 2. 3 rec.; 3 cr. (Not offered in 1947-1948.)



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53-54. GERMAN ROMANTICISM. The revival of the historical and imaginative Middle Ages in the first half of the nineteenth century. Prereq.: Two years of college German or the equivalent. 3 class hours; 3 cr. (Not offered in 1947-1948.)

57-58. MODERN GERMAN LITERATURE. The development of German literature from 1832 to the present, with special emphasis on the novel and drama. Authors considered are Grillparzer, Hebbel, Ludwig, Keller, Meyer, Wagner, Hauptmann, Sudermann, Thomas Mann, Rilke, George, and Schnitzler. Prereq.: Two years of college German or the equivalent. 3 class hours; 3 cr.

63-64. HISTORY OF GERMAN LITERATURE. Its development from pagan to modern times. Representative works read in and out of class. The history of German civilization is taken up parallel with the history of literature. Prereq.: Two years of College German or the equivalent. 3 class hours; 3 cr. (Not offered in 1947-1948.)

### GREEK

1-2. ELEMENTARY GREEK. Grammar, composition, translation. Prereq.: Permission of the instructor. 3 rec.; 3 cr. (Not offered in 1947-1948.)

3-4. Translation of several books of Homer's *Iliad*; work in grammar and word-derivations. Prereq.: Greek 2. 3 rec.; 3 cr. (Given every third year; not offered in 1947-1948.)

### LATIN

1-2. ELEMENTARY LATIN. Elements of grammar, reading of simple prose. Study of the changes in meaning and form of English and Romance language derivatives from Latin. 3 rec.; 3 cr. (Not offered in 1947-1948.) *This course cannot be used to satisfy major requirements.*

3-4. INTERMEDIATE LATIN. A review of Latin grammar and vocabulary, followed by readings in poetry and prose. Prereq.: Latin 2 or two years of high school Latin. 3 rec.; 3 cr.

5-6. LATIN POETRY. Selected poems from Catullus, Ovid, Phaedrus, Martial, and the odes and epodes of Horace. Translations, lectures, and study of Latin influence on English poetry. Prereq.: Latin 4, or three years of high school Latin. 3 rec.; 3 cr.

7-8. LATIN PROSE AND COMEDY. The plays of Plautus and Terence, Livy's History (Books I and II), and Pliny's Letters, studied for their value as mirrors of the life and history of Rome as well as for their literary value. Prereq.: Latin 4. 3 rec.; 3 cr. (Not offered in 1947-1948.)

## LANGUAGES

9-10. MASTERPIECES OF LATIN LITERATURE. Intensive study of selections from such prose writers as Plautus, Livy, Pliny, Caesar, and Cicero, and of such poets as Catullus, Horace, and Virgil. Rapid reading of other works by the same and additional authors. Lectures on Roman civilization and its contributions to the general culture of the world. 3 rec.; 3 cr. (Not offered in 1947-1948.)

51-52. PHILOSOPHY AND SATIRE. Philosophy, religion, natural science, and social theories of the Romans, as exemplified in the writings of Horace, Martial, and Cicero. Prereq. Latin 6. 3 rec.; 3 cr. (Not offered in 1947-1948.)

55-56. LITERATURE AND HISTORY. A comprehensive view of Latin literature of the Golden Age, particularly the works of Caesar, Cicero, and Virgil. Literary value and historical content will be studied as well as such background of the history of Rome during the period as is necessary for the student or teacher of the classics. Prereq.: Latin 6. 3 rec.; 3 cr. (Not offered in 1947-1948.)

LATIN-EDUCATION (LAT-ED) 91-92. PROBLEMS IN THE TEACHING OF HIGH SCHOOL LATIN. The study of methods, objectives, and problems of teaching high school Latin will be carried on throughout the year concurrently with work in composition and conversation. Prereq.: Latin 6. 3 rec.; 3 cr. (Not offered in 1947-1948.)

### COURSES PRIMARILY FOR GRADUATE STUDENTS

125, 126. LATIN LITERATURE. A study of Latin literature through the medium of selections from the works of the more important authors from the beginnings to the decline of literary Latin. This reading will be supplemented by a detailed study of some special field, author, or group of authors. Mr. Walsh. 3 rec.; 3 cr.

### SPANISH

1-2. ELEMENTARY SPANISH. Elements of Spanish grammar, reading of simple prose, oral practice, dictation. 3 rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

3-4. MODERN SPANISH PROSE AND POETRY. Review of grammar, reading, composition, and conversation. A large part of the reading will be in the field of Latin-American literature and civilization. Prereq.: Spanish 2 or its equivalent. Freshmen who pass a reading test in Spanish may take this course. 3 rec.; 3 cr.

9. THE DRAMA OF THE SIGLO DE ORO IN SPAIN. Representative plays of Lope de Vega, Tirso de Molina, Guillen de Castro, Calderon, and other dramatists of the Golden Age of Spanish Literature. Prereq.: Spanish 4. 3 rec.; 3 cr.



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10. THE PICARESQUE NOVEL AND THE WORKS OF CERVANTES. *Celestina*, *Lazarillo de Tormes*, *Don Quijote*, and other novels of the sixteenth and seventeenth centuries. Lectures on Spanish civilization. Prereq.: Spanish 4. 3 rec.; 3 cr.

13-14. SPANISH COMPOSITION AND CONVERSATION. The use of written and spoken Spanish taught by careful attention to pronunciation, grammar, and composition. To provide as much oral practice as possible, the usual preparation for recitations will be partially replaced by three drill sessions each week. Prereq.: Spanish 4 or grade of B in Spanish 2. 6 rec.; 3 cr.

55-56. LATIN-AMERICAN LITERATURE. Selected writers of Latin-American countries who illustrate literature and social conditions in Central and South America. Certain works will be discussed in class while others will be assigned for collateral reading. Prereq.: Spanish 4. 3 rec.; 3 cr. (Not offered in 1947-1948.)

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. SPANISH LITERATURE OF THE MIDDLE AGES. Masterpieces and writers of Spanish literature from the beginnings to 1500. Their historical background. Conducted as far as possible in Spanish. Prereq.: 3 years of college Spanish or equivalent; 3 lec.; 3 cr. Mr. Berzunza.

### LATIN

(See LANGUAGES, page 246.)

### LAW

(See PRE-LAW, page 114.)

### MATHEMATICS

HERMON L. SLOBIN, *Professor*; GEORGE N. BAUER, *Professor Emeritus*; MARVIN R. SOLT, *Associate Professor*; HORACE A. GIDDINGS, *Associate Professor*; WILLIAM L. KICHLINE, *Assistant Professor*; DONALD M. PERKINS, *Assistant Professor*; JOHN S. FRENCH, *Assistant Professor*; RICHARD S. SOMERS, *Assistant Professor*; A. RAYMOND HARVEY, *Instructor*; ROBERT O. KIMBALL, *Instructor*; CHARLES A. SEWELL, *Instructor*.

1-2. GENERAL MATHEMATICS. The elements of Algebra and Trigonometry. Prereq.: One entrance unit of high school math. 3 rec.; 3 cr.

3-4. THE ELEMENTS OF ANALYTICAL GEOMETRY AND CALCULUS. A continuation of Mathematics 1-2. Prereq.: Math. 1-2. 3 rec.; 3 cr.

5, (5)-6. FIRST YEAR MATHEMATICS. Algebra, Trigonometry, and

## MATHEMATICS

Analytic Geometry. Prereq.: See requirements of Math. for admission

Math. 11, (11). Algebra. The elements of Algebra. (To provide separate courses in Algebras, Trigonometry, Analytic Geometry, and to enable the introduction of Elementary Calculus in the Freshman year for students in the Engineering program.) For Freshmen in the Engineering program and others meeting Technology entrance requirements in Mathematics. Pre-requisite: 3 entrance units in Mathematics. 3 cr. (Does not count for major credit. Effective February 1948.)

34. MATHEMATICS OF FINANCE. Simple and compound interest, discount, annuities, depreciation, evaluation of securities, building and loan associations, and elements of life insurance. Mr. Kichline. Prereq.: Either Math. 2, 5, or 33. 3 rec.; 3 cr.

51. ADVANCED CALCULUS, DIFFERENTIAL EQUATIONS, AND THEIR APPLICATION TO ENGINEERING PROBLEMS. Prereq.: Math. 8. 3 rec.; 3 cr.

52. A CONTINUATION OF MATHEMATICS 51. 3 rec.; 3 cr.

54. VECTOR ANALYSIS. Vector and Scalar Algebra and Geometry, differentiation and differential operators, applications to electrical theory and to mechanics, dynamics, and hydro-dynamics. Prereq.: Math. 8. 3 rec.; 3 cr.

55-56. ADVANCED PLANE AND SOLID ANALYTICAL GEOMETRY. Prereq.: Math. 8. 3 rec.; 3 cr.

57. THE HISTORY OF MATHEMATICS. Designed especially for those preparing to teach Mathematics in high school. An historical background and an appreciation of the development of various fields of Mathematics. Prereq.: Math. 8 or 4. 3 rec.; 3 cr.

61-62. INTRODUCTION TO STATISTICAL METHODS. Graphical representation of statistical data, frequency distribution, averages, measures of dispersion, index numbers, linear correlation, time series. Mr. Kichline. Prereq.: One year of college Math. or its equivalent. 3 rec.; 3 cr.



## MATHEMATICS

Analytic Geometry. Prereq.: See requirements of Math. for admission to College of Technology. 4 rec.; 4 cr.

7, (7)-8, (8). CALCULUS. Applications of differentiation and integration; special methods of integration; the definite integral applications of the definite integral to geometry, physics, and mechanics; introduction to sequence and series. Prereq. for 7: Math. 4 or 6. 3 rec.; 3 cr.

10. ASTRONOMY. A brief descriptive course. The earth as an astronomical body; the sun and the solar system; the constellations; the stars. Mr. Solt. 3 rec.; 3 cr. Does not count for major credit in Math.

20. SOLID GEOMETRY. Elements of Solid Geometry. Mr. Perkins. Prereq.: High school Algebra and Plane Geometry. 2 rec.; 2 cr.

33. COMMERCIAL ALGEBRA. Preparation for, and introduction to, mathematics of finance; use of calculating machines. This course is designed to prepare students for Mathematics 34 and 61. Mr. Kichline. Prereq.: Two years of Math. in high school including at least one year of Algebra. 3 rec.; 3 cr.

34. MATHEMATICS OF FINANCE. Simple and compound interest, discount, annuities, depreciation, evaluation of securities, building and loan associations, and elements of life insurance. Mr. Kichline. Prereq.: Either Math. 2, 5, or 33. 3 rec.; 3 cr.

51. ADVANCED CALCULUS, DIFFERENTIAL EQUATIONS, AND THEIR APPLICATION TO ENGINEERING PROBLEMS. Prereq.: Math. 8. 3 rec.; 3 cr.

52. A CONTINUATION OF MATHEMATICS 51. 3 rec.; 3 cr.

54. VECTOR ANALYSIS. Vector and Scalar Algebra and Geometry, differentiation and differential operators, applications to electrical theory and to mechanics, dynamics, and hydro-dynamics. Prereq.: Math. 8. 3 rec.; 3 cr.

55-56. ADVANCED PLANE AND SOLID ANALYTICAL GEOMETRY. Prereq.: Math. 8. 3 rec.; 3 cr.

57. THE HISTORY OF MATHEMATICS. Designed especially for those preparing to teach Mathematics in high school. An historical background and an appreciation of the development of various fields of Mathematics. Prereq.: Math. 8 or 4. 3 rec.; 3 cr.

61-62. INTRODUCTION TO STATISTICAL METHODS. Graphical representation of statistical data, frequency distribution, averages, measures of dispersion, index numbers, linear correlation, time series. Mr. Kichline. Prereq.: One year of college Math. or its equivalent. 3 rec.; 3 cr.

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63-64. STATISTICAL METHODS. A continuation of 61-62, including a more thorough study of correlation, multiple and partial correlation, time series including trend and seasonal variation and cycles, sampling, variance, tests of significance. Material selected to meet the needs of advanced students and to throw light on statistical research methods. Mr. Kichline. Prereq.: Math. 61-62. 3 rec.; 3 cr.

*Note:* The Departments of Agricultural Economics, Government, History, Mathematics, and Sociology offer jointly a course designed to meet the needs of those Social Science students who are interested primarily in Statistics as applied to the Social Science Fields. This course is listed as Social Statistics 51. (See page 279.)

Students majoring in Mathematics and those interested in Mathematics should take Math. 61 and 62.

MATHEMATICS-EDUCATION (MATH-ED) 91. PROBLEMS IN THE TEACHING OF HIGH SCHOOL MATHEMATICS. The aims and values of secondary school mathematics, the recommendations of the national committee on mathematics requirements, and the State Board requirements; also, the subject matter and the sequence in which it should be presented in both junior and senior high schools, and the various techniques used in teaching secondary school mathematics. Errors, testing program, and remedial teaching. Lectures, assigned readings, and discussions. Mr. Perkins. Prereq.: Math. 8, or 34 and 7. Students preparing to teach mathematics in high school should register for this course. 3 rec.; 3 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. COMPLEX VARIABLE. The theory of analytic functions of a single complex variable by the methods of Cauchy (integrals), Riemann (derivatives) and Weierstrass (series), conformal mapping and Riemann's surfaces, and the elementary theory of elliptic functions. Mr. Bauer. Prereq.: Math. 51. Hours to be arranged. 3 cr.

103, 104. DIFFERENTIAL GEOMETRY. Plane and space curves; first and second differential forms of a surface; theorems of Meusnier and Euler; lines of curvature; asymptotic lines; conjugate lines; geodesics; theorems of Gauss and Codazzi; developable surfaces; Liouville surfaces; problems of mapping. Mr. Giddings. Prereq.: Math. 8. 3 rec.; 3 cr.

105, 106. EDUCATION STATISTICS. A study of the statistical methods dealing with data pertaining to problems in education. The topics to be considered include central tendency, dispersion, linear correlation, non-linear correlation, partial and multiple correlation, the normal probability curve, curve fitting, sampling, and variance. In considering the several problems emphasis will be placed on theory



## MECHANICAL ENGINEERING

and on application to concrete numerical data. Mr. Kichline. Prereq.: Math. 61, 62. 3 rec.; 3 cr.

107, 108. INFINITE SERIES AND PRODUCTS. This course includes selections from the following topics: theories of irrationals; series of positive terms; convergence tests; general series; double series; transformation of series; infinite products; Fourier, Dirichlet, and power series; special series; and divergent series. Mr. Slobin. Prereq.: Math. 51. 3 cr.

109, 110. ANALYTICAL MECHANICS. Statistics and dynamics of particles and rigid bodies. Lagrange's equations. Mr. Solt. Prereq.: Math. 51. 3 rec.; 3 cr.

113, 114. ADVANCED STATISTICS. This course centers about the problem of sampling and includes such topics as the normal distribution and the problem of inference, the chi-square test, the t-test, and a study of variance and covariance. Numerous applications are introduced. A general review of the more important statistical methods is included. Mr. Kichline. Prereq.: Math. 63, 64. Hours and credits to be arranged.

### MECHANICAL ENGINEERING

EDWARD L. GETCHELL, *Professor*; LAUREN E. SEELEY, *Professor*; E. HOWARD STOLWORTHY, *Associate Professor*; EDWARD T. DONOVAN, *Associate Professor*; LYMAN J. BATCHELDER, *Instructor, Emeritus*; JOHN C. TONKIN, *Instructor*; ELIA O'CONNELL, *Instructor*; TENHO S. KAUPPINEN, *Instructor*; WILLIAM E. CLARK, *Instructor*; WILLIAM D. CLEMENT, *Instructor*; EDWIN I. KIMBALL, *Instructor*; GARDNER LADD, *Instructor*; AUSTIN H. WELCH, *Instructor*.

1-2. ENGINEERING DRAWING. Fundamentals, including freehand lettering, use of instruments, isometric drawing, and the solution of problems by the principles of descriptive geometry. Messrs. Kauppinen, Clement, and Ladd. 2 lab.; 2 cr.

3. MACHINE DRAWING. Application of the principles of engineering drawing to machine parts. Various pictorial systems as an aid in sketching. Reproduction methods and modern drafting room organizations. Commercial drafting room methods in sketching machine parts, drawing from sketches, and making tracings. Mr. Kauppinen. Prereq.: M.E. 1. 2 lab.; 2 cr.

4. KINEMATICS. Motion in machine construction; belts and other flexible connectors; gear and gear teeth; wheels in trains; epicyclic trains, cams; instantaneous centers; linkwork, velocity, and acceleration diagrams. Prereq.: M.E. 1, M.E. 2 and Math. 7. 1 rec.; 2 lab.; 3 cr. Mr. Kauppinen.

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5-6. MECHANICAL LABORATORY. An over-all view of the more elementary features of Mechanical Engineering. Introduction of the equipment in the mechanical laboratory and the University Power Plant, and instruction in its use for studying problems found in Mechanical Engineering practice. Mr. Welch. M.E. 5. 1 lab.; 1 cr.; M.E. 6. 1 lab.; 2 cr.

7-8. MECHANICS. A study of forces and moment of forces; determination of stresses in trusses and cranes; centroids and center of gravity; rectilinear and curvilinear motion; translation and rotation of bodies; work, power, and energy. The application of mechanics to the determination of stress and strain in rigid bodies. The study of thin walled cylinders; riveted joints; torsion; transverse loading of beams; deflection in beams of all kinds; study of columns; compound stresses as applied to design of machine parts. Work in the second semester to be paralleled by exercises in the materials laboratory. For Juniors in Mechanical Engineering. Mr. Getchell. Prereq.: Math. 8 and Phys. 7. M.E. 7:4 rec.; 4 cr. M.E. 8:3 rec.; 1 lab.; 4 cr.

9-10. MECHANICS. Similar to Mechanical Engineering 7-8, but with those portions having application to the design of machine parts omitted. For Junior civil and electrical engineers. Mr. Kauppinen. Prereq.: Math. 8 and Phys. 7. M.E. 9: 3 rec.; 3 cr. M.E. 10: 3 rec. 1 lab.; 4 cr.

13. ELEMENTARY METALLURGY. A study of ferrous and non-ferrous metals and alloys used in engineering; a survey of the field of metals with particular attention to structure and properties resulting from alloying and heat treatments. Mr. Getchell. Prereq.: Chem. 4. 2 rec.; 2 cr.

15-16. MACHINE DESIGN. Application of the principles of mechanics to the design of machine elements with the idea of manufacturing the parts in the most economical manner in the shops. General principles of design will be followed rather than the development of any particular system of procedure. Mr. Getchell. Prereq.: M.E. 8. 1 rec.; 2 lab.; 3 cr.

17. HEAT TREATMENT LABORATORY. The study of the heat treatment of steel to obtain the proper strength, hardness, and ductility. Methods of determining the carbon content. Mr. Getchell. Prereq.: M.E. 13. 1 lab.; 1 cr.

19. ELEMENTARY DRAFTING. Fundamentals, including lettering, use of instruments, orthographic projection, isometric drawing, electrical symbols, plumbing symbols, typical hotel floor plans, graphs. Mr. Kauppinen. 2 lab.; 2 cr. for Hotel Administration. Cannot be substituted for M.E. 1.



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21. HEAT POWER ENGINEERING. The fundamental theory of engineering thermodynamics and its applications to steam power plant and internal combustion equipment. For civil engineers. Mr. Stolworthy. Prereq.: Math. 7 and Phys. 8. 3 rec.; 3 cr.

23-24. THERMODYNAMICS. The fundamental laws of thermodynamics and their relation to the operation of mechanisms using gases and vapors as their working substances. For mechanical engineers. Mr. Donovan. Prereq.: Math. 7 and Phys. 7. 3 rec.; 3 cr.

25-26. HEAT POWER ENGINEERING. The laws of thermodynamics and a consideration of steam power plant and internal combustion engine equipment. For electrical engineers. Mr. Stolworthy. Prereq.: Math. 7 and Phys. 7. 25: 3 rec.; 3 cr. 26: 3 rec.; 1 lab.; 4 cr.

27. MECHANICAL LABORATORY. The apparatus and methods of testing power plant operation and equipment. Mr. Donovan. Parallel requirement: Enrollment in M.E. 25-26. 2 lab.; 2 cr.

29-30. MECHANICAL LABORATORY. Methods of investigating operation and testing of power plant equipment. Mr. Donovan. Parallel requirement: Enrollment in M.E. 23. 29: 2 lab.; 2 cr. 30: 1 lab.; 1 cr.

31, (31). AIRPLANES AND AIRCRAFT ENGINES. A study of airplanes and aircraft engines including servicing and operation. Mr. Stolworthy. No prereq. 3 rec.; 3 cr.

37. AERONAUTICS. Elementary aerodynamics and aircraft construction; wind tunnel problems. Mr. Stolworthy. Prereq.: M.E. 8 and C.E. 24. 2 rec.; 1 lab.; 3 cr.

38. METEOROLOGY AND NAVIGATION. Synoptic meteorology and the instruments and methods used in navigation of aircraft. Mr. Stolworthy. Prereq.: Phys. 7. 2 rec.; 1 lab.; 3 cr.

39. HEATING AND AIR CONDITIONING. Heat losses and ventilation requirements of buildings, and the design of specific heating and ventilating systems. Mr. Stolworthy. Prereq.: M.E. 24. 2 lab.; 2 cr.

40. HEATING AND AIR CONDITIONING. Present methods of heating and ventilating buildings. Mr. Stolworthy. Prereq.: Hotel Admin. 21, 22, or Phys. 2. 1 rec.; 1 lab.; 2 cr.

41, (41). AVIATION GROUND SCHOOL. Civil air regulations, meteorology, navigation, servicing of aircraft. Mr. Stolworthy and assistants. No prereq.: 3 rec.; 3 cr.

49. THE THESIS. The thesis embodies research or commercial investigation. Equal emphasis upon composition and accuracy in subject matter. 2 cr. Students passing this course receive a grade of Cr.

52. MECHANICAL LABORATORY. Performance studies of steam engines

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and turbines, nozzles, and condensers. Application of the laws of thermodynamics to steam power plant equipment. Mr. Donovan. Prereq.: M.E. 30. 2 lab.; 2 cr.

53-54. POWER PLANTS. A study of the steam generating power plant dealing with its equipment and costs. For mechanical engineers. Mr. Donovan. Prereq.: M.E. 24. M.E. 53: 2 rec.; 2 cr. M.E. 54: 1 rec.; 2 lab.; 3 cr.

55-56. INTERNAL COMBUSTION ENGINES. Thermodynamics applied to spark ignition and compression ignition engines and gas turbines. Fuels, carburetion, fuel injection, combustion chambers, lubrication, cooling, and performance. Mr. Stolworthy. Prereq.: M.E. 8 and 24. 2 rec.; 1 lab.; 3 cr.

59, 60, 61, 62. STUDENT BRANCH OF AMERICAN SOCIETY OF MECHANICAL ENGINEERS. An organization of Junior and Senior students. Preparation and presentation of addresses on Mechanical Engineering topics by members, and criticism by instructor of delivery, subject matter and terms used. Required by Juniors and Seniors in M.E.  $\frac{1}{2}$  cr.

65. ENGINEERING ECONOMY. The principles which form the basis of engineering procedures for obtaining the highest ratio of utility to cost. Prereq.: Senior standing. 3 rec.; 3 cr.

66. INDUSTRIAL MANAGEMENT. Principles and methods of industrial management, designed to give students a working knowledge of modern industrial practice, with particular emphasis on the engineering viewpoint. Prereq.: Senior standing. 3 rec.; 3 cr.

71-72. AIRPLANE DESIGN. Airplane layout and stress calculations. Mr. Stolworthy. Prereq.: M.E. 8 and 37 in parallel. 3 rec.; 3 cr. (Not offered in 1946-1947.)

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. ADVANCED THERMODYNAMICS. The general equations of thermodynamics and their application to fluids such as air and steam; heat transmission; current applications and advances in thermodynamics. Mr. Donovan. 3 rec.; 3 cr.

105, 106. ADVANCED MECHANICS OF MATERIALS. To review and show the limitations of the ordinary formulas of strength of materials. To consider the conditions under which these limitations hold and to extend the subject to more complex topics than those previously considered. To present a more detailed study of the concepts and methods used in analysis of stresses in structures and machine members. Further study of stresses in plates, thick cylinders, rotating cylinders, and shafts; stresses in curved members under flexure; stress concentrations and analysis of stresses in statically indeterminate structures



## MECHANICAL ENGINEERING

by elastic strain energy and photoelastic methods. Mr. Getchell. Prereq.: M.E. 8. 3 rec.; 3 cr.

### MECHANICAL ENGINEERING SHOP COURSES

S1, S2. **ELEMENTARY SHOP PRACTICE.** For shop work Freshmen in Technology are divided into two groups, meeting simultaneously in Forge Shop and Machine Shop. Machine shop: practice in the operation of engine lathes and other machine tools, where precise measurements are important; the machinability of metals in the preparation of test specimens for use in the course on strength of materials. Forge shop: the operations necessary in the forging and welding of iron and steel, in the hardening, tempering, and annealing of steel. (S1 is Forge Shop; S2 is Machine Shop.) Messrs. O'Connell and Tonkin. 2 lab.; 2 cr.

S13, (S13). **FORGE SHOP.** Advanced work in forging, electric, and acetylene welding, tempering, case hardening, tool dressing. Mr. O'Connell. Prereq.: M.E. S1. 2 lab.; 2 cr.

S17, (S17). **MACHINE SHOP.** Continuation of work given in S2. Mr. Tonkin. Prereq.: M.E. S2. 2 lab.; 2 cr.

### AERONAUTICS

The courses in Aeronautics offered in the Department of Mechanical Engineering are grouped below for convenience. M.E. 41, (41) will be of particular interest to students or secondary school teachers who wish to cover basic ground work in aviation. M.E. 37 and 38 are offered for Mechanical Engineering students wishing to specialize in Aeronautics.

M.E. 31, (31). **AIRPLANES AND AIRCRAFT ENGINES.** (3 cr.)

M.E. 37. **AERONAUTICS.** (3 cr.)

M.E. 38. **METEOROLOGY AND NAVIGATION.** (3 cr.)

M.E. 41, (41). **AVIATION GROUND SCHOOL.** (3 cr.)

M.E. 71-72. **AIRPLANE DESIGN.** (3 cr.)

### MEDICINE

(See PRE-MEDICINE, page 120.)

### METEOROLOGY

(See page 226.)

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## MILITARY SCIENCE AND TACTICS

COL. JAMES C. BATES, CAC, *Professor*; LT. COL. HUNTINGTON K. GILBERT, A/C, *Associate Professor*; LT. COL. JOSEPH A. L. GRECO, A/C *Assistant Professor*; MAJ. JAMES A. SULLIVAN, CAC, *Assistant Professor*; MAJ. JOHN J. VEYETTE, A/C, *Assistant Professor*; CAPT. LEO D. LEAVENGOOD, Inf., *Assistant Professor*; 1/SGT. RICHARD J. MONIHAN, CAC, *Assistant*; 1/SGT. PAUL R. HOUCK, CAC, *Assistant*; M/SGT. JOHN J. STEMPKOWSKI, Inf., *Assistant*; M/SGT. WESLEY W. GIFFORD, A/C, *Assistant*; 1/SGT. JOSEPH L. MROZ, A/C, *Assistant*; S/SGT. CARLE F. HUSTON, CAC, *Assistant*; S/SGT. PHILIP J. WHELAN, Inf., *Assistant*.

### ELEMENTARY COURSE

1-2. FIRST YEAR ELEMENTARY. Individual Weapons and Marksmanship; Hygiene and First Aid; Leadership Drill and Exercise of Command; Map and Aerial Photograph Reading; Military Organization; National Defense Act and ROTC; World Military Situation. Required of Freshmen: Minimum of 3 hours of formal instruction. 3 cr.

3-4. SECOND YEAR, ELEMENTARY. Evolution of Warfare; Leadership Drill and Exercise of Command; Map and Aerial Photograph Reading; Military Administration; Military Law; Physical Development Methods; World Military Situation. Required of Sophomores: Minimum of 3 hours of formal instruction. 3 cr.

### ADVANCED COURSE

FIRST YEAR ADVANCED—GENERAL. Leadership Drill and Exercise of Command; Military Law; Military Leadership; Military Problems; Occupied Territories, and Specialized Training\*. Elective Course. Minimum of 5 hours of formal instruction. 6 cr.

5-6 A. FIRST YEAR ADVANCED—AIR CORPS.\* Instruction in the various administrative, tactical, and technical aspects of the Army Air Forces, including Supply, Transportation, Aeronautics, Navigation, History, Statistical Control, Organization, Personnel Administration, Training, Inspections, Communications and Guided Missiles.

5-6 C. FIRST YEAR ADVANCED—COAST ARTILLERY.\* (Anti-Aircraft.) Basic Gunnery, Fire Control, Technique of Fire, and the Characteristics and Tactical employment of Anti-aircraft Artillery Weapons.

Fire, Fire Control and Tactical Employment of Infantry Weapons in

5-6 I. FIRST YEAR ADVANCED—INFANTRY.\* Gunnery, Technique of the Military Team.

SECOND YEAR ADVANCED—GENERAL. Geographical Foundation of

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\*Denotes Specialized Training.



## MUSIC

National Power; Combined and Joint Operations; Command and Staff; Military Teaching Methods; Military Demobilization; Psychological Warfare; Leadership Drill and Exercise of Command, and Specialized Training\*. Minimum of 5 hours of formal instruction. 6 cr.

7-8 A. SECOND YEAR ADVANCED — AIR CORPS.\* Instruction in a specialized course designed to qualify the student for a definite duty assignment, such as Engineering Officer; Personnel Administration Officer, etc.

7-8 C. SECOND YEAR ADVANCED — COAST ARTILLERY.\* (Anti-Aircraft.) Advanced Gunnery and Fire Control, Orientation; New Developments in Anti-aircraft Weapons, Guided Missiles and in their employment; Logistics and Supply.

7-8 I. SECOND YEAR ADVANCED — INFANTRY.\* Advanced Infantry Gunnery; Tactics and Technique to include New Developments; Logistics and Supply.

## MUSIC

KARL H. BRATTON, *Associate Professor*; ROBERT W. MANTON, *Professor*; IRVING D. BARTLEY, *Assistant Professor*; MARGARET OLSON, *Instructor*; GEORGE E. REYNOLDS, *Instructor*; ELAINE R. MAJCHRZAK, *Instructor*; DONALD E. STEELE, *Instructor*; JOHN MITCHELL, *Instructor*.

Registration for musical organization courses should be completed during the registration period. These courses cannot be used to satisfy major requirements. Registration in musical organizations must be approved by the chairman of the Department of Music.

1, (1). UNIVERSITY BAND. Open to all undergraduates on basis of individual tryouts. The University Band furnishes music for the R.O.T.C. drills, all athletic events at home, and also gives concerts during the college year. Course credit is based on the extent and quality of participation. A student who participates in both marching and concert band activities receives full credit; those who limit their activities to either marching or concert band receive half credit. Prereq.: Permission of the instructor. 2 rec.;  $\frac{1}{2}$ -1 cr.

3W, (3W). WOMEN'S GLEE CLUB. Open to all students interested in singing who fulfill the requirements of a tryout. Recommended for all women voice majors. Miss Majchrzak. Prereq.: Permission of the instructor. 2 rec.;  $\frac{1}{2}$  cr.

3M, (3M). MEN'S GLEE CLUB. Open to all students interested in singing who fulfill the requirements of a tryout. Recommended for all

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\*Denotes Specialized Training.

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men voice majors. Mr. Bratton. Prereq.: Permission of the instructor. 2 rec.;  $\frac{1}{2}$  cr.

5, (5). UNIVERSITY CHOIR. An advanced choral group devoted to the study and performance of the best classical and modern choral literature. Recommended for men and women voice majors. Mr. Bratton. Prereq.: Permission of instructor. 2 rec.;  $\frac{1}{2}$  cr.

7, (7). ENSEMBLE. Small groups of instrumentalists and vocalists organized to provide advanced students experience in such groups as the Madrigal Singers, string quartets, men's quartets, and women's sextets. Mr. Reynolds. Prereq.: Permission of the instructor. 2 rec.;  $\frac{1}{2}$  cr.

8, (8). STRING ORCHESTRA. Open to all students on the basis of individual tryouts. This group appears at all the University Symphony Orchestra concerts. Miss Olson. 1 rec.;  $\frac{1}{2}$  cr.

9, (9). UNIVERSITY ORCHESTRA. Open to all students on basis of individual tryouts. The Orchestra gives several concerts during the year and also accompanies the vocal groups and solo instrumentalists on various occasions. Mr. Reynolds. Prereq.: Permission of instructor. 2 rec.;  $\frac{1}{2}$  cr.

*Only a possible total of 4 credits may be earned in four years by students in musical organizations to be counted towards graduation. An exception to this will be members of the R.O.T.C. Band and Music majors. Music majors may earn not more than 8 credits in musical organizations.*

### APPLIED MUSIC

All candidates for a degree with a major in Music (Applied Music option) must take an entrance examination before the Staff of the Department of Music to be judged as to their competence in becoming Music majors. The examination may be taken any time before the beginning of their Sophomore year.

Lessons in Applied Music are based on  $\frac{1}{2}$ -hour private instruction. One semester hour of credit will be given for one lesson; two semester hours of credit will be given for two lessons. Five one-hour practice periods will be allotted to each student. Necessary supplementary practice periods must be sought out by the music students themselves. The special semester fee for Applied Music is \$25 for one lesson a week, and \$50 for two lessons a week. These fees include the use of a practice room for the required preparation. Organ students will pay \$30 for one lesson a week and \$60 for two lessons a week.

Majors in Applied Music are required to present seven semester hours in the applied music taken over a period of six semesters. Two



## MUSIC

lessons per week are required in the last semester of the Senior year. Two semester credits taken in the Freshman year are regarded as prerequisite to entrance into the Music major field.

*Registration in Applied Music is subject to approval by the Head of the Music Department.* A student may register for the same course in successive semesters.

23, (23). PIANO. The methods of presentation and the material used vary with the particular needs of each individual pupil. For some students it will be necessary to intensify the technical side of playing, since an inadequate technique obviously is a handicap to a successful expression of musical thought. A number of pieces from the best masters will be studied for the purpose of applying principles of technique as well as gaining for the student an insight into the possibilities of musical expression. Mr. Bartley. 1 or 2 lessons; 1-2 cr.

24, (24). ORGAN. Students must possess reasonable keyboard facility before attempting the study of organ and should secure the permission of the organ instructor before enrolling for the course. The material used in the organ course includes Graded Materials for the Organ by Rogers, preludes and fugues by Bach, sonatas by Mendelssohn as well as compositions by contemporary American composers. Since the aim of the course is primarily to prepare students for playing in church services, emphasis will be laid on hymn playing and also on providing suitable organ accompaniments for solo, quartette and chorus. During the Junior and Senior Years the larger compositions by Franck, Widor and Guilmant will be studied. Mr. Bartley. 1 or 2 lessons, 1-2 cr.

25, (25). VIOLIN. Lessons in violin playing are adjusted to the individual needs of the pupil. A sound technical foundation is imparted with special stress on clear, resonant tone production, accurate intonation, fluency, and velocity. Technical exercises, studies, and solos are selected to correct the pupil's deficiencies and to develop and promote his talents and artistic self-expression. Solos are selected from the best violin literature and are studied as concert pieces and also as applications of the numerous items of basic technique. Miss Olson. 1 or 2 lessons; 1-2 cr.

26, (26). VOICE. Instruction in voice will seek to develop those qualities which are essential for intelligent interpretation, such as correct posture, breathing, pure tone, resonance, clear enunciation, and technical facility. Each voice is given the treatment best suited to its individual needs. A higher ideal than the perfection of mere mechanical skill is sought, namely a musicianly style of singing and a thorough appreciation of the best works of the masters, both classic and modern. Mr. Bratton and Miss Majchrzak. 1 or 2 lessons; 1-2 cr.

# UNIVERSITY OF NEW HAMPSHIRE

27, (27). VIOLONCELLO. The course consists of instruction in tuning, bowing, and in positions, as well as a thorough grounding in technical studies, solos, and ensemble literature. Miss Olson. 1 or 2 lessons; 1-2 cr.

28, (28). WOODWIND. Courses in the technique and literature of clarinet, flute, oboe, bassoon, and saxophone are given. Mr. Reynolds. 1 or 2 lessons. 1-2 cr.

29, (29). BRASS. Instruction will be offered for any of the following instruments: trumpet, trombone, French horn, baritone, and tuba. Correct tone production, articulation, and musical interpretation are stressed. Mr. Reynolds. 1 or 2 lessons; 1-2 cr.

## THEORY AND COMPOSITION

11-12. HARMONY. The fundamental principles of the theory of music are embodied in the study of harmony. It treats of the different chords in their natural and combined relationships. The subdivisions are as follows: intervals, triads, inversions of the same, the entire seventh chord family and its inversions together with intensive drill in sight singing, ear training, and melodic-harmonic dictation. Recommended for students who wish to prepare themselves for intelligent listening to music and for participation in music activities such as glee clubs, etc. Mr. Bartley. 5 rec.; 4 cr.

15-16. ADVANCED HARMONY AND COUNTERPOINT. Designed to supplement the technical training begun in Music 11-12. Simple counterpoint in two parts will be studied *parallel* to the acquisition of such new harmonic materials as ninth chords, cadences, chromatically altered chords, suspensions, augmented chords, ornamental tones, pedal point and modulation. Contrapuntal studies will include three-part writing as its final objective. Mr. Manton. Prereq.: Music 11-12. 5 rec.; 4 cr.

41-42. PRINCIPLES OF CONDUCTING. The development of conducting — physical aspects, equipment of conductor, fundamental gestures or beats used, function of the left hand, basic problems of baton technique, full and condensed scores — will be analyzed. Score reading and development of baton technique effects. Knowledge of technical terms determining tempo, variation of tempo, character and traditions of characteristic standard band and orchestral works. Study of essential choral techniques with emphasis on phrasing, fermata, and diction. Ear training in relationship to part-singing and analysis of choral works for more intelligent interpretation. Problems of choir organization and psychology of the rehearsal. Practice conducting throughout the course. Participation in group singing is recommended. Actual conducting experience with the University Band, Symphony, and choral

*2/23/48 - Phone with Schaefer  
May use Mus. 31 - Baton Technique -  
for this course in Mus. Ed. curriculum.*

*Must take  
13-14  
in 1949-50  
to cover*



## MUSIC

groups. The student conductors will be chosen from this group. Mr. Reynolds. 1 rec.; (plus laboratory experience with music organizations.) 1½ cr. (Not open to students who have had Music 31.)

51-52. FREE COUNTERPOINT, CANON AND FUGUE. This course will include free counterpoint in three and four parts, double counterpoint, the writings of simple two-part inventions, choral preludes, etc. The canonic and fugal studies will be based largely upon the works of Bach and will have as their objectives the composition of fugato, fughetta, a three- and a four-voiced fugue. Mr. Manton. Prereq.: Music 16 or permission of instructor. 2 rec.; 2 cr.

71-72. COMPOSITION, FORM AND ANALYSIS. Form is the foundation, the skeleton and support to imagination and expression in music. Through a study of form and analysis the student, in creating, learns to control his media of expression, or, when listening, to fully appreciate the formal and the free fantasia. The various harmonic and contrapuntal forms, symphonic tone poems, etc., will in turn serve as models for analysis. Prereq.: Music 51-52 or permission of the instructor. Mr. Manton. 2 rec.; 2 cr. (Not open to students who have had Music 96.)

97-98. ORCHESTRATION AND CHORESTRATION. This course offers the study of instruments and methods of combining them into coherent arrangements arriving at successful balances for the band and orchestral arranger. The characteristics, range, and tone quality of the instruments are fully covered and transcriptions are made. Striking orchestral effects from the pens of our greatest composers are studied. Chorestration is offered during the latter part of the second semester. The techniques of writing for solo voices, for mixed voices, men's and women's voices, are taken up through the medium of arrangements and original work. Mr. Reynolds. Prereq.: Music 15-16. 2 rec.; 2 cr.

### HISTORY, LITERATURE, AND APPRECIATION

33, 34. THE APPRECIATION OF MUSIC. Fundamentally a course to develop intelligent listening through formal analysis of the irreducible minimum of great musical masterpieces. A selection of the most important works of Bach, Handel, Haydn, Mozart, Beethoven, Schubert, Mendelssohn, Chopin, Liszt, Brahms, Franck, T'schaikowsky, d'Indy, and many others, analyzed by the students and the instructor and played several times in the classroom. Mr. Manton, Miss Olson. 3 rec.; 2 cr. *This course cannot be used to satisfy major requirements.*

43, (35). SURVEY OF MUSIC IN AMERICA. A comprehensive survey of the development of music in the United States from Colonial times to the present day. The various influences such as the English tradi-

## UNIVERSITY OF NEW HAMPSHIRE

tion, the German era, the French impressionistic influence and finally the quest for an American style will be presented and discussed together with the music of the most representative composers. Mr. Manton. 2 rec.; 2 cr.

45, 46. MUSIC HISTORY AND LITERATURE. A detailed study of the actual systems, spirit, and content of the music of a period rather than resumés of biography and critical evaluation. Music of the early church, beginning of polyphony, Ars Antiqua and Ars Nova, the Renaissance, opera and oratorio, Bach and Handel, the classic and romantic composers, on into the nineteenth and twentieth centuries, with a final survey of contemporary composers. Mr. Manton. Prereq.: Music 11-12 or Music 33, 34. 3 rec.; 3 cr.

### NATURE STUDY

(See BIOLOGY, pages 184-190.)

### NURSING

(See page 118.)

### OCCUPATIONAL THERAPY

These courses are for students in Occupational Therapy curriculum. Schedule as O.T. 1, etc.

O.T. 1. HANDICRAFTS. A series of simple projects using different media and techniques especially adapted to use in the practice of Occupational Therapy. Miss Wilkins. 2 lab.; 2 cr.

O.T. 4. HANDICRAFTS. Stresses the therapeutic use of crafts, such as leatherwork, chip carving, and stenciling. Miss Wilkins. 3 lab.; 3 cr.

O.T. 5, 6. HANDICRAFTS. Covers the use of plastic and synthetic materials, dyeing, chair seating, weaving, and other popular handicrafts used in Occupational Therapy. Miss Wilkins. 3 lab.; 3 cr.

O.T. 7-8. ELEMENTARY PROCESSES IN WOOD AND PLASTICS. A basic course in the design and construction of wood and plastic objects, including a study of the nature and properties of these materials and the processes of cutting, shaping, fitting and finishing. Practice and demonstrations cover the operation of hand and power tools, safety precautions and other problems of shop management to be encountered in Occupational Therapy. Mr. Brett. 2 lab.; 2 cr.

O.T. 10. LETTERING AND PRINTING. Freehand lettering, hand- and power-press printing; operation of various duplicating devices; silk screen process; poster design. A survey of graphic arts methods and



## PHILOSOPHY

processes as employed in Occupational Therapy. Mr. Brett. 2 lab.; 2 cr. (Formerly O.T. 9.)

O.T. 15-16. CERAMICS (POTTERY). Design and construction, methods of preparing and working clay, and the uses of pottery equipment best suited to application in Occupational Therapy work. Mr. Scheier. 2 lab.; 2 cr.

O.T. 23-24. ELEMENTARY DRAWING AND DESIGN. Exercises in drawing, design, and block printing. Creative activity as a background for craft study and for its therapeutic value. Outdoor sketching. Mrs. Schoolcraft. 2 lab.; 2 cr.

O.T. 45. ELEMENTARY LIBRARY METHODS. A course in library methods giving a brief survey of the detail involved in the management of a small institutional library. Mr. Heaney. 1 lab.; 1 cr.

O.T. 47. THEORY OF OCCUPATIONAL THERAPY. Historical background and evolution of Occupational Therapy. Miss Wilkins. 2 lec.; 2 cr.

O.T. 48. THEORY OF OCCUPATIONAL THERAPY. Techniques used in Occupational Therapy and their application to disease and injury. Instruction trips to hospitals and clinics, and demonstrations. Procurement and care of equipment, materials, and supplies. Miss Wilkins and Miss Moody. 3 lec.; 3 cr.

O.T. 49-50. CLINICAL SUBJECTS. Basic information concerning the etiology, pathology, symptoms, and treatment of disease. Introductory lectures to acquaint students with medical terminology are followed by a study of general medical and surgical conditions, orthopedica, ophthalmology, otology, and psychiatry. Dr. Batchelder and visiting lecturers. Prereq.: Zoöl. 17-18. 2 lec.; 2 cr. (Given in alternate years. Offered in 1948-1949.)

### ORAL ENGLISH

(See SPEECH, page 220.)

### PAINTING

(See THE ARTS, page 182.)

## PHILOSOPHY

DONALD C. BABCOCK, *Professor*.

Courses in this Department are open to Sophomores, Juniors, and Seniors.

1, 2. INTRODUCTION TO PHILOSOPHY. Designed for orientation in the field of Philosophy, this course gives some time to each of several

## UNIVERSITY OF NEW HAMPSHIRE

subjects associated with philosophic thoroughness and breadth of thought. Among these are: (1) ways of acquiring knowledge; forms of logical thought; (2) the nature of ethics; (3) the history of ideas; (4) chief hypotheses concerning the nature of mind and matter. Wherever possible, practical application to the problems of human living will be made. Mr. Babcock. 3 lec. or rec.; 3 cr.

4. ETHICS. Human beings behave as if there were standards by which conduct could be evaluated. What are "values"? What standards are there? What significance have they? Are "right" and "wrong" in any sense universal? How can we find out? This course deals with these questions, but makes application constantly to everyday problems of individual and social living. Mr. Babcock. 3 lec. or rec.; 3 cr.

11, 12. HISTORY OF RELIGIONS. Religion as an historic force in society. The nature of religion, its origins, and early development treated in connection with primitive social history. A study of the principal religions of the world, exclusive for the most part, of Christianity. Chief attention given to Hinduism, Buddhism, Zoroastrianism, Confucianism, and Mohammedanism. The history, literature, and philosophy of the oriental civilizations and culture as a background. Mr. G. R. Johnson. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1947-1948.)

13, 14. HISTORICAL ORIGINS AND DEVELOPMENT OF CHRISTIANITY. The life, literature, religion, and social development recorded in the Old Testament are studied as a cultural background. An investigation of the historic data existing concerning the life, character, and teaching of Jesus. The growth and expansion of the Christian movement. Designed to furnish students an opportunity to evaluate their own religious heritage in the light of contemporary thought, and to make special study of particular intellectual problems. Mr. G. R. Johnson. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1947-1948.)

15. PHILOSOPHIC VALUES IN THE BIBLE. A course intended first of all to make the student familiar with the actual contents of the Bible, especially its time-honored and formerly commonly quoted passages. Attention will be directed to the relation between the great utterances in the Bible and the persistent problems of human thought and living. All sectarian preference will be excluded. Thoughtful appreciation of a great cultural heritage is the result sought. Mr. Babcock. 3 lec. or rec.; 3 cr.

16. PHILOSOPHIC VALUES IN GENERAL LITERATURE. A continuation of Philosophy 15, except that literature other than that of the Bible will be studied. English and American authors will be chiefly used.



## PHYSICAL EDUCATION

The richness of Biblical allusion in secular literature will be noted. The inclusive purpose of the course is to attain familiarity with the literary and philosophic sources of the modern world, and to render them usable in common life. Mr. Babcock. 3 lec. or rec.; 3 cr.

19. THE LIBERAL TRADITION IN WESTERN THOUGHT. This course deals with the nature of the important but elusive movement of thought called liberalism; in its several aspects — intellectual, religious, economic, political, etc. It will be concerned with the limits of freedom, the nature of democracy, and anti-democratic forces. American patterns of liberalism, with their English antecedents. The modern dilemma of liberalism in a changing social order is referred to throughout. Mr. Babcock. 3 lec. or rec.; 3 cr.

51, 52. SEMINAR. Intensive study of a selected topic or field. Designed for those who wish to cultivate the philosophical way of life for further self-improvement. Open to students who have had a course in philosophy, or by permission of the instructor. Mr. Babcock. 2 lec. or rec.; 2 or 3 cr.

55, 56. PHILOSOPHY OF HISTORY. (1) Some of the less obvious aspects of chronology; periodizing as a means of interpreting history; (2) historical geography; (3) culture-history, including the historical side of everyday life; (4) the philosophy-of-history proper, or a study of some of the ways in which history as a whole has been viewed, including both deterministic theories and the study of biography. Mr. Babcock. 3 lec. or discussions; 3 cr.

### PHOTOGRAPHY

(See THE ARTS, page 182.)

### PHYSICAL EDUCATION FOR MEN

CARL LUNDHOLM, *Professor, Director of Physical Education and Athletics*; HENRY C. SWASEY, *Associate Professor*; PAUL C. SWEET, *Associate Professor*; ANTHONY A. DOUGAL, *Assistant Professor*; EDWARD J. BLOOD, *Instructor*; JAMES W. GLASSFORD, *Instructor*; EDWARD M. STANCZYK, *Instructor*.

REQUIREMENTS: All Freshmen and Sophomore men students and first-year students in the Two-Year Curriculum in Agriculture are required to register for Physical Education. Each student must provide himself with an activity suit consisting of a gray sleeveless jersey, gray trunks, white woolen socks, and rubber-soled tennis or basketball shoes. This suit must be worn at all classes in Physical Education.

## UNIVERSITY OF NEW HAMPSHIRE

31, 32. PHYSICAL EDUCATION. Development of the organic system generally; stimulation of the neuromuscular system through physical activity; encouragement of a proper attitude toward play; development of an appreciation of physical activities as worthwhile leisure-time recreation. Required of Freshmen. 2 periods;  $\frac{1}{2}$  cr. Students passing will get a grade of cr.

33, 34. PHYSICAL EDUCATION. Continuation of 31, 32. Required of Sophomores. 2 periods;  $\frac{1}{2}$  cr. Students passing will get a grade of cr.

### TEACHER PREPARATION COURSES

*Required of students registered in the University Physical Education Teacher Preparation Curriculum for Men. Elective for other students by special permission from the Director of Physical Education and Athletics.*

23. PRINCIPLES OF PHYSICAL EDUCATION. The aims, objectives, and principles of Physical Education and the historical factors which have influenced the physical life of nations. Mr. Lundholm. 3 lec.; 3 cr.

40. WINTER SPORTS. Instruction and practice in ski jumping, downhill, slalom, and cross country skiing, and snowshoeing. Conditioning of men, waxing of skis, and selection and care of equipment. The organization and management of winter carnivals and other competitions. Special emphasis on methods of teaching skiing. 2 rec.; 2 cr.

45. FOOTBALL. A history of football with consideration of its educational implications and an analysis of the various systems of play. Instruction in team and individual offensive and defensive fundamentals. The rules, theory, strategy, generalship of team play, and the responsibilities of the coach for the physical welfare of the team. 2 rec.; 2 cr.

46. BASEBALL. Theoretical and practical consideration of the basic principles of batting and fielding; the fundamentals of each position; special stress on problems involving team play, coaching methods, physical conditioning, and rules; a history of the game with a consideration of its educational values. 2 rec.; 2 cr.

47. TRACK AND FIELD ATHLETICS. Instruction and practical demonstrations in starting, sprinting, middle distance and distance running, relay racing, hurdling, high and broad jumping, pole vaulting, shot putting, discus, hammer, and javelin throwing. Methods of preparing contestants for the various events. 2 rec.; 2 cr.

48. BASKETBALL. History of basketball with a consideration of its educational values. Theory and practice in the fundamentals of individual offense and defense. The various styles of team offense and defense and rules of the game. Problems in handling and conditioning a team. 2 rec.; 2 cr.



## PHYSICAL EDUCATION FOR WOMEN

61. PROBLEMS OF TEACHING IN PHYSICAL EDUCATION. Methods and materials of instruction, theories of play, and actual practice for the successful teaching of recreational activities in school, on the playground, and in the community. Studies of activities adapted to different levels of maturity. 3 rec.; 3 cr.

63. CARE AND PREVENTION OF INJURIES. Nature and causes of injuries incident to physical activities, the common hazards of play, and preventative measures for children and athletes are discussed. First aid principles are presented. Elective for Seniors who have taken one of the following: P.E. 40, 45, 46, 47, 48; and Juniors and Seniors in the O.T. Curriculum. 2 rec.; 2 cr.

65. ADMINISTRATION OF PHYSICAL EDUCATION IN SECONDARY SCHOOLS. The aims and objectives of health and physical education. Organization and supervision of a complete unified program of health and physical education including the legal aspects, intra-mural and inter-scholastic athletics, medical problems, budgeting, financing, maintenance of equipment, publicity programs, and office management. Each student will be given an opportunity to serve on a committee to draw up an original program of health and physical education in a theoretical or actual situation found in some secondary school. Mr. Lundholm. Prereq.: Zoöl. 17-18; P.E. 23 and 61; and two courses in the coaching of sports. These last may be taken concurrently. 3 rec.; 3 cr.

EDUCATION-PHYSICAL EDUCATION (ED-PE) 93 (93). DIRECTED TEACHING IN PHYSICAL EDUCATION. Given in the Department of Physical Education and Athletics for Men. Prereq.: Zoöl. 17-18; P.E. 23, and 61. The student must have completed the methods course in the sport which he is directing or take the course concurrently. 2 to 4 cr.

EDUCATION-PHYSICAL EDUCATION. (ED-PE) 94. SUPERVISED TEACHING IN PHYSICAL EDUCATION IN THE FIELD. An opportunity under joint supervision of the Physical Education and Education Departments, to coach athletics in secondary schools and to assist in supervising a recreational program. Prereq.: Zoöl. 17-18. P.E. 23, 65 and methods courses in those sports in which the student intends to become actively engaged. 2 to 4 cr.

### PHYSICAL EDUCATION FOR WOMEN

MARION C. BECKWITH, *Associate Professor*; EVELYN BROWNE, *Assistant Professor*; CAROLINE S. WOOSTER, *Assistant Professor*; PHYLLIS ONGLEY, *Instructor*; SALLY DUNNING, *Instructor*; PRISCILLA L. RABETHGE, *Instructor*; JEANETTE L. GOODWIN, *Instructor*; CATHERINE J. MARKEY, *Instructor*.

The Department of Physical Education for Women aims to develop

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in each individual the physical, social, and mental qualities which will enable her to meet successfully the demands of modern society. The courses include recreative and leisure-time activities, vigorous team sports and gymnastics, rhythmic and dance activity, and the opportunity to participate in club activities which are provided for the more highly skilled. This program is supplemented by the extra-curricular competition offered by Women's Recreation Association.

**REQUIREMENTS.** All women students are required to complete at least one credit of physical activity for each of the first six semesters they attend the University. Freshmen women should register for P.E. 1, 2; Sophomores for P.E. 3, 4; and Juniors for P.E. 5, 6. One additional activity (it may be a club) or an academic course within the Department may be elected each semester for additional credit. Except by special permission, the same activity shall not be credited more than twice.

**PHYSICAL EXAMINATIONS.** Each student must, upon entering, have a physical examination by the University Physician and a posture test by the Physical Education staff. Individual gymnastics is required of each Freshman whose physical condition indicates this need. Students with physical disabilities must follow the same procedure as other students including registration for Physical Education credit. In most cases, modified activities are recommended by the University Physician. Otherwise, theoretical work is approved by the Department.

**MOTOR ABILITY TEST.** All students are expected to take the motor ability test at the time of entering the University and at the completion of their Physical Education requirement. In addition, this test is used as a basis for determining club membership and credit for Advanced Instruction. (See Advanced Instruction.)

**ADVANCED INSTRUCTION.** To provide for the more highly skilled student and to encourage the interest and ability of the less skilled, the Department of Physical Education for Women includes in its program numerous club and interclass activities in which Advanced Instruction is given by a member of the teaching staff.

**Membership:** Open to any University student.

**Qualifications:** Club standards or membership of class squad.

**Credit:** Upperclassmen may, if the results of the motor ability test show they are qualified to do so, substitute: (1) club activities for their 3 hours of Physical Education requirement, or (2) interclass activities for their rhythmic.

**Clubs:** Dance—Instructor, Miss Ongley; Riding—Instructor, Miss Browne; Rifery—Miss Browne; Skating—Instructor, Miss Ongley; W. R. A.—Instructor, Miss Browne and staff.



## PHYSICAL EDUCATION FOR WOMEN

*Women students following any Teacher Training Curriculums in the University are urged to elect for required Physical Education the following activities: Folk dancing, community games, speedball, hockey, basketball, and American country dancing.*

**REQUIRED COSTUME AND EQUIPMENT.** Special gymnasium uniform consists of blue cotton tennis-type dress and shorts, white socks, and regulation gymnasium sneakers. Students are required to furnish their own individual equipment for such activities as tennis, modern dancing, individual gymnastics, skiing, and skating. Equipment is furnished for golf, fencing, badminton, hockey, archery, lacrosse, and softball.

1, 2; 3, 4; 5, 6. **PHYSICAL EDUCATION.** Students should register for one activity (meeting two hours a week) from the lists below. One additional hour of fundamentals (Freshmen) or rhythmic (upper-classmen)\* will be arranged by the Department. 3 hours; 1 cr.

### ACTIVITY COURSES

(elect one a quarter)

*First Quarter:* Archery, badminton, modern dance, hockey, individual gym, riding (elem. + inter. + advanced), soccer, speedball, tennis (elem. + inter.).

*Second Quarter:* Basketball, badminton, modern dance, community games, individual gym, folk dancing, fencing, skating, figure skating, skiing (elem.), riflery.

*Third Quarter:* Basketball, badminton, modern dance, community games, individual gym, Am. country dance, fencing, skating, skiing (elem. + inter.), riflery, volleyball.

*Fourth Quarter:* Archery, badminton, modern dance, golf, individual gym, riding (elem. + inter. + advanced), lacrosse, softball, tennis (elem. + inter.).

Required of Freshmen, Sophomores, and Juniors. 3 periods; 1 cr.

7, 8. **PHYSICAL EDUCATION.** Elect courses from the list under P. E. 1, 2. Elective for Seniors. 3 hours. 1 cr.

11, 12; 13, 14; 15, 16; 17, 18. **PHYSICAL EDUCATION.** Elective courses open to Freshmen, Sophomores, Juniors, and Seniors respectively may be chosen from the lists under P. E. Ed. 1, 2. 2 hours; 1 cr.

### THEORY COURSES

23. **PRINCIPLES OF PHYSICAL EDUCATION.** See course description under Department of Physical Education for Men.

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\*See Advanced Instruction for substitutions.

## UNIVERSITY OF NEW HAMPSHIRE

24. ORGANIZED CAMPING. The methods, objectives, and purposes of organized camping for groups; standards for organized summer camps, facilities, equipment, food, sanitation, health, and safety requirements; departments, programs, and leadership qualifications. Mrs. Wooster. Elective for Sophomores, Juniors, and Seniors. 3 lec., 3 cr.

(36.) RECREATION LEADERSHIP. Philosophy of recreation, organization, and administration of social recreation, clubs, and playgrounds; recreation as therapy. Miss Rabethge. Elective for Sophomores, Juniors, and Seniors. 2 lec. or rec.; 1 lab.; 3 cr.

53, 54. SURVEY OF DANCE. A survey of materials and techniques in teaching dance as well as a history of dance as an art and as a phase of education. Includes instruction in social, tap, and Modern Dance III (composition), first semester; in folk and square dancing, second semester. Miss Ongley, Miss Dunning, and Miss Rabethge. Prereq. to 53: Modern Dance I and II. Open to Physical Education majors or by permission of instructor. 1 lec.; 2 lab.; 2 cr.

55. REMEDIAL GYMNASICS. The adaptation of exercise to individual needs, capacities, and limitations; physical abnormalities and their correction. Theory and technique of massage. Mrs. Wooster. Prereq.: Zoöl. 17-18. 2 lec. or rec.; 2 lab.; 3 cr.

56. HEALTH EDUCATION. A general health course designed to acquaint the student with principles, teaching methods, and materials in modern medical treatment in immunity and disease; accident prevention; exercise and fatigue, food in relation to health and problems of growth. Miss Markey. Prereq.: Zoöl. 17, 18. 3 lec. or rec.; 3 cr.

63, 64. THE THEORY AND COACHING OF TEAM SPORTS FOR WOMEN. The principles involved in the teaching of team games and lead-up games with emphasis on coaching methods and officiating. Miss Dunning. Prereq.: Elementary courses in team sports. 2 lec. or rec.; 2 lab.; 2 cr.

66. ADMINISTRATION OF PHYSICAL EDUCATION IN SECONDARY SCHOOLS. Administrative relationships and procedures in the conduct of physical education and health education in the secondary schools. Preparation of general administrative policies; facilities and equipment. Miss Browne. 3 lec.; 3 cr.

73, 74. THE THEORY AND COACHING OF INDIVIDUAL SPORTS FOR WOMEN. A study of the advanced techniques and principles involved in the teaching of tennis, archery, skating, skiing, badminton, fencing, bowling, golf, and swimming. Coaching methods and materials will be emphasized. The history, equipment, courtesies, rules and tactics of each sport will be discussed. Miss Beckwith, Miss Browne. Prereq.:



## PHYSICS

Elementary work in six of the courses listed above. Open to Senior majors or others by permission of instructor. 1-2 lab.; 1-2 cr.

P.E.-Ed 91. PROBLEMS IN THE TEACHING OF PHYSICAL EDUCATION FOR WOMEN. The organization of a comprehensive program of activities for use from the elementary schools through college. Miss Goodwin. 3 lec. or rec.; 3 cr.

P.E.-Ed 92. DIRECTED TEACHING OF PHYSICAL EDUCATION FOR WOMEN. Opportunity for teaching of Physical Education activities under direction in the elementary and secondary schools and in college. Miss Goodwin. Prereq.: P.E.-d 91. 1 lec. or rec.; 2 lab. 2 cr.

### PHYSICS

HORACE L. HOWES, *Professor*; WILLIAM H. HARTWELL, *Associate Professor*; HAROLD I. LEAVITT, *Associate Professor*; HARRY H. HALL, *Associate Professor*; DUANE F. CARLISLE, *Assistant Professor*; CHARLES B. HASKELL, *Instructor*; E. WELLS HUBBARD, *Instructor*; J. DOUGLAS CROOKS, *Instructor*; BEATRICE S. VARNEY, *Laboratory Instructor*.

1-2. INTRODUCTORY PHYSICS. Mechanics; properties of matter; heat; magnetism; electricity; wave motion; sound and light. Demonstration lectures, laboratory, and recitation. A knowledge of high school algebra and plane geometry is essential. 1 lec.; 2 rec.; 1 lab.; 4 cr.

7-8. GENERAL PHYSICS. Mechanics and properties of matter; heat; selected topics in sound and light; electricity and magnetism. Prereq.: Math. 4 or 6 in advance, and Math. 7-8 either in parallel or as a prerequisite. 1 experimental lec.; 3 rec.; Phys. 7, 4 cr.; Phys. 8, 4 cr.

9. GENERAL PHYSICS LABORATORY. Open only to students studying, or credited with Phys. 7. Experiments in mechanics and properties of matter, with report writing and curve plotting of data. Appreciation of the laws of Physical Science; the development of laboratory technique, and the estimation of the limitations of scientific experimentation. Prereq.: The same as those for Phys. 7-8. 1 lab.; 2 cr.

10. GENERAL PHYSICS LABORATORY. A continuation of Physics 9 to include experiments in heat, sound, light, electricity, and magnetism. Prereq.: Phys. 7 and 9. 1 lab.; 2 cr.

15. SURVEY OF PHYSICAL SCIENCE. The fundamental facts and principles necessary for an understanding of such subjects as the earth as an astronomical body and our neighbors in space; the origin of the solar system; the universe as a whole; the nature of matter and energy, heat, light, sound, electricity, radiant energy and atomic structure. Mr. Leavitt. Open to Sophomores preparing to teach in the fields of English, Social Studies, and the Foreign Languages, who may elect

## UNIVERSITY OF NEW HAMPSHIRE

this course and Phys. 16 to meet their Physical Science requirements for the degree. 3 lec. or rec.; 3 cr. (Not given in 1947-1948.)

16. SURVEY OF PHYSICAL SCIENCE. The fundamental facts and principles necessary for an understanding of such subjects as the constitution of matter, physical changes, chemical changes, communication, the uncontrolled changes or geological evolution of our physical environment, the climate and weather. Mr. Leavitt. Open to Sophomores preparing to teach in the fields of English, Social Studies, and the Foreign Languages. 3 lec. or rec.; 3 cr. (Not given in 1947-1948.)

41-42. INTERMEDIATE PHYSICS. A general survey of Physics in which free use is made of the methods of Calculus. The course is designed to introduce the student to the topics of mechanics, heat, light, sound, and wave motion in a more rigorous manner than is possible in the elementary presentations. Prereq.: Math. 7-8; Phys. 1, 2 or Phys. 7, 8. 2 lec.; 1 rec.; 3 cr.

51. THEORY OF ELECTRONS. A limited survey of theory of electricity including the passage of a current through a gas, the mobility of ions, the determination of charge and mass of the electron, ionization by collision, the corona discharge, cathode rays, positive rays, thermionic emission, photo-electricity and X-rays, Prereq.: Phys. 7-8, Math. 7-8. 2 lec.; 2 cr.

54. ACOUSTICS. The principles of sound origins, propagation, and reception applied. Lectures and recitations. Prereq.: Phys. 1, 2 or Phys. 8 and 10. 3 lec.; 3 cr.

55. EXPERIMENTAL PHYSICS. Designed to augment the student's knowledge of the theory and performance of optical instruments; to improve his laboratory technique in precision measurements. The fundamental physical theories underlying the phenomenons of refraction, interference, diffraction, and polarization will be discussed in the lecture periods. Prereq.: Phys. 2 or 8; Math. 7-8. 2 lec.; 1 lab.; 4 cr.

\*56. MODERN EXPERIMENTAL PHYSICS. Measurement of the charge on the electron by the Millikan oil drop method; of  $e/m$  by cathode ray deflection; of Planck's constant by the investigation of photoelectric cells and various other quantities will be taken up. The first portion of the laboratory work is planned to acquaint the student with the laboratory techniques of modern Physics. A part of the course will consist of a development project for each student. Prereq.: Phys. 1, 2; Math. 7-8. 2 lec.; 1 lab.; 4 cr. (Not given in 1947-1948.)

\*57-58. INTRODUCTION TO THEORETICAL PHYSICS. Equation of motion in particle dynamics and typical problems; simple harmonic motion; small oscillations; damped and forced oscillations; some rigid dynamics; normal coordinates; vibrating string; elasticity; heat flow;



## PHYSICS

electrostatics; potential theory; energy in electromagnetic field; waves; dispersion; Huygens' principle. Prereq.: Math. 7-8; either Phys. 1, 2 or Phys. 7, 8; Phys. 41, 42 or equivalent. 2 lec.; 1 rec.; 3 cr. (Not given in 1947-1948.)

\*61. ELECTRICITY AND MAGNETISM. Intended to give a theoretical background for the understanding of electrical phenomena, and a foundation for the study of electrical measurements. Electrostatics, magnetostatics, Kirchoff's laws, fields associated with currents, alternating currents, complex impedance, free and forced oscillations of a simple circuit, thermoelectricity, characteristics of vacuum tubes. Prereq.: Phys. 7-8; Math. 7-8. 3 lec.; 3 cr.

64. ELECTRICAL MEASUREMENTS. Experiments on the use of precision potentiometers, the constants of sensitive galvanometers, low resistance by the Kelvin double bridge, high resistance by the method of leakage and by direct deflection, the use of alternating current bridges for measuring capacity, self and mutual inductance and frequency, the characteristics of certain photoelectric cells. Prereq.: Phys. 8 and 10. 1 lec.; 1 lab.; 3 cr.

\*65-66. MOLECULAR PHYSICS. An introduction to kinetic theory of gases, thermodynamics, and statistical mechanics as applied to physical and chemical problems. Prereq.: Phys. 1, 2 or Phys. 7, 8; Math. 7-8. 3 lec.; 3 cr. (Not given in 1947-1948.)

71-72. PHYSICS SEMINAR. Selected subjects in modern and classical Physics are discussed before the seminar. Each student presents at least one paper per semester. Prereq.: Math. 7-8; Phys. 7, 8; general scientific maturity. 1 lec.; 1 cr. (Not given in 1946-1947.)

73-74. THESIS. A topic for experimental investigation will be assigned each student and a thesis covering the reading and the observations will be required. Prereq.: Phys. 41, 42, and permission of Department Head. (Not given in 1947-1948.)

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. INTRODUCTION TO ATOMIC PHYSICS. A course of lectures with accompanying problems and outside reading treating the following subjects: The fundamental experiments and equations of static and dynamic electricity leading to the electromagnetic theory of Maxwell; various experimental methods of determining the Avogadro number by diffusion, Brownian movement, and measurement by dielectric constant; radiation from accelerated charges, and special relativity; various black body radiation laws and the quantum hypothesis; the Bohr postulates and hydrogenic solution of the Schrodinger equa-

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\*Course to be given at the discretion of the Head of the Department.

## UNIVERSITY OF NEW HAMPSHIRE

tion. Time permitting, other topics will be discussed depending on the interests of the class, such as the photo electric effect, the quantum theory of specific heats, or the electron theory of metallic conduction. Mr. Hall. Prereq.: Phys. 57, 58. 3 lec.; 3 cr.

104. LUMINESCENT RADIATION. Lectures descriptive of experimental researches in the luminescence of solids; with some attention to the luminescence of gases, and non-blackbody radiation in general. Mr. Howes. Prereq.: Phys. 7, 8, 9, 10, 14, or the equivalent. 3 lec.; 3 cr.

105, 106. ELECTRIC OSCILLATIONS AND ELECTRIC WAVES. Free and forced oscillations of coupled circuits, applications of Fourier's theorem to steady state and transient response of networks, Maxwell's field equations, free and guided waves, reflection, refraction, absorption, application to shielding, waves on wires, wave guides, radiation. Mr. Hall. Prereq.: Phys. 7, 8, 61; Math. 51-52.

### POLITICAL SCIENCE

(See GOVERNMENT, pages 227-230.)

### POULTRY HUSBANDRY

T. BURR CHARLES, *Professor*; FRED E. ALLEN, *Assistant Professor*; ALAN C. CORBETT, *Assistant Professor*; RICHARD C. RINGROSE, *Assistant Professor*.

2. FARM POULTRY. The general principles of Poultry Husbandry and their practical applications with emphasis on factors of culling, breeding, housing, feeding, marketing, diseases and parasites, incubation and management. Mr. Charles, Mr. Ringrose. 2 lec.; 1 lab.; 3 cr.

6. POULTRY FEEDING. The principles of feeding; analysis of recent experimental work and current feed problems. Each student will care for a group of birds for several weeks for practical observation and collection of data. Mr. Ringrose. 2 lec.; 1 lab.; 3 cr.

7. POULTRY HOUSING. Design and construction of poultry houses and equipment; costs of materials; management principles. Mr. Charles. 1 lec.; 1 lab.; 2 cr.

17. POULTRY BREEDS AND JUDGING. The origin, history, and classification of breeds. Theory and practice in judging fowls for egg production and exhibition and for intercollegiate contests. Mr. Ringrose. 2 lec.; 1 lab.; 3 cr.

18. INCUBATION AND BROODING. The principles involved in incuba-

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\*Course to be given at the discretion of the Head of the Department.



## POULTRY HUSBANDRY

tion and brooding of poultry; embryonic development. Students individually operate incubators and care for groups of chicks. Mr. Charles, Mr. Ringrose. 2 lec.; 1 lab.; 3 cr.

19. **POULTRY MARKETING.** The preparation of poultry and eggs for market. Egg qualities and grades, candling and packaging; egg and poultry market conditions; practical instruction in killing, picking, and dressing. Mr. Ringrose. 2 lec.; 1 lab.; 3 cr.

20. **POULTRY DISEASES.** The anatomy of the fowl; diseases and parasites encountered in poultry practice; methods of prevention and control. Mr. Corbett. 3 lec.; 1 lab.; 4 cr.

24. **POULTRY PRACTICE.** Practical work at the University Poultry Plant in the hatching, rearing, and care of chickens. Mr. Charles. Ten hours a week of practical work. 4 cr. (NOTE: By permission, students with previous practical poultry experience may substitute 4 semester credits of electives for this course.)

26. **POULTRY MANAGEMENT.** The application of successful business principles to poultry farming; study of surveys and production costs. As a part of the laboratory work, a detailed "three year" development plan of a poultry farm will be studied. Mr. Charles, Mr. Ringrose. 2 lec.; 1 lab.; 3 cr.

27, 28. **POULTRY SEMINAR.** Students abstract experimental data and report on various current poultry topics. Thesis required. Mr. Charles, Mr. Ringrose. 1-hour conference; 1 cr.

29. **POULTRY BREEDING.** The genetic principles involved in breeding for egg production, including practical application and demonstration. Mr. Charles, Mr. Ringrose, 2 lec.; 2 cr.

53, 54. **POULTRY PROBLEMS.** Students are given a selection of various problems and are required to compile and present accurate and detailed information in their solution. Mr. Charles, Mr. Corbett, Mr. Ringrose. 1 to 3 cr.

56. **TURKEY BREEDING AND PRODUCTION.** Subject matter covered includes breeds and their commercial importance; breeding methods, including the National Turkey Improvement Plan and Record of Performance; brooding and rearing methods; feeding, housing, and management practices. Mr. Charles. 2 rec.; 2 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

101, 102. **ADVANCED POULTRY DISEASES.** A study of the cause and effects of disease applied to the body as a whole. Lectures supplemented by laboratory demonstrations of the basic pathology of diseased tissue. A detailed discussion of diagnosis, prevention, control

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and treatment of poultry diseases. Mr. Allen and Mr. Corbett, Prereq.: Poultry Husbandry 20, Bact. 2, and Zoöl. 53 and 54. (Zoöl. 53, 54 may be taken simultaneously with Poultry Husbandry 101, 102.) 3 lec.; 3 cr.

103, 104. **ADVANCED POULTRY SCIENCE.** A comprehensive study of (1) the inheritance of morphological and physiological characters in poultry; (2) problems involved in the production, processing and sale of poultry products, and (3) the study of metabolism and physiology of digestion with special emphasis on mineral needs and deficiency diseases of poultry. Mr. Charles and Mr. Ringrose. Prereq.: Poultry Husbandry 29, 19, and 6, or their equivalent. 2 lec.; 1 lab.; 3 cr.

105, 106. **SEMINAR.** A survey of recent literature and research in poultry husbandry. Department Staff. 1 cr.

107, 108. **POULTRY PROBLEMS.** Students are given a selection of various problems and are required to compile and present accurate and detailed information in their solution. Hours and credits not to exceed three, are to be arranged.

### *PRE-DENTAL*

(See page 113.)

### *PRE-LAW*

(See page 114.)

### *PRE-MEDICINE*

(See page 120.)

## PSYCHOLOGY

HERBERT A. CARROLL, *Professor*; GEORGE M. HASLERUD, *Associate Professor*; ELMER D. WEST, *Associate Professor*; RUTH B. KELLY, *Instructor*; DANIEL G. DITTMER, *Instructor*; PAUL H. MCINTIRE, *Instructor*.

Except for Psychology 1, 2, courses in this Department are not open to Freshmen.

1, (1). **ELEMENTARY GENERAL PSYCHOLOGY.** An introductory course designed to familiarize the student with fundamental concepts of human behavior, emphasizing the functional applications of basic principles. Mr. Dittmer and Mr. McIntire. 3 lec.; 3 cr. This course cannot be used to satisfy major requirements.

2, **ADVANCED GENERAL PSYCHOLOGY.** A systematic study of Psychol-



## PSYCHOLOGY

ogy as a science with emphasis on the experimental evidence for generalizations about behavior, including attention to topics of intelligence, personality, motivation, emotion, learning, memory, sensation, perception, thinking, dreaming, and the nervous system. Mr. Haslerud and Mr. McIntire. Prereq.: Psych. 1. 3 lec.; 3 cr.

33. INDUSTRIAL PSYCHOLOGY. The principles of Psychology applied to industry and business, including advertising, sales, and customer research. Mr. Dittmer. 3 lec.; 3 cr.

36. PSYCHOLOGY OF PERSONNEL. The principles of Psychology applied to the management of personnel and labor relations in business and industry, including a study of the techniques involved. Mr. Dittmer. Prereq.: Psych. 33. 3 lec.; 3 cr.

47, (47). MENTAL HYGIENE. An examination of the fundamental emotional satisfactions desired by human beings and a consideration of the several ways in which these desires are thwarted. The mental conflicts growing out of such thwartings and ways of resolving them will be the central theme of the course. Specific application of the principles of mental health will be made to the problems of college students. Mr. Carroll, Mr. Dittmer, and Miss Kelly. 3 lec.; 3 cr.

48. PSYCHOPATHOLOGY. The distortion of the psychological functions of perception, association, memory, judgment, and thinking as found in the maladjusted individual in need of institutional care. The symptoms distinguishing the various types of mental disorders and the more common forms of the psychoses and neuroses are presented to enable the student to recognize typical cases. Mr. Haslerud. Prereq.: Psych. 47. 3 lec.; 3 cr.

51. PSYCHOLOGY OF CHILDHOOD. The mental processes and reactions of the normal child from birth to adolescence studied in order to obtain a comprehensive understanding of the development of the personality of the child. Special emphasis is placed on problems of parents and teachers and the importance of childhood for later adjustment. Mr. Haslerud. Prereq.: Psych. 1. 3 lec.; 3 cr.

57. EXPERIMENTAL PSYCHOLOGY. A study of experimental work in Psychology, supplemented by class experiments. Emphasis will be placed on scientific method and experimental procedure. Mr. Haslerud. Prereq.; Psych. 2. 2 lec.; 2 lab.; 3 cr.

58. PSYCHOLOGY OF LEARNING. A study of the principles and theories of learning and forgetting and their application to habit formation, social learning, and educational problems. Mr. Haslerud. Prereq.; Psych. 2. 3 lec.; 3 cr.

63. INDIVIDUAL DIFFERENCES. A study of individual differences with

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special emphasis on intellectually gifted and mentally subnormal children. Mr. West. Prereq.: Psych. 2. 3 lec.; 3 cr.

67. PRINCIPLES OF MEASUREMENT. A study of the problems involved in objectively measuring mental aptitudes and the results of learning by means of informal and standardized group tests. Special attention will be given to the statistical interpretation of scores. Mr. Carroll. Prereq.: Psych. 2. 3 lec.; 3 cr.

68. INDIVIDUAL MENTAL TESTING. Demonstrations and experience in the administration of individual intelligence tests. Major attention will be given to the Terman-Merrill Revision of the Binet-Simon Scales. Miss Kelly. Prereq.: Psych. 67. 3 lec.; 3 cr.

74. PSYCHOLOGY OF PERSONALITY. A scientific approach to the analysis of personality in terms of structure, development, classification, and methods of measurement. Mr. Dittmer. Prereq.: Psych. 2. 3 lec.; 3 cr.

77. PHYSIOLOGICAL PSYCHOLOGY. A study of the organic bases of behavior. Psychologically relevant topics concerning the nervous system, endocrine glands, sense organs, etc., will be considered. Mr. Haslerud. Prereq.: Psych. 2. 3 lec.; 3 cr.

83. SYSTEMATIC PSYCHOLOGY. A critical examination of the points of view of the various schools of Psychology. Considerable attention is given to the contributions which the more important of these schools have made to contemporary thought in Psychology. Mr. Carroll. Prereq.: Psych. 2. 3 lec.; 3 cr.

98. SEMINAR IN PSYCHOLOGY. Mr. Carroll. Prereq.: 15 semester credits in Psych. 3 cr.

### COURSES PRIMARILY FOR GRADUATE STUDENTS

105 (105). CLINICAL PSYCHOLOGY. A study of procedures in the diagnosis and therapy of behavior disorders. Instruction is given in the administration and interpretation of personality tests and inventories. Directive and non-directive methods in psychotherapy are compared and critically evaluated. Mr. Carroll. Prereq.: Psych. 47 or its equivalent, and permission of instructor. 3 lec.; 3 cr.

106. CLINICAL PROBLEMS. Attention is concentrated on actual cases. In addition to a study of reports on individuals with behavior disorders, opportunities are provided for field work. Mr. Carroll. Prereq.: Psych. 105. 3 cr.

107. DYNAMICS OF BEHAVIOR. A comprehensive study of the biological, social, and developmental aspects of motivation and emotion. Mr. Haslerud. Prereq.: Permission of instructor. 3 lec.; 3 cr.



## SOCIAL SCIENCE

110. *TECHNIQUES OF COUNSELING.* A study of the psychological factors, techniques, and procedures involved in the analysis of the individual's vocational, educational, and social adjustments. Mr. West. Prereq.: Psych. 67 and permission of instructor. 3 lec.; 3 cr.

114. *STATISTICAL PROBLEMS IN PSYCHOLOGY.* Advanced study of techniques for analyzing and interpreting experimental and testing problems, including psychophysical methods and factor analysis. Mr. Haslerud. Prereq.: Psych. 67 or its equivalent. 3 lec.; 3 cr.

131, 132. *GRADUATE SEMINAR.* By lectures, readings in source materials (primarily current psychological journals), and reports, the student is directed in a critical examination of psychological theory and practice and in a synthesis of psychological knowledge. At least one semester required for Master's degree in Psychology. Mr. Haslerud in charge. Prereq.: Undergraduate major in Psychology or permission of instructor. 3 cr.

181, 182. *READING AND RESEARCH IN PSYCHOLOGY.* With the advice and consent of the instructor, a student prepared by training and experience to do independent work may register for this course. The student will undertake assigned problems and readings under the guidance of the instructor. Hours and credits by arrangement. Mr. Carroll and Mr. Haslerud.

### *PUBLIC SPEAKING*

(See page 220.)

### *RADIO*

(See page 220.)

### *RELIGION*

(See courses in Department of Philosophy, page 263.)

### *SECRETARIAL STUDIES*

(See page 203.)

## *SOCIAL SCIENCE*

The four courses listed are given under the auspices of the Division of Social Science of the Faculty of the College of Liberal Arts. This Division includes the Departments of Economics and Business Administration, History, Government, Psychology, and Sociology.

51. *SOCIAL STATISTICS.* A course primarily for the Social Science student designed to acquaint him with the place of Statistics in the

# UNIVERSITY OF NEW HAMPSHIRE

Social Science field and to bring out the significance of Statistics as an instrument of research. The course will cover the meaning and interpretative use of the most commonly employed statistical symbols and terminology and the applications of these to the various Social Science fields. Those interested in Mathematical Statistics should take Math. 61-62. Mr. Kichline and Mr. Bachelder. 3 lec. or lab.; 3 cr.

79, 80. SEMINAR IN STATE PROBLEMS. A research course in problems of current import to New Hampshire taught by staff members in the Division of Social Science. Hours arranged; 1-6 cr.

81, (81). UNDERGRADUATE INTERNSHIPS. Actual field work in a department of the state or local government. The work will be in charge of the department or agency to which the student is appointed. Arrangements for each student will be in charge of the Head of the Department involved or his representative. Prereq.: Background work for the internships, substantial work in Govt., Econ., B. Ad., Hist., or Soc. For Juniors and Seniors. Not more than 16 credits. No more than 9 credits may be counted toward the completion of major requirements.

## SOCIAL SERVICE

(See page 283.)

## SOCIOLOGY

CHARLES W. COULTER, *Professor*; JOSEPH E. BACHELDER, JR., *Associate Professor*; HERBERT J. MOSS, *Assistant Professor*.

1. PRINCIPLES OF SOCIOLOGY. The underlying laws of human society, especially those governing the origin, growth, and decline of institutions; group relationships to biological and geographic environments; social processes such as conflict, competition, imitation, accommodation, co-operation, assimilation, and differentiation; societal isolation; culture, its organization, content, location, and formation; social institutions, including the familial, religious, economic, educational, recreational, and political; social change with its attendant maladjustments, and control. Mr. Bachelder and Mr. Moss. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

2. SOCIAL PSYCHOLOGY. The social aspects of the development and functioning of the personality, analysis of the processes through which the individual's impulses are shaped and confined by the cultural patterns of the group, and of the factors which determine attitudes, wishes, habits, and social roles; a critical evaluation of the various methods used at present for the study of human nature. Mr. Bachelder and Mr. Moss. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*



not offered  
1947-48

## SOCIOLOGY

22. AMERICAN POPULATION PROBLEMS. A course dealing with the growth, distribution, mobility and ecology of population in the United States. Statistical estimates will be made of the significance of such population factors as: age, sex, race, religion in sectionalization, social coherence and other social problems. Mr. Bachelder. 3 lec. or rec.; 3 cr. (*Not open to Freshmen.*)

33. CULTURAL ANTHROPOLOGY AND ETHNOLOGY. (1) A comparative study of primitive folk-ways, institutions, and social organization, marriage, economic activities, religion, property inheritance and folklore; culture and the principles of its development; the significance of primitive culture for an understanding of contemporary civilization. (2) A comparative study of peoples; environmental factors, societal effect of invasion, colonization, and linguistic fusions; race and class struggles; jingoism, race relations in mid-European territory and in the Far East; the problem of world peace. Mr. Coulter. Prereq.: Soc. 1 and 2, or by special permission. 3 lec. or rec.; 3 cr.

34. THE IMMIGRANT AND THE NEGRO. Negro and immigrant heritage; problems of assimilation and Americanization. Intensive study of selected groups, the Negro, the Jew, the Italian, the Pole, the Greek, the French-Canadian, and the Japanese. Mr. Coulter. Prereq.: Soc. 1 and 2, or by special permission. 3 lec. or rec.; 3 cr.

37. URBAN AND RURAL SOCIOLOGY. The foundation materials for the study of both urban and rural life; the physical setting, population shifts, contrasting incomes, habits, attitudes, the significance of the improvement of means of communication, factors involved in the rapid growth of cities since 1800: physical structure of the city; processes of internal growth of city areas. Mr. Moss. Prereq.: Soc. 1 and 2 or by special permission. 3 lec. or rec.; 3 cr.

41. SOCIAL PATHOLOGY. The social factors involved in alcoholism, blindness, deafness, sickness, illness, accidents, mental deficiency, mental disorder, drug addiction, prostitution, poverty, and vagrancy. The relation of personal, institutional, and community disorganization to social and individual pathologies. Remedial measures based upon a discussion of human nature and the physical conditions of modern life. Especially recommended for Pre-medical, Pre-legal, and other students who will be handling social variants in their professions. Mr. Bachelder. Prereq.: Soc. 1 and 2. 3 lec. or rec.; 3 cr.

42. COMMUNITY ORGANIZATION. Town and country community organization with respect to natural and interest groupings; the survey; methods of analyzing problems of community organization; methods of utilizing institutions and equipment in the development of programs and organizations for health, recreation, general welfare, and control. Mr. Bachelder. Prereq.: Soc. 1 and 2, or by special permission. 3 lec. or rec.; 3 cr.

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71. **CRIME AND ITS SOCIAL TREATMENT.** The increase, extent, and more popular theories of crime and delinquency, juvenile and adult. Case studies of individual delinquents with special reference to the influence of family and neighborhood environments; typical social situations and their influence; programs for the social treatment of crime, the reorganization of reformatory institutions, classification of offenders for separate treatment, the "honor system," limited self-government, parole and probation, and the juvenile court as agencies for the prevention of delinquency. Mr. Coulter. Prereq.: Soc. 1 and 2, or by special permission. 3 lec. or rec.; 3 cr.

72. **THE FAMILY.** The rise of the marriage institution and the family. Divorce, desertion, changing status of women, child welfare, child labor laws, and related modern problems. Mr. Coulter. Prereq.: Soc. 1 and 2, or by special permission. 3 lec. or rec.; 3 cr.

73. **PRINCIPLES OF SOCIAL CASE WORK.** The present trend in family case work; the techniques of interviewing, diagnosis, treatment and case recording; the significance of present-day relief practices. Mr. Moss. Prereq.: Soc. 1 and 2. 3 lec. or rec.; 3 cr.

75. **METHODS OF SOCIAL RESEARCH.** The application of the historical survey, statistical and case methods to social data; the use of bibliography, definition, and selection of the problem, determination of the data needed, collection and arrangement of data for presentation and exposition. Mr. Bachelder. Prereq.: Soc. 1 and 2, for majors in Sociology; without prerequisite for other students in Division of Social Science. 3 lec. or rec.; 3 cr.

84. **METHODS OF SOCIAL PROGRESS.** Efforts to improve social conditions and attain a larger measure of social justice; community experiments; development of modern social legislation; application of principles of insurance to social problems; various forms of mutual aids and philanthropy; endowments and special foundations. Mr. Coulter. Prereq.: Soc. 1 and 2. 3 lec. or rec.; 3 cr.

87. **THE CHURCH IN AMERICAN SOCIETY.** Contemporary organizations for worship in the community, their correlation, functions, and problems; the rise of the church and its relation to labor, the state, school, social welfare agencies; significance to the community of its organization and financing; church federation and union. Mr. Coulter. Prereq.: Soc. 1 and 2. 3 lec. or rec.; 3 cr.

88. **RECREATION AND LEISURE.** Problems arising from the increase of leisure time in modern society; typical leisure-time activities; theories of play; practical training programs in recreation; the function of leadership; analysis of types and qualities of leadership as exhibited by typical leaders; the material and program of leadership training. Mr. Moss. Prereq.: Soc. 1 and 2. 3 lec. or rec.; 3 cr.



## SOCIOLOGY

89-90. DEVELOPMENT OF SOCIOLOGICAL THOUGHT. The history of sociological thought, with special reference to the writings of Comte, Spencer, and the later writers of the nineteenth century; a comparison of contemporary sociological systems. Mr. Moss. Prereq.: Soc. 1 and 2. 3 lec. or rec.; 3 cr.

95, 96. SOCIOLOGICAL RESEARCH. A workroom course. Research projects will be set up in conference with the instructor and worked out individually or in groups. Emphasis is placed on techniques of gathering data and on presentation of the findings. Mr. Bachelder. Prereq.: 12 credits in Sociology including Soc. 75. 3 cr. *Coulter*

97, 98. SOCIAL SERVICE FIELD WORK. Designed to give the student an understanding of social work through observation and participation. Lectures, readings, and conferences will be offered during the college year. The field work requirement may be satisfied either during the college year in co-operation with neighboring social agencies or during the summer by eight weeks' work with other accredited social work institutions. The Department will arrange for a limited number of student summer placements with well supervised settlements, correctional institutions, and case work agencies in Chicago, Cleveland, Pittsburgh, Boston, and other urban centers. It is strongly recommended that students who can qualify should acquire this experience in the summer, following the Junior Year. In most cases agencies offer no remuneration beyond living expenses. Mr. Coulter. Prereq.: 12 credits of work in Soc. 3 cr.

*The Departments of Agricultural Economics, Government, History, Mathematics and Sociology offer jointly a course designed to meet the needs of those Social Science students who are interested primarily in Statistics as applied to the Social Science fields. See Social Statistics 51, page 279.*

### COURSES PRIMARILY FOR GRADUATE STUDENTS

107. SOCIAL TRENDS. A study of the nature of social change; media in which it takes place; facilitating or retarding factors; differential rates of change among institutions; social lag; contemporary American ameliorative movements looking toward the improvement of the lot of the working man; public welfare programs; social security and social legislation. Mr. Coulter. Permission of the instructor. 3 lec. or rec.; 3 cr.

181, 182. READING AND RESEARCH IN SOCIOLOGY. With the consent of the instructor, a student prepared by training and experience to do independent work may register for a reading and research course. The student will undertake assigned problems and readings under the guidance of the instructor.

Social Control—Mr. Coulter; Consumer Credit—Mr. Coulter; Social Disorganization—Mr. Bachelder; Research Technique—Mr. Bachelder. 3 cr.

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*SPANISH*

(See LANGUAGES, page 247.)

*SPEECH CORRECTION*

(See page 220.)

*STENOGRAPHY*

(See page 203.)

*TEACHER PREPARATION*

(See pages 207-212.)

*THERAPY*

(See OCCUPATIONAL THERAPY, page 262.)

*TYPING*

(See page 203.)

*ZOOLOGY*

(See page 187.)



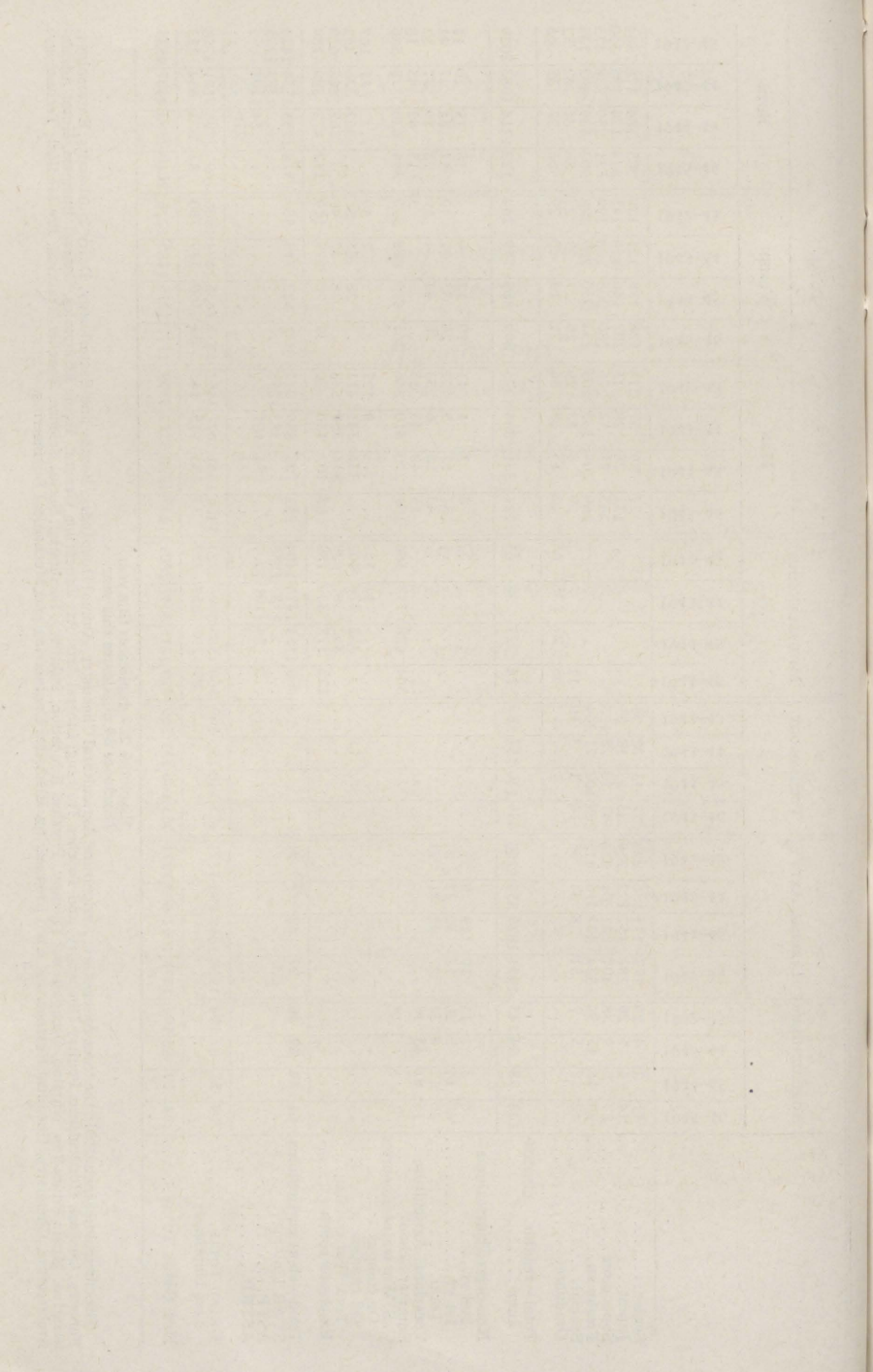
SUMMARY OF REGISTRATION

	AGRICULTURE				LIBERAL ARTS				TECHNOLOGY				MISCELLANEOUS				TOTAL																
																	MEN				WOMEN				BOTH								
	1945-46	1944-45	1943-44	1942-43	1945-46	1944-45	1943-44	1942-43	1945-46	1944-45	1943-44	1942-43	1945-46	1944-45	1943-44	1942-43	1945-46	1944-45	1943-44	1942-43	1945-46	1944-45	1943-44	1942-43	1945-46	1944-45	1943-44	1942-43					
Senior.....	11	2	4	26	172	171	136	227	22	11	38	91								77	26	57	214	128	158	121	130	205	184	178	344		
Junior.....	14	4	1	20	287	157	172	259	33	13	12	81								132	28	29	215	202	146	156	145	334	174	185	360		
Sophomore.....	27	5	9	38	407	241	201	314	97	13	28	123								245	51	54	276	286	208	184	199	531	259	238	475		
Freshman.....	79	15	15	54	534	422	316	415	289	102	71	264								669	209	133	505	233	330	269	228	902	539	402	733		
Special.....	12	2	5	7	51	28	34	35	14	1	3	10	11							59	4	13	29	29	27	29	23	88	31	42	52		
Graduate.....													63	27	38	65				42	13	18	36	21	14	20	29	63	27	38	65		
Total—regular curricu- lums.....	143	28	34	145	1451	1019	859	1250	455	140	152	569	74	27	38	65	1224	331	304	1275	899	883	779	754	2123	1214	1083	2029					
Non-degree curriculums																																	
2nd yr.....	6	3	1	11	10	12	9										6	3	1	11					10	12	9		16	15	10	11	
1st yr.....	40	14	5	20	17	30	22	21									37	12	5	22					20	32	22	19	57	44	27	41	
Total.....	46	17	6	31	27	42	31	21									43	15	6	33					30	44	31	19	73	59	37	52	
Vocational Agriculture	15	42	43	18													15	42	43	15													
Summer School													364	620	778	586	101	210	310	266					263	410	468	320	364	620	778	586	
U. S. War training courses																																	
On campus															11	167			9	127							2	40			11	167	
Off campus																					362	376	462				28	35	51		362	376	462
Total War training																					362	*387	†629				28	37	91		362	387	629
Extension courses													122	172	309	189	83	102	130	70					39	70	179	119	122	172	309	189	
Total—short curriculums	61	59	49	49	27	42	31	21					486	1154	1474	1404	242	703	839	922					332	522	715	552	574	1255	1554	1474	
STAR Unit.....																																	
ASTP.....																																	
ASTRP.....																																	
GRAND TOTAL.....	204	87	83	194	1478	1061	890	1271	455	140	152	569	560	1508	3996	2724	1466	1361	3627	3452					1231	1435	1494	1306	2697	2796	5121	4758	
Less Duplicates.....													87	293	654	223	33	133	415	143					54	160	239	80	87	293	654	223	
NET GROSS TOTAL.....	204	87	83	194	1478	1061	890	1271	455	140	152	569	473	1215	3342	2501	1433	1228	3212	3309					1177	1275	1255	1226	2610	2503	4467	4535	

\*Excludes 229 duplicates this year.

†Excludes 84 duplicates this year.

The curriculums included in the three colleges are: Agriculture: Agricultural Chemistry, Animal Husbandry, Botany and Bacteriology, Dairy Husbandry, Entomology, Forestry, General, Horticulture, Poultry Husbandry, and Teacher Training; Liberal Arts: Art Education, General, Home Economics, General Business, Hotel Administration, Music Education, Nursing, Occupational Therapy, Physical Education, Publicity, Secretarial, Social Science, Teacher Training, Pre-Medical; Technology: Architecture, Chemistry, Chemical Engineering, Civil Engineering, Electrical Engineering and Mechanical Engineering.





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## Courses For Teachers

The University of New Hampshire  
Department of Education

Beginning February 9, 1948

- Education 63 - Audio- Visual Education in Elementary and Secondary Schools, 3 credits. Thursday, 4:00-6:30 P.M. Murkland 14. Austin L. Olney.
- Education 76 - Philosophy of Education. 2 or 3 credits. Wednesday, 7:00- 9:00 P.M. Murkland 116. Frederick E. Ellis .
- Education 83 - Education and Vocational Guidance--Principles and Practices. 2 or 3 credits. Saturday, 8:00-10:00 A.M. Murkland 210. T.O.Marshall.
- Education 89 - Mental Hygiene for Teachers. 2 or 3 credits. Saturday 10:00- 12:00 A.M. Pettee 305. Daniel G. Dittmer.

Fee-- In-state students--\$6 a credit per semester.  
Out-of state students--\$13 a credit per semester.

Students may register before 4:00 o'clock on weekdays, or Saturday mornings, in the Recorder's office between January 13th and 21st or from February 9th on.



