

GRADUATE SCHOOL

HERMON L. SLORIN. *Dean*

DIVISIONS

BIOLOGICAL SCIENCES

(Chairman:
Prof. L. W. Slanetz)

Agronomy
Animal Industry
Bacteriology
Botany
Entomology
Horticulture
Poultry Husbandry
Zoology

EDUCATION

(Chairman: Prof. A. M. Stowe)
Education

ENGINEERING

(Chairman:
Prof. E. L. Getchell)

Civil Engineering
Electrical Engineering
Mechanical Engineering

LANGUAGES AND LITERATURE

(Chairman: Prof. C. S. Parker)

English
Languages

PHYSICAL SCIENCES

(Chairman: Prof. A. F. Daggett)

Agricultural and Biological
Chemistry
Chemistry
Geology
Mathematics
Physics

SOCIAL SCIENCES

(Chairman:
Prof. Norman Alexander)

Agricultural Economics
Economics
Government
History
Philosophy
Psychology
Sociology

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, who constitute the School Faculty. Administrative functions and supervision of advanced students are delegated to the Dean of the Graduate School and the Committee on Graduate Study.

ADMISSION

Admission to the Graduate School may be granted to graduates of all colleges and universities of approved standing provided their

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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 intends to work for a Master's degree must have had an undergraduate average of not less than 2.5 honor points* or the equivalent, throughout his entire program of study. This requirement may be waived upon petition to the Executive Committee 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 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 Committee.

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 Advisor, the Chairman of a Division, and the Dean.

TUITION

Tuition in the Graduate School is at the rate of \$5.50 per semester credit for New Hampshire residents and \$9.00 per semester credit for non-residents. Tuition for members of the regular University Staff is one-half the rate for residents.

ADVANCED DEGREES

The advanced degrees conferred are: Master of Science, Master of Arts, Master of Education, and Master of Science in Engineering.

REQUIREMENTS FOR THE MASTER'S DEGREE

Residence.—A minimum of one full academic year, or four summer sessions of six weeks each, at the University of New Hampshire.

*See page 52.

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In the case of a student who offers six semester credits earned in another graduate school, the residence requirement will be reduced to three summer sessions or one semester and one summer session.

Subject.—A candidate for a degree will be enrolled in one of the Divisions of the School and will do his work in the field of that Division or in one of the subjects of the field.

Credits.—To obtain a Master's degree the candidate must earn not less than 30 semester credits.

In general, all graduate work must be completed within a period of not more than eight years.

Transferred Credits.—Of the total credits required for a Master's degree not more than six may be transferred from another graduate school.*

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

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.

Thesis.—A thesis embodying the results of original investigation is required by some of the divisions. A thesis, if required, will count towards the total of 30 credits.

Special Requirements.—A student must meet the special requirements of the Division or Sub-division in which he does his major work.

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

ASSISTANTSHIPS AND SCHOLARSHIPS

Graduate Assistantships, which usually require half-time service at a stated salary, are available in a number of Departments. Graduate Assistants pay tuition in accordance with the regulation pertaining

*See special regulations for veterans.

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to the members of the University Staff. The residence requirement for a Master's degree for holders of these appointments is not less than two years. 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 Registrar, and the Chairman of the Division 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 Chairmen of the Divisions or to the Dean.

DESCRIPTION OF COURSES

(Departments Alphabetically Arranged)

The University of New Hampshire continues its broad educational offering, in spite of the difficulties of the war situation. Departure of Faculty members for military or war production service has caused the cancellation of certain courses. In some areas where men normally make up the bulk of the enrollment, too few students remain to justify continuation of the work. Except in the Engineering fields, however, adjustments usually are possible to enable a student to pursue essentially the same program of studies as would have been followed in peace times. Students interested in a specialized field of study should address the Registrar for up-to-date information on expected offerings.

The title of the course is given in small capital letters. The numeral designates the particular course. Odd numerals indicate courses offered in the first semester; even numerals indicate courses 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 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:

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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.

ACCOUNTING

ACCOUNTING

(See ECONOMICS, page 196.)

AGRICULTURAL AND BIOLOGICAL CHEMISTRY

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

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, Mr. Teeri. 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.

5. ORGANIC AND BIOLOGICAL CHEMISTRY. An introduction to Organic Chemistry and a brief survey of Biological Chemistry. Mr. Shimer. Prereq.: Chem. 2. 3 lec.; 2 lab.; 5 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, Miss Purinton, 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 1945-1946.)

For courses primarily for Graduate students, see Catalogue of the Graduate School.

AERONAUTICS

(See MECHANICAL ENGINEERING, page 243.)

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AGRICULTURAL ECONOMICS

HARRY C. WOODWORTH, *Professor*; HAROLD C. GRINNELL, *Associate Professor*.

7. FARM ACCOUNTING. The principles of double-entry accounting applicable to the farm business; the interpretation and use of financial statements. Mr. Grinnell. (Formerly given as Agr. Econ. 13.) Elective for Juniors and Seniors in Agriculture. 1 lec.; 1 lab.; 3 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. COOPERATIVE 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. (Formerly given as Agr. Econ. 15.) Elective for Juniors and Seniors, 3 lec.; 3 cr.

53. AGRICULTURAL PRICES. Quantity-price relationships, measures of shifts in demand and supply, determination of prices, price stabilization, market discrimination, and time elements in prices. Elective, subject to approval of instructor. 3 lec.; 3 cr.

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

55, 56. SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS. Special assignments in readings and problems to satisfy students' needs. Mr. Woodworth, Mr. Grinnell. 1 to 3 cr.

For courses primarily for Graduate students, see Catalogue of the Graduate School.

AGRONOMY

AGRONOMY AND AGRICULTURAL ENGINEERING

FORD S. PRINCE, *Professor*; LEROY J. HIGGINS, *Assistant Professor*; GEORGE M. FOULKROD, *Assistant Professor*; PAUL T. BLOOD, *Assistant Professor*; LOUIS T. KARDOS, *Assistant Professor*; EDWARD W. FOSS, *Instructor*.

AGRONOMY

1. SOILS. The nature and properties of soils; fundamental physical, chemical, and biological processes and characteristics of productive soils. Mr. Higgins. (Formerly given as Agron. 2.) 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. (Formerly given as Agron. 13.) 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. Sanborn. (Formerly given as Agron. 16.) 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. (Formerly given as Agron. 14.) Prereq.: Agron. 1, 4, and 10 or permission of instructor. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered in 1945-1946.)

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 1945-1946.)

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 1945-1946.)

58. SOIL CLASSIFICATION AND MAPPING. The origin, morphology, classification, and mapping of soils. Relationships of the Great Soil

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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 1945-1946.)

59. SOIL CHEMISTRY. A study of the methods for 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. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered in 1945-1946.)

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 1945-1946.)

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. (Formerly given as Agron. 51-54.) Prereq.: Agron. 1, 4, 10. Elective for Seniors. 1 to 3 cr.

AGRICULTURAL ENGINEERING

5. BASIC AGRICULTURAL ENGINEERING APPLICATIONS. The solution of problems in farm mechanics, drainage, irrigation, soil conservation, water supply, and sanitation. Mr. Foulkrod. 2 lec.; 1 lab.; 3 cr.

12. FARM POWER AND MACHINERY. A study of the farm tractor and farm machinery with emphasis on applications to New England agriculture. Mr. Foulkrod. Elective for Juniors and Seniors. 1 lec.; 1 lab.; 2 cr.

13. ELECTRIC FARM POWER. The application of electricity to modern farm practices. Mr. Foulkrod. Elective for Juniors and Seniors. 1 lec.; 1 lab.; 2 cr.

14. AGRICULTURAL DRAWING. Practice in making and reading maps, shop sketches, and farm building plans. Mr. Foulkrod. Recommended for Sophomores in Agriculture. 1 lab.; 1 cr.

15. FARM BUILDINGS. Lectures, drafting room practice, and field studies in design, construction, and maintenance of all types of farm structures. Mr. Foss. Prereq.: Agr. Eng. 14. 1 lec.; 1 lab.; 2 cr.

16. FARM MECHANICS SHOP. Offers a general knowledge of farm mechanics and develops the skills needed to teach farm shop work. Mr. Foss. 2 lab.; 2 cr.

ANIMAL HUSBANDRY

ANIMAL HUSBANDRY

*LORING V. TIRRELL, *Professor*; FRED E. ALLEN, *Assistant Professor*;
*NICHOLAS F. COLOVOS, *Assistant Professor*; HARRY A. KEENER, *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. 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. 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. 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. 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. 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. 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. 2 lec.; 1 lab.; 3 cr.

51. ANIMAL BREEDING. The principles and practices of breeding farm animals, including cross-breeding, in-breeding, selection, inheri-

*On Military leave

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tance, breed analysis, reproductive efficiency, fertility and sterility. Mr. Keener. 3 lec.; 3 cr.

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

For courses primarily for Graduate students, see Catalogue of the Graduate School.

ARCHITECTURE

ERIC T. HUDDLESTON, *Professor.*

2. ELEMENTS OF ARCHITECTURE. Basic modern building materials and their use in the construction of walls, columns, floors, roofs, doors, windows, etc., illustrating their varied application and relation to contemporary architectural usage. Elective by permission. 2 rec.; 2 cr.

4. THE SIGNIFICANCE OF ARCHITECTURE. A comprehensive view of the architectural profession, its allied arts, and the building construction industry to the end that the student's interest in further study in these fields may be better directed. Non-technical, requiring no previous architectural experience. Mr. Huddleston. Elective by permission. 2 rec.; 2 cr.

5-6. HISTORY OF EUROPEAN ARCHITECTURE. The historical development of the successive periods, with an analysis of the environment, the style evolved, and the chief contributions of each period to architectural expression. Elective by permission. 2 rec.; 2 cr.

7. HISTORY OF AMERICAN ARCHITECTURE. The historical development of the successive periods. The social conditions, type of architecture, work of the outstanding architects in the various geographical sections, and the chief contribution of each period to architectural expression. Elective by permission. 2 rec.; 2 cr.

9. PRINCIPLES OF ARCHITECTURAL DESIGN. The study of individual needs and environmental factors which influence architectural design; principles governing the organization of space, structure, and aesthetics and their application to the design analysis of various types of buildings. Elective by permission. 2 rec.; 2 cr.

11, (11). CAMOUFLAGE. A foundation course for those interested in camouflage training. Includes camouflage procedure, basic design principles, materials, technique, estimate, and methods of practices and maintenance. Elective. 2 rec.; 2 cr.

ARCHITECTURE

13-14. DOMESTIC ARCHITECTURE. A brief history of domestic architecture with special emphasis on early American housing as a basis for an appreciation of the New England colonial architecture. Modern housing problems, including the relation of the house plan to family requirements, individual site, garden, accessory buildings, and the community, with special consideration of economy in design and material, as it affects initial building and maintenance costs. Mr. Huddleston. 13, Elective by permission. 3 rec.; 3 cr. 14, Prereq.: Arch. 26. 2 rec.; 2 cr.

15. PROFESSIONAL PRACTICE. The personal, ethical, business, and legal relations of the architect with clients, contractors, etc. Procedure in the conduct of an architect's office; i.e., contract forms, bookkeeping and accounting as they apply to professional work. Mr. Huddleston. Prereq.: Arch. 9. 2 rec.; 2 cr.

16. SPECIFICATIONS AND APPRAISING. The fundamentals of specification writing and the preparation of an outline specification adapted to the requirements of the thesis problem designed by each student. Methods of estimating and appraising buildings. Mr. Huddleston. Prereq.: Arch. 20 or C.E. 15. 2 rec.; 2 cr.

17-18. PLUMBING, HEATING, AND ELECTRIC EQUIPMENT. Principles of plumbing, heating, and electricity as applied to the various types of equipment used in residential and public buildings, and the design of simple piping and wiring systems. 2 lec.; 1 lab.; 3 cr.

19-20. BUILDING CONSTRUCTION. 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 selection of structural systems in the solution of various types of construction problems; and the introduction of plumbing, heating, ventilating, and electrical equipment. Mr. Huddleston. Prereq.: Arch. 26. 3 lab.; 3 cr.

24. SHADES, SHADOWS, AND PERSPECTIVE. Determination of conventional shades and shadows in architectural drawings; architectural application of descriptive geometry; theory of perspective and practical construction of perspective drawings. Rendering in wash of problems illustrating light, shade, and shadow. Elective by permission. 1 lec.; 2 lab.; 3 cr.

26. ARCHITECTURAL DESIGN. The accepted methods of architectural drafting. Measured drawings showing the relation of material, construction, and design, drawn from field sketches and photographs of existing elements. Design studies of interior and exterior elements and motives. Arch. 2 must be taken either in parallel or as a prerequisite. Elective by permission. 2 lab.; 2 cr.

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27-28. ARCHITECTURAL DESIGN. The composition of architectural elements in interior and exterior design, with special emphasis on the correct use of the modern materials and structural forms of design. Prereq.: Arch. 24 and 26. Elective by permission. 3 lab.; 3 cr.

29-30. ARCHITECTURAL DESIGN. Problems applying the materials, elements and principles of architecture to the design of contemporary buildings for residential, recreational, commercial, and municipal buildings of town and small city scale. Prereq.: Arch. 28. 6 lab.; 6 cr.

31-32. ARCHITECTURAL DESIGN AND THESIS. A practical course of building design to familiarize the student with the fundamental process of working drawing development in the architect's office. *The thesis will be an approved research project proposed by the student to provide the training and opportunity to exercise originality and inventiveness in the practical solution of a building type in his particular field of interest.* Mr. Huddleston. Prereq.: Arch. 30. 6 lab.; 6 cr.

33-34. ARCHITECTURAL DESIGN. An approved program proposed by the student will be used for advanced study. Prereq.: Arch. 30. Elective by permission only. Credits to be arranged.

35, (35). WORKING DRAWINGS. Complete working drawings are made of a building designed by the student and include dimensioned plans, elevations, sections, small and full-size details, and framing drawings. Mr. Huddleston. 2 lab.; 2 cr.

THE ARTS

GEORGE R. THOMAS, *Associate Professor*; IRMA G. BOWEN, *Associate Professor*; *PAUL L. GRIGAUT, *Associate Professor*; *HARLAND P. NASVIK, *Assistant Professor*; VERA E. MOULTON, *Assistant Professor*; EDWIN SCHEIER, *Instructor*; WESLEY F. BRETT, *Instructor*; MARTHA R. SACKETT, *Instructor*; DORIS F. WILKINS, *Instructor*; MARION MOODY, *Assistant*.

CRAFT COTTAGE.—A small house devoted to the pursuit of a variety of handicrafts suitable for avocational or leisure-time hobbies. The classes are open to all students. Laboratories are scheduled at various times throughout the week in order to meet the differences in individual programs.

STUDENT WORKSHOP.—The Department of the Arts maintains an experimental Arts laboratory (Student Workshop) in Hewitt Hall for use of all students in the University. Whether enrolled in Art courses

*On leave of absence.

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or not, students are invited to explore, under advice and assistance of Mr. Wesley F. Brett, their creative interests and abilities. This laboratory is equipped with a complete set of power and hand tools for woodworking, a printing press with type, an air brush, silk screen printing equipment, and facilities for block printing, model building, wood carving, and metalwork.

All laboratory courses listed in this section are limited in enrollment. Students should consult the instructor in charge before registering.

In those courses where students retain finished products, they pay for 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.

7, 8. HANDICRAFTS. A continuation of Arts 5 or 6. Miss Bowen. Elective by permission only. Prereq.: Arts 5 or 6. 1-3 lab.; 1-3 cr.

11, (11). MODELING. Elementary work in modeling in relief and the round figure. An introduction to ceramic sculpture and to the processes of casting in plaster and papier-mâché. Mr. Scheier. 2 lab.; 2 cr.

13-14. CARVING. Study of the possibilities and limitations of various materials suitable for carving. Design and carving in relief and in the round. Care and use of carving tools. Mr. Brett. 1 lab.; 1 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.

19, 20. PUPPETRY. Design and construction of hand puppets, marionettes, and shadow puppets. Writing and production of puppet plays and pantomimes. Mr. Scheier. 2 lab.; 2 cr.

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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. 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. Mr. Thomas. 2-3 lab.; 2-3 cr.

25, 26. **ADVANCED DRAWING AND DESIGN.** Advanced studio exercises 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. Outdoor sketching. Mr. Thomas. Permission of instructor. 2-3 lab.; 2-3 cr.

27, 28. **WATER COLOR PAINTING.** Handling of wash; studies from documents, photographs, and still-life; supplemented with lectures presenting the theories of color, scientific and aesthetic, and their application. Outdoor sketching. Mr. Thomas. 1 lec.; 2 lab.; 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. 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 19th and 20th centuries. Illustrated lectures, assigned readings, and reports. Mr. Grigaut. For Sophomores, Juniors, and Seniors. 3 lec.; 3 cr. (Not offered in 1945-1946.)

35, (35). **STAGECRAFT.** Technical phases of play production, including stage design, construction and painting of scenery, stage lighting, makeup, costuming, mechanical effects, and handling of properties. Offered in conjunction with Play Production (English 5 (5)). Mr. Brett. $\frac{1}{2}$ -1 cr.

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39, (39). ELEMENTARY PHOTOGRAPHY. The theory and technique of photography, covering camera operation, printing, enlarging, and presentation. Special lectures on Optics and Photographic Chemistry by Physics and Chemistry Department staff members. Mrs. Sackett. Open to Sophomores, Juniors, and Seniors with permission of the instructor. 1 lec.; 2 lab.; 3 cr. Laboratory fee: \$5.00.

43-44. HISTORIC COSTUME AND DESIGN. Costume changes from the primitive to the present, and something of the historical events that influenced such changes. Adaptation of period costume to modern use. Miss Moulton. First semester: 3 lec. or rec.; 3 cr. Second semester: 2-3 lab.; 2-3 cr.

52. ADVANCED PHOTOGRAPHY. Each student will be assigned a special problem, in which he will outline a project and prepare and present a series of not less than 10 photographs to illustrate a single theme. Mrs. Sackett. Prereq.: Completion of Photography 1 with a grade of B or better, and the permission of the instructor. 1 rec.; 2 lab.; 3 cr. Laboratory fee: \$2.50.

ART-EDUCATION (ART-ED) 91. PROBLEMS OF TEACHING ART IN ELEMENTARY SCHOOLS. 2 rec.; 1 lab.; 3 cr. (Not offered in 1945-1946.)

ART-EDUCATION (ART-ED) 92. PROBLEMS OF TEACHING ART IN SECONDARY SCHOOLS. 2 rec.; 1 lab.; 3 cr. (Not offered in 1945-1946.)

EDUCATION-ART (ED-ART) 94. SUPERVISED TEACHING IN SECONDARY SCHOOL ART. Prereq.: Art-Ed 92. One semester of Supervised Teaching. 6-14 cr.

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

ARCHITECTURAL COMPOSITION. See ARCHITECTURE 9.

ARCHITECTURAL DESIGN. See ARCHITECTURE 26.

DOMESTIC ARCHITECTURE. See ARCHITECTURE 14.

ELEMENTARY LANDSCAPE GARDENING. See HORTICULTURE 28.

ELEMENTS OF ARCHITECTURE. See ARCHITECTURE 2.

FLORAL ARRANGEMENT. See HORTICULTURE 38.

FORGE SHOP. See MECHANICAL ENGINEERING S13 (S13).

HOME BUILDING AND FURNISHING. See ARCHITECTURE 13 and HOME ECONOMICS 32.

HISTORY OF EUROPEAN ARCHITECTURE. See ARCHITECTURE 5-6.

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HISTORY OF AMERICAN ARCHITECTURE. See ARCHITECTURE 7.

SHADES, SHADOWS, AND PERSPECTIVE. See ARCHITECTURE 24.

THE SIGNIFICANCE OF ARCHITECTURE. See ARCHITECTURE 4.

WOOD WORK. See MECHANICAL ENGINEERING S3 (S3).

WOOD SHOP. See MECHANICAL ENGINEERING S6.

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

A special University committee on Fine Arts 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 183.)

BIOLOGY

C. FLOYD JACKSON, *Professor*; LAWRENCE W. SLANETZ, *Associate Professor*; ALBION R. HODGDON, *Associate Professor*; GEORGE M. MOORE, *Associate Professor*; EDYTHE T. RICHARDSON, *Assistant Professor*; MARIAN E. MILLS, *Assistant Professor*; STUART DUNN, *Assistant Professor*; CHARLE G. DOBROVOLNY, *Assistant Professor*; M. C. RICHARDS, *Assistant Professor*; PAUL E. SCHAEFER, *Assistant Professor*; ELEANOR L. SHEEHAN, *Instructor*; *H. GILBERT CRECELIUS, *Instructor*; ERMA L. ANDREWS, *Instructor*; ARTHUR J. SHANAHAN, *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 136. 2 rec.; 1 lab. or field trip; 3 cr.

*On leave of absence.

BIOLOGY

EDUCATION-BIOLOGY (ED-BI) 93, 94. SUPERVISED TEACHING IN HIGH SCHOOL BIOLOGY. See page 202.

95, 96. SEMINAR. Reports on research and literature in the Biological Sciences by students and Faculty. Recommended for Juniors and Seniors who have completed 20 or more hours in Biological Science. 1 lec.; 1 cr.

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, Mr. Shanahan. Prereq.: Chem. 1-2 or equivalent. 2 lec.; 1 rec.; 2 lab.; 5 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. 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 bacteria and their role in soil fertility; characteristics of bacteria and viruses causing plant disease. Mr. Crecelius. Prereq.: Bact. 1. 3 lec.; 1 lab.; 4 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 Mr. Shanahan. Prereq.: Bact. 1. 2 lec.; 2 lab.; 4 cr.

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53. IMMUNOLOGY AND SEROLOGY. The theories of infection and immunity; production of vaccines, toxins, and antisera; serological techniques for disease diagnosis and identification of bacteria including agglutination, precipitin, and complement fixation tests. Mr. Slanetz, Mr. Shanahan. Prereq.: Bact. 52. 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. Credits to be arranged.

57, 58. BACTERIOLOGY SEMINAR. Reports and discussions on current literature and recent developments in bacteriology. Mr. Slanetz. Prereq.: Bact. 2 or 52 and consent of instructor. One 2-hour period; 1 cr.

For courses primarily for Graduate students, see Catalogue of the Graduate School.

BOTANY

MR. HODGDON, *In Charge*

1. GENERAL BOTANY. The principal plant groups with emphasis on structure, function, and economic importance with stress on 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.

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. (Formerly Botany 3.)

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.

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

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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.

56. **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.

57, 58. **PROBLEMS IN (a) SYSTEMATIC BOTANY (b) PLANT PHYSIOLOGY, AND (c) PLANT PATHOLOGY.** Elective only upon consultation with Head of Section. Mr. Hodgdon, Mr. Dunn, and Mr. Richards. Hours to be arranged. 2 to 6 credits. (Formerly Botany 53, 54.)

ZOOLOGY

MR. JACKSON, *In Charge*

7-8. **GENERAL ZOOLOGY AND COMPARATIVE ANATOMY.** Basic course for Zoology majors and pre-medical students, dealing with anatomy of invertebrates and vertebrates. Fundamental principles of Zoology. 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.

ADVANCED COURSES

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.: Zool. 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 and 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 Zool. 2 lec.; 2 lab.; 4 cr.

55. INVERTEBRATE ZOOLOGY. A survey of the major invertebrate groups, exclusive of insects, with emphasis on free living forms. Evolution of various phyla and their ecological relationships. Miss Sheehan. Prereq.: Zool. 7-8 and permission of the instructor. 2 lec.; 2 lab.; 4 cr.

57, 58. LABORATORY TECHNIQUE. Methods in histologic technique and examination of blood, urinary sediments, parasites, and zoological preparations. Mr. Dobrovolny. Prereq.: Zool. 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 Zool. 3 lec. or rec.; 3 cr. (3 lec. or rec.; 1 lab.; 4 cr., by permission of the instructor.)

61. HEREDITY AND VARIATION. A study of the physical basis of inheritance, expression, and interation of the hereditary units, linkage, and variation. Mrs. Richardson. Prereq.: Biol. 1-2 and one year of Zool. 3 lec. or rec.; 1 lab.; 3 or 4 cr.

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

71, 72. ECOLOGY OF THE VERTEBRATES. The habits, habitat, life history, and economic importance of vertebrate animals with emphasis on their ecological relationships. Field methods and technique will be considered. Mr. Jackson. Prereq.: Permission of the instructor. 3 lec. or rec.; 1 lab.; 4 cr.

75, 76. MARINE BIOLOGY AND OCEANOGRAPHY. Marine life with special emphasis on the economic species of fish and shellfish with problems concerning their utilization and conservation. Mr. Jackson and Miss Sheehan. Prereq.: Biol. 1-2 and Zool. 7-8. 2 lec. or rec.; 2 lab.; 4 cr. (Note: Students are advised to elect this course in the Summer Session when Zool. 75 will be devoted to problems in Great Bay, and Zool. 76 may be given in the Intersession at the Isles of Shoals. Special laboratory fee, \$10.00.)

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95. LIMNOLOGY. Factors affecting biological productivity of fresh-water 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.

96. PROBLEMS OF CONSERVATION RESEARCH. Problems in all phases of conservation work and specifically in Zoology, Ecology, and Limnology. Nature of problems to be determined by background and interests of the individual student. Mr. Moore. Prereq.: permission of the instructor. 1 conference; 1-3 lab.; 2-4 cr.

97, 98. SPECIAL PROBLEMS. 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 instructor. Graduate or undergraduate credit. 1-4 cr.

SERVICE COURSES

48. GENERAL ZOOLOGY. 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 Sophomores in Agriculture. Open only to students in Agriculture. 3 lec.; 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.

For courses primarily for Graduate students, see the Catalogue of the Graduate school.

BOTANY. See page 184.

BUSINESS. See page 197.

DENTISTRY. See PRE-DENTAL, page 119.

DESIGN. See THE ARTS, page 178.

DRAMATICS. See ARTS 35 and ENGLISH 5.

DRAWING. See THE ARTS, page 178.

CHEMISTRY AND CHEMICAL ENGINEERING

HAROLD A. IDDLES, *Professor*; OSWALD T. ZIMMERMAN, *Professor*; MELVIN M. SMITH, *Associate Professor*; JAMES A. FUNKHOUSER, *Associate Professor*; ALBERT F. DAGGETT, *Associate Professor*; EDWARD R. ATKINSON, *Associate Professor*; JOHN L. TORGESEN, *Assistant Professor*; NORMAN BAUER, *Assistant Professor*; HEMAN C. FOGG, *Demonstrator*.

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BREAKAGE. A breakage deposit is required in certain laboratory courses, from which the actual breakage is deducted. The deposit receipt must be presented to the instructor at the first class meeting.

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. Smith, Atkinson, Torgesen, and assistants. 2 lec.; 1 rec.; 1 lab.; 4 cr. Deposit: One dollar for the year.

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, Smith, Funkhouser, and assistants. For students who plan to take further courses in the Department of Chemistry. 2 lec.; 1 rec.; 1 lab.; 4 cr. Deposit: One dollar for the year.

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, Mr. Smith, and assistants. Prereq.: Chem. 3, Mathematics 5, and permission of instructor. 2 lec.; 1 rec.; 3 lab.; 6 cr. Deposit: continued from Chem. 3.

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. Bauer and assistant. Prereq.: Chem. 4 or 6. 2 lec.; 2 lab.; 4 cr. Deposit: Five dollars for the semester.

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 and as-

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sistants. Prereq.: Chem. 21. 2 lec.; 3 lab.; 5 cr. Deposit: Five dollars for the semester.

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, Bauer, and assistants. Prereq.: Chem. 4. 1 lec.; 2 lab.; 3 cr. Deposit: Ten dollars for the year.

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. Deposit: Five dollars for the semester.

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. Deposit: Five dollars.

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. Deposit: Ten dollars for the year.

51. **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. Mr. Atkinson. Prereq.: Chem. 48 or 54. 3 lec.; 3 cr.

53-54. **ORGANIC CHEMISTRY.** Lectures on the chief divisions of Organic Chemistry, aliphatic and aromatic, with the needs of the pre-professional student in mind. A more detailed consideration of

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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.: Chem. 3-4, and 26 when possible. Chem. 53 alone does not meet the Pre-medical or Pre-dental requirements; a grade of "Incomplete" will appear on the student's record following the completion of Chem. 53, and the grade in the course will be filed upon completion of Chem. 54. 3 lec.; 2 lab.; 5 cr. Deposit: Ten dollars for the year.

55, 56. THEORETICAL PROBLEMS OF MODERN ORGANIC CHEMISTRY. 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 spectrography. Sufficient experience is obtained to allow the development of considerable skill in even the more complex methods. Mr. Daggett. Prereq.: Chem. 22. 2 lec.; 2 lab.; 4 cr. Deposit: Five dollars for the semester.

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. Deposit: Five dollars for the semester.

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.

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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.

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. Deposit: Five dollars for the semester.

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. Deposit: Ten dollars for the year.

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. Bauer. 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 Chem. who have completed Chem. 48, 62, and 84. 4 lab.; 4 cr. Deposit: Ten dollars for the year.

For courses primarily for Graduate students, see Catalogue of the Graduate School.

CIVIL ENGINEERING

EDMOND W. BOWLER, *Professor*; RUSSELL R. SKELTON, *Associate Professor*; *CHARLES O. DAWSON, *Assistant Professor*.

*On leave of absence for Military service.

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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. 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. 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.

7-8. SURVEYING. The theory and use of surveying instruments and methods on plane and topographic surveys, including the measurement of angles, measurement of direction and distance, differential leveling, calculations relating to traverses, observations and reduction of observations on the sun and Polaris for direction. Prereq.: Math. 2 or 6. 2 lab.; 2 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. Prereq.: Math. 6. 1 rec.; 1 lab.; 2 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, 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.

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23. **HYDRAULICS.** Fundamental principles of hydrostatics and hydrokinetics: fluid pressures, hydraulic gauges and meters, flow through pipes, tubes, orifices and nozzles, flow over weirs, flow in open channels, and the dynamic action of jets and streams. Mr. Bowler. Prereq.: M.E. 9. 3 rec.; 3 cr.

24. **HYDRAULICS.** Fundamental principles of hydrostatics and hydrokinetics: fluid pressure and fluid flow, hydraulic gauges and meters, fluid flow through pipes, tubes, orifices and nozzles, flow over weirs, flow in open channels, the dynamic action of jets and streams, and the theory of tangential and reaction turbines. Mr. Bowler. Prereq.: M.E. 7. 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.

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. Prereq.: English 41. 1 conference each week; 2 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. Bowler. No credit. Students passing this course will receive a grade of Cr.

52. **HYDRAULICS.** Principles of hydrostatics and hydrokinetics, including the laws governing static pressures, the flow of water through orifices, tubes, nozzles, weirs, pipe lines, and open channels, the dynamic action of jets and streams and fluid flow in pipes. Laboratory exercises in hydraulic machinery and in stream gaging. Mr. Bowler. Prereq.: Math. 8. 3 rec.; 1 lab.; 4 cr.

61. **HIGHWAY ENGINEERING AND TRANSPORTATION.** The economics of location and design of highways and city streets; methods of con-

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struction, 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.

For courses primarily for Graduate students, see Catalogue of the Graduate School.

DAIRY HUSBANDRY

KENNETH S. MORROW, *Professor*; HERBERT C. MOORE, *Associate Professor*; HARRY A. KEENER, *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, Mr. Keener. 2 lec.; 1 lab.; 3 cr.

DAIRY HUSBANDRY

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. 1 lec.; 1 lab.; 2 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 College herd and in near-by herds. (2) The various standards and grades of dairy products with practice in judging milk, butter, cheese, and ice cream. 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 dairying. Mr. Morrow, Mr. Moore, Mr. Keener. 1 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. Morrow. 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.

For courses primarily for Graduate students see Catalogue of the Graduate Schools.

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DRAMATICS

(See page 207.)

ECONOMICS AND BUSINESS ADMINISTRATION

HARRY W. SMITH,* *Professor*; ARTHUR W. JOHNSON, *Professor*; NORMAN ALEXANDER, *Associate Professor*; RUTH J. WOODRUFF, *Associate Professor*; CARROLL M. DEGLER, *Associate Professor*; DORIS E. TYRRELL, *Associate Professor*; JOHN D. HAUSLEIN, *Assistant Professor*; EDITH M. MCKENZIE, *Instructor*; IRENE L. LADD, *Instructor*.

ACCOUNTING

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

1-2. ELEMENTARY 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. Johnson and Mr. Hauslein. 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.: Acc. 2 or equivalent. 2 lec. or rec.; 2 lab.; 4 cr.

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

6. FEDERAL TAX ACCOUNTING. The Federal Income Tax Law and accounting procedure in connection therewith. Social security taxes, estate and gift taxes. Mr. Johnson. Prereq.: Acc. 4, or permission of the instructor. 2 lec. or rec.; 2 lab.; 4 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. Careful analysis of methods of computing costs. Principles of cost

*On leave of absence.

ECONOMICS AND BUSINESS ADMINISTRATION

control. Mr. Johnson. Prereq.: Acc. 4, or permission of the instructor. 2 lec. or rec.; 2 lab.; 4 cr.

9-10. HOTEL ACCOUNTING. Theory and practice of keeping accounting and financial records for hotels. Mr. Johnson. Prereq.: Acc. 1-2. 2 lec.; 1 lab.; 3 cr. (Given in alternate years; offered in 1945-1946.)

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 McKenzie. 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 (in conjunction with Sec. St. 9-10) practice in developing skill and speed in transcription. Miss Tyrrell, Miss McKenzie. Prereq.: Sec. St. 2, or the 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. Miss Ladd. 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 Ladd and Miss McKenzie. 5 lab.; 1 cr.

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

9-10. ADVANCED TYPEWRITING. Practice in tabulating and in writing business letters, legal papers, and various business forms; and (in conjunction with Sec. St. 3-4) practice in transcribing shorthand notes. Miss Tyrrell. Prereq.: Sec. St. 8 or the equivalent. 5 lab.; 2 cr.

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 Ladd. 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 mimeo-

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graph, and a mimeoscope; practice in machine transcription; and an introduction to adding and calculating machines. Miss Ladd. 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.

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. 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.

4. ECONOMIC AND COMMERCIAL GEOGRAPHY. The development of the resources of the continents and the influence of physical environment on industrial and agricultural progress. Miss Woodruff. 3 lec. or rec.; 3 cr.

5. ECONOMIC AND COMMERCIAL DEVELOPMENT OF EUROPE. Not open to Freshmen. 3 lec. or rec.; 3 cr. (Not given in 1944-1945.)

(6), 6. PRINCIPLES OF BUSINESS. An introduction to the organization and functioning of the several aspects of Business as represented by organization; management; labor relations and personnel; marketing; pricing problems; financial administration; tax problems; reorganization and consolidation. Mr. Degler. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

10. TRANSPORTATION. Development and organization of transportation agencies. Prereq.: Econ. 2. 3 lec. or rec.; 3 cr. (Not given in 1945-1946.)

ECONOMICS AND BUSINESS ADMINISTRATION

21-22. **COMMERCIAL LAW.** The law of contracts, agency, sales, negotiable instruments, partnerships, and corporations. Mr. Alexander. Elective for Juniors and Seniors. 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.

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, war risk, social. Fidelity and surety bonds. Mr. Johnson. 3 lec. or rec.; 3 cr.

51. **LABOR PROBLEMS.** 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.: 12 semesters of credits in Econ. and permission of the instructor. 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 average in Econ. 53. 3 lec. or rec.; 3 cr. (Not given in 1945-1946.)

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.

57, (57). **POSTWAR ECONOMIC PROBLEMS.** This course will treat economic adjustments caused by total war; problems of reconversion of the economy from a condition of total war with special emphasis on postwar economic problems. 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 average in the Department. Recitations and reports; 3 cr.

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61. PUBLIC REGULATION OF BUSINESS. The Federal control of business organizations and their activities with special reference to war-time regulations affecting business. Mr. Alexander. Elective for Juniors and Seniors. 3 lec. or rec.; 3 cr.

63. INTERNATIONAL ECONOMICS. 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.

* *The Departments of Economics and Business Administration, 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 page 268.)*

For courses primarily for Graduate students, see the Catalogue of the Graduate School.

EDUCATION

A. MONROE STOWE, *Professor*; HARLAN M. BISBEE, *Associate Professor Emeritus*; EVERETT B. SACKETT, *Associate Professor*; I. N. THUT, *Associate 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)*; JOHN S. WALSH, *Associate Professor (Latin-Education)*; *BJÖRNAR BERGETHON, *Associate Professor (Music-Education)*; *HARRY D. BERG, *Assistant Professor (History-Education)*; *JOHN A. FLOYD, *Assistant Professor (French-Education)*; HAROLD I. LEAVITT, *Assistant Professor (General Science)*; †EARL H. LITTLE, *(Agriculture-Education)*; ROBERT H. GRANT, *Assistant Professor (English-Education)*; PAUL E. SCHAEFER, *Assistant Professor (Biology-Education)*; DONALD M. PERKINS, *Instructor (Mathematics-Education)*.

RAYMOND I. BEAL, JOHN N. COTTON, AUSTIN J. McCAFFREY, HAROLD T. RAND, CHARLOTTE SMITH, and MURRAY H. WATSON, *Consultants in Teacher Education*.

*On leave of absence.

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

EDUCATION

COURSES IN EDUCATION

42. EDUCATIONAL PSYCHOLOGY OF ADOLESCENCE. The purpose of this semester course in Educational Psychology is to help students acquire an appreciative understanding of adolescents and their educational needs and of the most effective ways of meeting those needs. Mr. Stowe, Mr. Bisbee. Prereq.: Psych. 11 or 31. 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. Bisbee. Open to Juniors and Seniors. Preparatory for the state examinations in secondary program and in school law. 2 rec.; 2 cr.

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

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. Prereq.: Open to Juniors, Seniors, and Graduate Students. 3 rec.; 3 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, Education 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 hopes to do supervised teaching. The satisfactory completion of two of these courses is required of students completing the University Teacher-Preparation Program.

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

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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. Grant.

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.

MUSIC-EDUCATION (MU-ED) 91. PROBLEMS IN THE TEACHING OF ELEMENTARY SCHOOL MUSIC. (3 cr.) Mr. Bergethon.

MUSIC-EDUCATION (MU-ED) 92. PROBLEMS IN THE TEACHING OF SECONDARY SCHOOL MUSIC. (3 cr.) Mr. Bergethon.

MUSIC-EDUCATION (MU-ED) 95. THE TEACHING OF STRINGED INSTRUMENTS. (2 cr.) Mr. Bergethon.

MUSIC-EDUCATION (MU-ED) 96. THE TEACHING OF WOODWIND INSTRUMENTS. (2 cr.) Mr. Bergethon.

MUSIC-EDUCATION (MU-ED) 97. THE TEACHING OF BRASS AND PERCUSSION INSTRUMENTS. (2 cr.) Mr. Bergethon.

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

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

EDUCATION

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 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 14 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 12 semester credits in Supervised Teaching toward the fulfillment of the major requirements in Education.

EDUCATION-AGRICULTURE (AG-ED) 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-FRENCH (ED-FR) 94. SUPERVISED TEACHING IN HIGH SCHOOL FRENCH. Prereq.: LANG-ED 91.

EDUCATION-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.

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HOME ECONOMICS-EDUCATION (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.

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

EDUCATION-MUSIC (ED-MU) 93. SUPERVISED TEACHING IN ELEMENTARY SCHOOL MUSIC. Prereq.: MU-ED 91.

EDUCATION-MUSIC (ED-MU) 94. SUPERVISED TEACHING IN SECONDARY SCHOOL MUSIC. Prereq.: MU-ED 92.

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.

55. GENERAL EDUCATIONAL PSYCHOLOGY. A general survey of the applications of Psychology to the educational field. The relation of growth, learning, intelligence, individual differences, and personality to more effective learning situations. Applications of Psychology to examples of learning drawn from elementary and secondary schools. Mr. Carroll. Prereq.: Psych. 11 or 31. 3 lec.; 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. Thut. Prereq.: Ed. 42. 3 rec.; 1 two-hour lab.; 4 cr.

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. 11. 3 lec.; 3 cr.

ELECTRICAL ENGINEERING

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. Mr. Bisbee. Open to Seniors who have satisfactorily completed Education 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. Thut. Prereq.: Ed. 42, 51-52. 3 rec.; 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. Prereq.: Psych. 11 or 31. 3 lec.; 3 cr. Open to Seniors and Graduate students. Not open to students who have completed Psych. 81 or 47.

ELECTRICAL ENGINEERING

LEON W. HITCHCOCK, *Professor*; *FREDERICK D. JACKSON, *Associate Professor*; WILLIAM B. NULSEN, *Associate Professor*.

1-2. ELECTRICAL ENGINEERING. Elementary electrical circuits and machinery. Prereq.: Math. 6. E.E. 1: 1 rec.; 1 lab.; 2 cr. E.E. 2: 3 rec.; 1 lab.; 4 cr.

7. ELECTRONICS AND COMMUNICATION. Principles and applications of vacuum tubes, amplifiers, photo-electric cells, and electronic apparatus in communication and industry. Prereq.: E.E. 33, 36, 38, or 54. 2 rec.; 1 lab.; 3 cr.

12. ILLUMINATION. Photometry, light sources, lighting applications, wiring methods, and National Electrical Code Rules. Prereq.: E.E. 33, 36, 38, or 53. 2 rec.; 2 cr.

13. ELECTRICAL PROBLEMS. Magnetic circuits, direct and alternating current circuits and machinery, batteries and meters. Prereq.: E.E. 2. 2 rec.; 2 cr.

14. ELECTRONIC TUBES. Principles of electronics and vacuum tubes. Prereq.: E.E. 53. 2 rec.; 1 lab.; 3 cr.

*On leave of absence.

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15, 16, 17, 18. STUDENT BRANCH OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. No credit. Students passing this course will receive a grade of Cr.

19, 20. THESIS. Original investigation in the field of Electrical Engineering. Prereq.: E.E. 54 and E.E. 24. 3-5 lab.; 3-5 cr.

23-24. LABORATORY. Direct and alternating current equipment; laboratory practice and report presentation. Prereq.: E.E. 2. 1 lab.; 2 cr.

25. LABORATORY. Continuation of E.E. 24. 2 lab.; 4 cr.

31. CIRCUITS AND APPLIANCES. National Electrical Code, wiring methods, fuses, circuit breakers, meters, motors, signal circuits, and telephones. Prereq.: Hotel Administration 21, 22, or Physics 2. 2 rec.; 1 lab.; 3 cr.

33. FUNDAMENTALS OF ELECTRICITY. Electric and magnetic circuits, storage batteries, direct and alternating current equipment, electronics. For chemical engineers. Prereq.: Phys. 8. 3 rec.; 1 lab.; 4 cr.

36. PRACTICAL ELECTRICITY. Direct and alternating current circuits, machines, and equipment. For civil engineers. Prereq.: Phys. 8. 3 rec.; 1 lab.; 4 cr.

37-38. ELECTRICAL MACHINERY. Direct and alternating current circuits and machines; theory and application of electrical equipment. For mechanical engineers. Prereq.: Phys. 8. 3 rec.; 1 lab.; 4 cr.

42. ELECTRONIC TUBES. Principles and industrial applications of electronic apparatus. Prereq.: E.E. 33, 36, or 37. Elective for students not register in the E.E. Curriculum. 2 rec.; 1 lab.; 3 cr.

53-54. ELECTRICAL ENGINEERING. Direct current machinery, alternating current circuits, alternators and transformers. Prereq.: Phys. 8, Math. 8, and E.E. 2. 3 rec.; 3 cr.

55. ELECTRICAL ENGINEERING. Continuation of E.E. 54. Induction motors, regulators, synchronous machines, and transmission lines. Prereq.: E.E. 54. 3 rec.; 3 cr.

58. RADIO AND WIRE COMMUNICATION. Radio frequency equipment and radiation. Telephone apparatus, circuits, and transmission. Equivalent networks, filters, and line and cable characteristics. Prereq.: E.E. 7. 3 rec.; 1 lab.; 4 cr.

60. ADVANCED CIRCUIT THEORY. Application of differential equations and Heaviside's operators to the solution of circuit problems. The derivation of fundamental formulas and constants. Prereq.: E.E. 55. Elective for selected Seniors in E.E. 3 rec.; 1 lab.; 4 cr.

ENGLISH

76. LABORATORY. Advanced laboratory testing for students with approved projects. Prereq.: E.E. 25. 4 lab.; 4 cr.

78. ADVANCED ELECTRONICS LABORATORY. Special problems in electron tube applications, and in radio and audio frequency equipment. Prereq.: E.E. 7. Elective for selected Technology Seniors. Lab. and conferences; 4 cr.

For courses primarily for Graduate students, see Catalogue of the Graduate School.

ENGLISH

HAROLD H. SCUDDER, *Professor*; ALFRED E. RICHARDS, *Professor Emeritus*; WILLIAM G. HENNESSY, *Professor*; LUCINDA P. SMITH, *Associate Professor*; CARROLL S. TOWLE, *Associate Professor*; EDMUND A. CORTEZ, *Associate Professor of Speech*; *PAUL S. SCHOEDINGER, *Assistant Professor*; ROBERT G. WEBSTER, *Assistant Professor*; *THOMAS H. MCGRAIL, *Assistant Professor*; SYLVESTER H. BINGHAM, *Assistant Professor*; ROBERT H. GRANT, *Assistant Professor*; G. HARRIS DAGGETT, *Assistant Professor*; J. DONALD BATCHELLER, *Assistant Professor of Speech*.

The courses in the Department of English are open to students as follows:

Courses primarily open to Freshmen: English 1, 3, 4, 43, 44, 45, 46; 6; (5).

Courses primarily open to Sophomores: English 5, (5); 7, 8; 10; 11, 12; 14; 17, 18; 19; 20; 23, 24; 25, 26; 28; 32; 34; 35, (35); 36; 39, (39); 40.

Courses primarily open to Juniors: All the preceding and the following: English 37, 38; 52; 53, 54; 55; 56; 57; 59; 61, 62; 63, 64; 65, 66.

Courses primarily open to Seniors: All the preceding and the following: English 67, 68; 41, (41); 91.

1. ELEMENTARY WRITTEN AND ORAL ENGLISH. Designed to meet the needs of each student in writing and in speech, this course will vary in content for each individual. All Freshmen will be examined during Freshman Week in this subject, and those whose attainments are found to be satisfactory will be released from instruction at once. Others will be grouped for individual instruction, and will be released individually from time to time as soon as their work is found to be satisfactory. Anyone may be recalled and reassigned to an instruction

*On leave of absence.

UNIVERSITY OF NEW HAMPSHIRE

group at any time in his four years in college upon report of any member of the Faculty that the student's work in English is deficient. Besides written English, this subject covers correction for all Freshmen found to be defective in speech. (See Speech Correction for Freshmen, page 212.) This is a non-credit course for students entering after May 15, 1943, but all students are required to meet the requirements of this course. Mrs. Smith, and a special staff.

Conference schedules will be arranged by Instructors. Members of upper classes may enroll if they desire, for assistance in writing or for speech correction. Apply to Mrs. Smith.

3, 4. SURVEY OF ENGLISH LITERATURE. A general survey of English literature from its beginnings to the year 1900. Lectures and recitations. Mr. Richards, Mr. Daggett, Mr. Bingham, Mr. Hennessy. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

43, (43), 44, (44). READING FOR THOUGHT. Analysis of the thought and structure of three forms of writing: first semester: exposition; second semester: description and narration. Mr. Bingham. For Freshmen. Open to others upon permission of instructor. 3 lec. or rec.; 3 cr.

45, 46. ENGLISH FOR ENGINEERS. This course is built around the special interests of engineers, and will include (1) a study of the American way of life through the reading of biographies of famous scientists, essays, short stories, plays, and poetry; (2) the written and oral expression of the ideas suggested by the reading. Mrs. Smith, Mr. Daggett. For Freshmen in the College of Technology. Open to others with permission of instructor. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

7, 8. ADVANCED COMPOSITION. Study and practice of writing brief impressions, essays, sketches, and narratives. Collateral readings; weekly conferences. English 7 should be taken before English 8, but the instructor will consider special cases. Mr. Towle. Elective for Sophomores, Juniors, and Seniors if not enrolled in English 1. 3 lec. or rec.; 3 cr.

*9, 10. NEWS WRITING. A practical study of the preparation of articles for newspapers and magazines. It is for all whose vocations will demand frequent writing for publication, and it is a preparation in part for those who intend to take up newspaper work after graduation. It does not attempt to cover the entire field of journalism, but it

*Does not meet Liberal Arts English requirement. See page 109.

ENGLISH

surveys briefly the social role and responsibilities of the newspaper and instructs the student in the duties of a reporter and affords constant practice in the writing of news stories. Mr. Scudder. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

11, 12. SURVEY OF AMERICAN LITERATURE. Lectures and extensive outside reading. Mr. Scudder. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

14. MEDÆVAL AND ELIZABETHAN DRAMA. A survey of the English drama, exclusive of Shakespeare, from its beginnings to the closing of the theatres (1642). Mr. Richards. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

17, 18. ENGLISH LITERATURE IN THE SEVENTEENTH CENTURY. Poetry and prose from Shakespeare and Bacon to Swift and Pope, omitting the drama and the works of Milton. The poetry of John Donne and his school; of Jonson, Herrick and the "Cavaliers"; of Denham, Waller and Dryden; of the followers of Spenser, etc. The prose of such writers as Izaak Walton, Bunyan, Sir Thomas Browne, Fuller, Taylor, and John Dryden. One hour of the week will be devoted to round-table discussion in small groups. Mr. Towle. For Sophomores, Juniors, and Seniors. 2 lec. or rec.; 1 lab.; 3 cr. (Given in alternate years; not offered in 1945-1946.)

*19. ENGLISH GRAMMAR. The fundamentals of English grammar in order to provide an understanding of the language from a structural point of view. A thorough drill in the rules and classifications. Mrs. Smith. For Sophomores, Juniors, and Seniors. 3 rec.; 3 cr.

20. POPE AND HIS AGE. The literature of the first half of the eighteenth century, with special reference to Pope, Swift, Addison, and Steele. Mr. Schoedinger. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1945-1946.)

23, 24. VICTORIAN PROSE. Prose of the nineteenth century. Particular attention is given during the first semester to the work of Coleridge, Lamb, Carlyle, Hazlitt, Newman, and Matthew Arnold; in the second semester to the work of John Ruskin as writer, art critic, and social reformer. Mr. Richards and Mr. Hennessy. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1945-1946.)

25, 26. VICTORIAN POETRY. English poetry from 1830 to 1900, with special reference to Tennyson and Browning. Mr. Daggett. For

*Does not meet Liberal Arts English requirement. See page 109.

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Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1945-1946.)

28. 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. Mr. Richards. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

32. MODERN BRITISH POETRY. A study of British poetry written since 1900. Mr. Towle. Elective for Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1945-1946.)

34. MODERN AMERICAN POETRY. A study of American poetry written since 1900. Mr. Towle. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1945-1946.)

52. INTRODUCTION TO DRAMA. A comprehensive survey of dramatic literature from the Greek drama to the present. Mr. Hennessy. For Juniors, Seniors, and Graduate students. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1945-1946.)

53, 54. SHAKESPEARE'S PLAYS. A study of the major histories, comedies, and tragedies. Shakespeare is interpreted as poet and as dramatist. Mr. Hennessy. For Juniors, Seniors, and Graduate students. 3 lec.; 3 cr.

55. MILTON. Milton's minor poetry and the *Paradise Lost*. Consideration of the social, political, and religious history of Milton's day. Mr. Richards. For Juniors, Seniors, and Graduate students. 3 lec.; 3 cr. (Given in alternate years; not offered in 1945-1946.)

56. JOHNSON AND HIS CIRCLE. Boswell, Johnson, and their time. Mr. Scudder. For Juniors, Seniors, and Graduate students. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1945-1946.)

57. THE ENGLISH NOVEL IN THE EIGHTEENTH CENTURY. The novel from Defoe through the Gothic Romance. Lectures and outside reading. Mr. Bingham. For Juniors, Seniors, and Graduate students. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1945-1946.)

59. THE ENGLISH NOVEL IN THE NINETEENTH CENTURY. The novel from Jane Austen to Thomas Hardy. Lectures, recitations, and reading. Mr. Scudder. For Juniors, Seniors, and Graduate students. 3 lec.; 3 cr. (Given in alternate years; not offered in 1945-1946.)

61, 62. THE ENGLISH ROMANTIC WRITERS. The major writers of the early nineteenth century, such as Wordsworth, Coleridge, Byron, Lamb, Shelley, Hazlitt, and Keats. Readings from the work of many

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minor writers, especially those of the late eighteenth century. One hour of the week devoted to round-table discussion with small groups. Mr. Towle. For Juniors, Seniors, and Graduate students. 2 lec.; 1 rec.; 3 cr.

63, 64. ADVANCED AMERICAN LITERATURE. A series of studies in special fields, the subjects to be announced. In 1945-1946 the subjects are: American Novel, and American Poetry of the 19th Century. Mr. Scudder. For Juniors, Seniors, and Graduate students. 3 lec.; 3 cr.

65, 66. WRITING AS AN ART. The study and practice of forms of writing through an examination of the history of literary criticism. Reading of famous critical essays and of many contemporary opinions, correlated with practice writing of various types. Each student is allowed to spend much of his time with the type he finds most congenial. Collateral readings, with frequent class discussions and conferences. Mr. Towle. Prereq.: Eng. 7. For Juniors, Seniors, and Graduate students. 2 lec.; 1 rec.; 3 cr. (Given in alternate years; offered in 1945-1946.)

67-68. EARLY ENGLISH AND CHAUCER. Chaucer's life and times, and a reading of most of his poetry. First semester: Old and Middle English grammar as an introduction to the language of Chaucer and a portion of *The Canterbury Tales*. Second semester: *Troilus and Criseida*, and *The Canterbury Tales*. Mr. Richards. For Seniors and Graduate students. 3 lec. or rec.; 3 cr.

SERVICE COURSES

*41, (41). EXPOSITORY WRITING. Practice in the writing of reports and other papers pertaining to technical subjects; recommendation reports, progress reports, information reports; term papers or short theses; business letters of various types, such as letters of application, of complaint, and of sales. Mr. Webster. For Seniors in Agriculture and Technology. 2 lec.; 2 cr.

*ENGLISH-EDUCATION (ENG-ED) 91. PROBLEMS IN THE TEACHING OF HIGH SCHOOL ENGLISH. The selection and organization of subject-matter, the most efficient methods of presenting this material, and the problems which arise within the wide field of the teaching of high school English. Mr. Grant. 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. 19, or by examination. For all students who plan to teach English in secondary schools and for students majoring in Language, History, or Education. 2 lec.; 1 lab.; 3 cr.

*Does not meet Liberal Arts English requirement. See page 109.

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BUSINESS WRITING. A course in Business Writing is offered by the Department of Economics and Business Administration. See Sec. St. 23. 24.

For courses primarily for Graduate students, see the Catalogue of the Graduate School.

SPEECH

MR. CORTEZ, *In Charge*

THE SPEECH CLINIC. Any member of the University may go to the Speech Clinic, in room 306 Thompson Hall, to have his voice and speech analyzed. The clinician in charge examines each person privately and recommends appropriate treatments. Unless the person has to satisfy a University requirement in Speech, he is under no obligation to accept the recommendations of the clinician. Consultations are by appointment.

SPEECH CORRECTION FOR FRESHMEN. All Freshmen are required to take a speech test. The test is ordinarily given during Freshmen Week. Those students who are found to have severe speech difficulties are listed in *Group I*, and are scheduled to report to the Speech Clinic for individual help until such time as their speech is sufficiently improved. Those students who are found to have milder speech difficulties are listed in *Group II*, and are scheduled to meet in small sections until their speech is satisfactory.

*5. (5). **PLAY PRODUCTION.** This is not an elective, but a laboratory course in the public presentation of notable plays. Members of the course are elected by competitive trial, and credit is given both for acting and stage management. Credit is also given (but not in English) for technical assistance. (See Arts 35.) Mr. Batcheller. Open to all students, except Freshmen in the first semester. $\frac{1}{2}$ to 3 cr. *This course cannot be used to satisfy major requirements.*

*6. **VARSAITY DEBATING.** Designed to give experience in public discussion and debate. Debates will be arranged with other college teams. (Not offered in 1945-1946.) Open to all students by permission of the instructor. No student may receive more than six credits in this course during his entire four years. 1-6 semester credits. *This course cannot be used to satisfy major requirements.*

35 (35). **PUBLIC SPEAKING.** How to gather material for a talk, organize it, and present it to an audience. The psychology of an audience. Technique of group control. Extemporaneous and impromptu

*Does not meet Liberal Arts English requirement. See page 109.

ENTOMOLOGY

speaking for every occasion. Mr. Cortez and Mr. Batcheller. For Sophomores, Juniors, and Seniors. 3 rec.; 3 cr.

36. ORAL READING. The art of reading from the page; expressive reading of lyrics and other types of literature; platform reading for entertainment; choric speaking. Mr. Cortez. Prereq.: Eng. 35 or its equivalent, and permission of instructor. For Sophomores, Juniors, and Seniors. 3 rec.; 3 cr. (Not offered in 1945-1946.)

*37, 38. DISCUSSION AND DEBATE. First semester: The proposition and its main issues; sources and tests of evidence; construction of the argumentative brief; principal laws of reasoning; principal fallacies of reasoning; practice debates. Second semester: Application and evaluation of principles of problem-solving in groups; forms of discussion and debate; parliamentary procedure. Subjects for research and debate will be selected from current events. (Not offered in 1945-1946.) Prereq.: Eng. 35 or its equivalent. For Juniors and Seniors (and for Sophomores by permission of the instructor). 3 rec.; 3 cr.

*39, (39). RADIO SPEAKING. Practice in presenting readings, sketches, and prepared speeches, and in radio announcing; analysis of radio programs; elementary practice in the preparation and delivery of radio continuity. Outstanding students will be given opportunity to participate in broadcasts. Mr. Cortez. Prereq.: Permission of the instructor. For Sophomores, Juniors, and Seniors. 3 rec.; 3 cr.

*40. STAGE DIRECTION. A laboratory course in the fundamentals of acting, stage direction, and allied phases of play production. Designed to fit the needs of prospective teachers, particularly teachers of English. Mr. Batcheller. Prereq.: The permission of the instructor. For Sophomores, Juniors, and Seniors. 3 lab.; 3 cr.

ENTOMOLOGY

WALTER C. O'KANE, *Professor*; JAMES G. CONKLIN, *Associate Professor*.

2. ELEMENTARY ENTOMOLOGY. An introduction to Entomology in its broad aspects. The structure, biology, and classification of insects. Each student is required to make an insect collection. Mr. Conklin. (Formerly given as Ent. 6.) 2 lec.; 1 lab.; 3 cr.

51. 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.

*Does not meet Liberal Arts English requirement.

UNIVERSITY OF NEW HAMPSHIRE

Mr. Conklin. 2 lec.; 1 lab.; 3 cr. (Given in alternate years; not offered in 1945-1946.)

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. Conklin. 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 wood-structures. Mr. Conklin. 1 lec.; 1 lab.; 2 cr. (Given in alternate years; offered in 1945-1946.)

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. Open to others than Ent. majors by permission of the Head of the 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. Required of Ent. majors. Open to others than Ent. majors by permission of the Head of the Department. 1 to 3 cr.

For courses primarily for Graduate students see Catalogue of the Graduate School.

FINE ARTS

(See THE ARTS, page 181.)

FORESTRY

CLARK L. STEVENS, *Professor*; LEWIS C. SWAIN, *Assistant Professor*;
WILLIAM A. MEDESY, *Assistant Professor*.

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

FORESTRY

in all 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. FOREST MENSURATION. Practice in forest mapping; measurement of forest products; timber cruising; and studies of growth and yield of the commercial tree species of New England. Mr. Medesy. For foresters. Elective for others with approval of the instructor. 1 lec.; 2 lab.; 3 cr.

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.

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 Management 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. Medesy. Prereq.: Forestry 26, 28, and 29. 2 lec.; 2 or 3 cr.

37. FOREST RECREATION. Principles and methods for planning, designing, and administering public and semi-public forest recreational areas. Mr. Medesy. Prereq.: Permission of the instructor. Recommended for Seniors in Forestry. 2 lec.; 1 lab.; 3 cr.

39-40. FOREST MANAGEMENT. Management of woodlots and large forest tracts for the purposes of gaining the largest immediate and

*See description of Summer Camp, page 43.

UNIVERSITY OF NEW HAMPSHIRE

future returns. Preparation of working plans to coordinate forest operations. Mr. Medesy. Prereq.: Forestry 26; 27-28; 29-30; 42. 2 lec.; 2 lab.; 4 cr.

41. PRACTICAL FISH AND GAME MANAGEMENT. 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. Prereq.: For students in Game Management Group. Elective for others by permission of the instructor. Forty hours per week for 8 weeks. 10 cr.

42. TIMBER SURVEY. Summer Camp Course.* Investigation of a large block of timberland on the White Mountain National Forest. The student prepares a detailed timber survey report and a topographic map of the area. Mr. Stevens, Mr. Swain, Mr. Medesy. Prereq.: Forestry 28. Forty hours per week for 8 weeks. 10 cr.

52. HISTORY OF FORESTRY. The history of forestry; its development and present status in different countries. Mr. Medesy. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

53. WILDLIFE RESEARCH PROBLEMS. 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, page 233.)

GEOGRAPHY

(See page 218.)

GEOLOGY

T. RALPH MEYERS, *Associate Professor*; DONALD H. CHAPMAN, *Associate Professor*; GLENN W. STEWART, *Instructor*; MARJORIE SMITH, *Instructor*.

COURSES IN 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.*

*See Camp description, page 43.

GEOLOGY

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.

11. 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.

12. 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.

51-52. MINERALOGY. The minerals that make up the earth's crust: crystals; minerals and their determination by means of physical and chemical characteristics; and the aggregation of minerals to form rocks. Mr. Stewart. 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; cement materials, building stones and related materials. 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; not offered in 1945-1946.)

GEOLOGY

55-56. 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. Meyers. Prereq.: One year's work in Geol. or Zool. 2 lec. or rec.; 1 lab.; 3 cr. (Given in alternate years; offered in 1945-1946.)

57, (57). GEOLOGIC 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.

For courses primarily for Graduate students, see the Catalogue of the Graduate School.

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GEOGRAPHY

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. *This course cannot be used to satisfy Science requirements, nor major requirements.*

3. PHYSICAL GEOGRAPHY. A study of the physical elements of Geography and their relationship to man. Mr. Chapman. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy Science requirements.*

52. 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. *This course cannot be used to satisfy Science requirements.*

ECONOMIC AND COMMERCIAL GEOGRAPHY

(See ECONOMICS 4.)

METEOROLOGY

Register for these courses as Met. 1, etc.

1. THE WEATHER. The interpretation of atmospheric phenomena: the heating and circulation of the atmosphere 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. *This course cannot be used to satisfy Science requirements nor major requirements.*

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. *This course cannot be used to satisfy Science requirements nor major requirements.*

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. Mr. Meyers. 2 lec. or rec.; 2 cr. *This course cannot be used to satisfy Science requirements.*

26. WEATHER MAP PLOTTING. A training course, using modern methods, for the plotting and interpretation of observational data used

GOVERNMENT

in the preparation of weather maps. Mr. Chapman. 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, page 235.)

GOVERNMENT

NORMAN ALEXANDER, *Associate Professor and Acting Head of Department*; *LASHLEY G. HARVEY, *Assistant Professor*.

THE BUREAU OF GOVERNMENT RESEARCH

The Bureau of Government Research was established to meet the demands for information about governmental matters and to serve as a clearing house on problems of public administration. Its activities are instruction, research, and service, with emphasis upon public administration and in-service training.

Juniors or Seniors majoring in Government may obtain practical training in public administration by serving as interns in some department of the state or local government. See Social Science 81, page 268.

1. CITIZENSHIP. Present-day society; its political and social institutions; the development of an independent and informed attitude on vital political questions and the scientific approach to them; problems of political expression. The development of the state and its place in present-day society. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

2. CURRENT PROBLEMS. A survey of the economic, political, diplomatic problems involved in the waging of this total war. Postwar problems and international planning. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

3-4. AMERICAN GOVERNMENT. A study of the organization and operation of the American political system with special emphasis on present-day problems of national, state, and local governments. Mr. Alexander. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

5-6. COMPARATIVE GOVERNMENT. A comparative study of the chief governments of Europe, of the Far East, and of one or more of the

*On leave of absence.

UNIVERSITY OF NEW HAMPSHIRE

Latin American countries. Special attention is given to recent political developments and to differences in the procedures and principles of the democracies and of the totalitarian governments. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

9. **POLITICS AND PUBLIC OPINION.** A study of political parties — their history and organization. Pressure groups, party machines and bosses, campaign methods, party platforms. Public opinion — rational and irrational elements. The role of the political party in shaping public opinion and in the political process with special emphasis on the current political scene. Mr. Alexander. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr.

51. **THE AMERICAN CONSTITUTION.** A study of the development of the American Constitution. Consideration is given to the economic and social aspects of court decisions as well as to the legal principles involved. Mr. Alexander. Prereq.: Govt. 3. 3 lec. or rec.; 3 cr.

52. **INTRODUCTION TO JURISPRUDENCE.** Generalized principles of law and legal institutions. The law as an institution of social and political control. Prereq.: Govt. 53-54 or 51, or Econ. 21-22. 3 lec. or rec.; 3 cr.

53-54. **INTERNATIONAL LAW.** The laws of peace and war; international legislation, treaties, sanctions; developments growing out of the war. Discussions supplemented by preparation and argument of cases. For Juniors and Seniors. 3 lec. or rec.; 3 cr. (Previously given as Govt. 7-8.)

55-56. **INTERNATIONAL RELATIONS AND ORGANIZATIONS.** The study of the relationship of forces in international politics; analysis of plans for cooperation among states including current proposals for regional and world organizations. For Juniors and Seniors. 3 lec. or rec.; 3 cr.

57. **PRINCIPLES OF PUBLIC ADMINISTRATION.** A general study of the field of public administration including such topics as the organization of administrative services, financial administration, personnel management, forms of administrative action, legislative and judicial control over the administrative process. Prereq.: Govt. 3, or open to Juniors and Seniors who are taking Govt. 3. 3 lec. or rec.; 3 cr.

58. **PROBLEMS OF PUBLIC ADMINISTRATION.** An intensive study of the problems of selected divisions of public administration chosen from such subjects as personnel management, administrative organization, financial organization and procedures, a specific administrative board or commission. Prereq.: Govt. 3 and Govt. 57. 3 lec. or rec.; 3 cr.

HISTORY

61-62. COMMUNITY PLANNING. An introduction to the subject of community planning having as purposes: (1) the acquainting of the student with planning programs, and (2) the introduction of the student to specialized training for planning. For Juniors and Seniors or by special permission of the instructor. 3 lec. or rec.; 3 cr.

63. HISTORY OF POLITICAL THOUGHT. A survey of political thought from Plato to the present day. Special attention is given to the analysis of trends in political thinking and to the significance of political philosophy to contemporary problems. For Juniors and Seniors. 3 lec. or rec.; 4 cr.

65-66. SEMINAR. Readings, reports, and papers on assigned topics. For Senior majors in Govt. 1-4 cr. (Formerly given as Govt. 63-64.)

GREEK

(See LANGUAGES, page 236.)

HANDICRAFT

(See THE ARTS, page 179.)

HISTORY

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

In these courses an important place is given to historical reading carried on in the reference room. Often a considerable part of the work is written.

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

SURVEY COURSES

The following subject constitutes a basic course, required of all students in the College of Liberal Arts, to be taken in the Freshman year.

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.*

*On leave of absence.

UNIVERSITY OF NEW HAMPSHIRE

COURSES FOR UPPERCLASSMEN

GROUP I. ANCIENT AND MEDIEVAL

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. (Given in alternate years; offered in 1944-1945.)

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. (Given in alternate years; offered in 1944-1945.)

13, 14. HISTORY OF ROME. The great completion and integration of ancient Mediterranean civilization under the leadership of Rome. First semester: the preliterate foundations and legendary origins, the transition to republican life and institutions, and territorial expansion to the first century B.C. Second semester: the transition from republic to principate, and imperial and world affairs to the time of Justinian in 565. Mr. Partridge. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1944-1945.)

15, 16. MEDIEVAL HISTORY. First semester: the pageant of the Middle Ages from the period of the barbarian invasions to the First Crusade. Second semester: to the 14th century. Designed: (1) to recapture the unique charm and social pattern of the Middle Ages, and (2) to interpret them as the source of modern times. Mr. Partridge. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1944-1945.)

17, 18. THE RENAISSANCE PERIOD. The period when mediæval institutions were both being consummated and fading away, and when a recovery of ancient factors in culture mingled with modern forces. The Renaissance as an artistic and broadly cultural revival, and as a forward movement introducing the modern period. In this and in the preceding course, considerable pictorial material is used. Mr. Part-

HISTORY

ridge. For Sophomores, Juniors, and Seniors. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1944-1945.)

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 15th to the early 20th 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. HISTORY OF EAST ASIA. A survey of the growth of civilizations east of Persia, with special emphasis on China, Japan, and their neighbors. This course deals with one-half of human history as well as with what is happening to one-half of mankind today. Mr. Rudd. 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 by permission of the instructor. 3 lec. or rec.; 3 cr.

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 of the 19th and 20th century American culture.

UNIVERSITY OF NEW HAMPSHIRE

7, 8. THE UNITED STATES FROM 1790 TO 1900. The administration of Washington, the great forces of nationalism, expansion, democracy and sectionalism followed through the period of the Spanish-American 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. Babcock. 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 and 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 1944-1945.)

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 1944-1945.)

65, 66. RECENT AND CONTEMPORARY AMERICAN HISTORY. Developments in American life since the opening of the 20th century. The revolution in our material world and our outward life. The reaction of our individualism in the presence of new world ideologies, and the extent of its modification. A close-range observation of social history in the making. Current newspapers and periodicals will be used. Mr. Babcock. For Juniors and Seniors. 3 lec., rec., or discussions; 3 cr.

GROUP IV. HISTORY FROM AN EDUCATIONAL OR PHILOSOPHICAL

VIEWPOINT

55, 56. THE PHILOSOPHY OF HISTORY. (1) Some of the less obvious aspects of chronology, periodizing as a means of interpreting history, etc. (2) Culture-history, including the historical side of everyday things. (3) The philosophy-of-history proper, or a study of some of the ways in which thoughtful persons have interpreted the nature of history as a whole. Mr. Babcock. For Juniors and Seniors. 3 lec. or discussions; 3 cr. (Given in alternate years; offered in 1944-1945.)

HOME ECONOMICS

67, 68. HISTORICAL GEOGRAPHY AND BIOGRAPHY. Schools of thought in history are likely to be either environmental or personal; that is, either deterministic or voluntaristic. This course devotes a semester to each way of thinking, reviewed in the light of concrete data. New applications and methods of study and teaching will receive some attention; for example, the use of maps, and map-making for classrooms and the study of representative, as distinguished from great, persons. Mr. Babcock. For Juniors and Seniors. 3 lec. or discussions; 3 cr. (Given in alternate years; not offered in 1944-1945.)

For courses primarily for Graduate students, see the Catalogue of the Graduate School.

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 the 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. 1-2 or 3, 4, and Ed. 61. 3 class meetings; 3 cr. For teachers primarily in service, one 2-hour rec.; 2 cr.

HISTORY-EDUCATION (HIST-ED) 92. PRACTICUM IN THE TEACHING OF HISTORY IN HIGH SCHOOLS. Open only to students who have done cadet teaching in History or the Social Sciences. 3 cr.

The Departments of Economics, 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 268.

HOME ECONOMICS

HELEN F. McLAUGHLIN, *Professor*; LUCILLE PEPOON, *Assistant Professor*; VERNA MOULTON, *Assistant Professor*; TATIANA LEWCOWICH, *Instructor*; JANINA CZAJKOWSKI, *Instructor*.

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, (49)*; Projects in Home Economics.

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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 woolen problems, a renovation problem; children's clothes; and a draping problem on the dress form. Miss Moulton. 2 labs.; 2 cr.

HISTORIC COSTUME AND DESIGN. (See ARTS 43-44.)

61, (62), (61), 62. 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.

FOOD AND NUTRITION

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

33. HOME MANAGEMENT. Management of time, energy, and money in relationship to home living; skills and techniques for care of the home. Miss Pepoon. 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. Miss Pepoon. 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. Miss Pepoon. Half semester. Permission of the Head of the Department. 3 cr.

37. HOME NURSING. Various aspects of maintaining good health in the home are presented with special emphasis on the accepted methods involved in the home care of the sick. Problems as related to disease; community health organization and special sick-room techniques. Prereq.: None. 1 lec.-rec.; 1 lab.; 2 cr. Required of H.Ec. Teach. Prep. Jrs.; elective for other students.

HOME ECONOMICS

38. HOUSEHOLD MECHANICS. The application of engineering principles and practices to the problem of making the home more comfortable, convenient, and liveable is covered in theory and demonstration. Electrical appliances, water supply, sewage 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.

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.

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

71, 72. ADVANCED PROBLEMS IN FOODS. Selected problems in one or more phases of food study, such as: experimental cookery; advanced food preparation; advanced meal planning and service; advanced food preservation. Miss Levcowich. 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. Miss Czajkowski. 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. Miss Pepoon. Prereq. or parallel requirement: Psych. 11 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 with children in the play group. 2-3 cr.

HOME MANAGEMENT

31. HOME BUILDING. The principles involved in selecting a home best fitted to the needs, desires, and activities of the whole family

UNIVERSITY OF NEW HAMPSHIRE

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.

32. HOME FURNISHING. Decorating and furnishing of a modern home. Miss Moulton. 3 lec.; rec. or conferences; 3 cr.

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 Czajkowski. 3 lec. or rec.; 3 cr.

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

45. FURNITURE, EQUIPMENT, AND TEXTILES. Problems in the purchase, care, and use of equipment, furniture, and textiles for institutions. Miss Czajkowski. 3 rec.; 3 cr. (Formerly H.Ec. 46.)

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. 3-6 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 Czajkowski. Prereq.: H.Ec. 15-16. 2 lab.; 2 cr.

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. Eleven weeks supervised teaching, 11 cr.

HORTICULTURE

HOME ECONOMICS-EDUCATION (HE-ED) 96. SEMINAR IN THE TEACHING OF HIGH SCHOOL HOME ECONOMICS. Mrs. McLaughlin. Prereq.: HE-ED 94. Four 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.

For courses primarily for Graduate Students, see the Catalogue of the Graduate School, under the Department of Education.

HORTICULTURE

ALBERT F. YEAGER, *Professor*; J. RAYMOND HEPLER, *Associate Professor*; L. PHELPS LATIMER, *Assistant Professor*; WILLIAM W. SMITH, *Assistant Professor*; W. D. HOLLEY, *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. Holley, and Mr. Smith. 1 lec.; 1 lab.; 2 cr.

13. JUDGING IN HORTICULTURE. Judging of fruits, vegetables, and flowers, and of fruit and vegetable products. Recommended for students who expect to be county agricultural agents or teachers, and for Hotel Management and Home Economics majors. Mr. Latimer, Mr. Hepler, Mr. Holley, and Mr. Yeager. 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. Hepler. 2 lec.; 1 lab.; 3 cr.

27. LANDSCAPE MATERIALS. The identification of trees, shrubs, vines, and herbaceous plants and their use in landscape planting. Practice in pruning, transplanting, shipping, and other nursery operations. Mr. Holley. 2 lec.; 1 lab.; 3 cr. (Given in alternate years; offered in 1945-1946.)

28. LANDSCAPE GARDENING. The design and maintenance of small properties with emphasis on the principles of arrangement and the use of plant materials in the beautification of home surroundings. Mr. Holley. 2 lec.; 1 lab.; 3 cr. (Given in alternate years; offered in 1945-1946.)

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38. FLORAL ARRANGEMENT. Floral design and the use of flowers in the home; practice in floral arrangement. A laboratory fee of \$3 is charged. Mr. Holley. Prereq.: Permission of the instructor. 1 lab.; 1 cr.

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. Mr. Holley. 2 lec.; 1 lab.; 3 cr. (Given in alternate years; not offered in 1945-1946. Students may elect additional work on greenhouse crops under Hort. 51 and 52.)

40. FLORICULTURE. The fundamentals underlying the growing of plants including garden soils, plant materials, and the arrangement of these materials in beautifying the home. Practice work in propagating plants, sowing seeds, transplanting, and other garden work. Mr. Holley. 2 lec.; 1 lab.; 3 cr.

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, 49. 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. Subject matter in any phase of horticulture (with laboratory practice if desirable) to meet the needs of special students or groups of students. Horticultural staff. Prereq.: Permission to register from the Head of the Department. 1 to 3 cr.

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. (Given in alternate years; offered in 1945-1946.)

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, planting, pruning, harvesting, marketing, insects, and diseases, and domestic uses. Mr. Latimer. 2 lec.; 2 cr. (Given in alternate years; offered in 1945-1946.)

HOTEL ADMINISTRATION

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. (Given in alternate years; not offered in 1945-1946.)

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. (Given in alternate years; offered in 1945-46.)

61. HARVESTING, STORING, AND MARKETING. The handling of vegetable and fruit crops, technicalities of grading, agencies used and problems in storing, transporting, and merchandising the crop, with laboratory practice in packing-house work. 2 lec.; 1 lab.; 3 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. (Given in alternate years; not offered in 1945-1946.)

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.: Zool. 49. 2 lec.; 1 lab.; 3 cr.

For courses primarily for Graduate students, see Catalogue of the Graduate School.

HOSPITAL DIETETICS

(See page 173.)

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.

UNIVERSITY OF NEW HAMPSHIRE

*1. ORIENTATION. Some time is utilized to accustom the students to methods used in local University work, in a treatment of the history and organization of the University, followed by the history of hospitality the world over, particularly the development of the hotel business in the United States. Required of Freshmen in Hotel Administration. 2 lec.; 1 cr.

5. HOTEL OPERATION. The problems of the hotel manager form the basis of work in this course. Some sections studied are the organization, personnel and work of departments, front office procedure, control of income and expenditure and overhead expenses incurred in establishing a hotel property. The point of view of the resort hotel man is constantly compared with that of the metropolitan operator. Acc. 9-10 should precede or accompany this course. 3 lec. or 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.

8. FRONT OFFICE PROCEDURE. The layout of the hotel office, the members of the staff and their relation to other staffs of the hotel. Equipment, and procedures of keeping guest accounts. For Juniors and Seniors with permission of the instructor. 1 class discussion; 1 cr.

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.: Acc. 10 or Hotel Admin. 5: 2 lec. or rec.; 2 cr.

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 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. Prereq.: none. 2 lec. (One afternoon 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.

*Not to be included in the courses to meet the requirements of 27 semester credits in prescribed courses with major grades.

LANGUAGES

INSTITUTIONAL MANAGEMENT

(See page 116.)

JOURNALISM

(See PUBLICITY, page 266.)

LANGUAGES

CLIFFORD S. PARKER, *Professor*; JOHN S. WALSH, *Associate Professor*; PAUL L. GRIGAUT,* *Associate Professor*; JULIO BERZUNZA, *Assistant Professor*; JOHN A. FLOYD,* *Assistant Professor*; JAMES T. SCHOOLCRAFT, *Assistant Professor*; ALBERT F. BUFFINGTON, *Assistant Professor*.

GENERAL LANGUAGE AND LITERATURE

LANGUAGES 1, 2. SURVEY OF GREEK AND ROMAN LITERATURE. The masterpieces of Greek and Roman literature in translations. 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, History, Latin, or one of the modern languages and literatures. Continued in Languages 51, 52. 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.

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.

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 Freshman Week.)

*On leave 1944-45.

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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 may influence the reconstruction of France. Prereq.: French 4. 3 rec.; 3 cr.

11-12. **FRENCH LITERATURE OF THE SEVENTEENTH AND EIGHTEENTH CENTURIES.** (Formerly 11-12, **FRENCH CLASSICISM.**) French literature from 1600 to the French Revolution. 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 18th 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. Especially valuable for students who wish to teach French. Prereq.: French 4 with grade of C or better; or French 6. 3 rec.; 3 cr.

53. **FRENCH ROMANTICISM AND REALISM.** The period from 1800 to approximately 1870; Chateaubriand and Mme. de Staël; 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. (Will not be offered in 1945-1946.)

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 19th century; the various trends, schools, and individual writers of the 20th century. Prereq.: French 53. 3 rec.; 3 cr. (Will not be offered in 1945-1946.)

LANGUAGES

61-62. FRENCH GRAMMAR. A systematic study of French grammar in all its phases from elementary to highly advanced. Intended primarily for those preparing to teach French. Prereq.: French 6. 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, with consideration of their historical and social background. Recommended for Seniors and Graduate students. Prereq.: French 12 or 54. 2 lec.; 2 cr.

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, the phonograph, the dictaphone, and other devices. Prereq.: French 14 or 62. 2 rec.. 2 cr.

GERMAN

1-2. ELEMENTARY GERMAN. Drill in reading and speaking German. In some sections the grammar-reading method will be used, in others an oral method, making use of phonograph records. In the latter, the usual preparation for recitations will be partially replaced by drill sessions. 3 rec. in reading sections, 5 rec. in oral sections; 3 cr. *This course cannot be used to satisfy major requirements.*

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 1945-1946.)

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,

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and for free German composition. Prereq.: German 2. 3 rec.; 3 cr. (Not offered in 1945-1946.)

53-54. GERMAN ROMANTICISM. The revival of the historical and imaginative Middle Ages in the first half of the 19th century. Prereq.: Two years of college German or the equivalent. 3 class hours; 3 cr. (Not offered in 1945-1946.)

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. (Offered in 1945-1946.)

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 1945-1946.)

GREEK

1-2. ELEMENTARY GREEK. Grammar, composition, translation. Prereq.: Permission of the instructor. 3 rec.; 3 cr. (Not offered in 1945-1946.)

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 1945-1946.)

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 1945-1946.) *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. (Not offered in 1945-1946.)

5-6. LATIN POETRY. Selected poems of 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

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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 1945-1946.)

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 1945-1946.)

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 1945-1946.)

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 8. 3 rec.; 3 cr. (Not offered in 1945-1946.)

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.

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 D'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.

10. THE PICARESQUE NOVEL AND THE WORKS OF CERVANTES. *Celestina*, *Lazarillo de Tormes*, *Don Quijote*, and other novels of the 16th and 17th centuries. Lectures on Spanish civilization. Prereq.: Spanish 4. 3 rec.; 3 cr.

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13-14. SPANISH COMPOSITION AND CONVERSATION. The use of written and spoken Spanish taught by careful attention to pronunciation, grammar, and composition. While there will be some reading as a basis for conversation, the main stress will be laid on oral practice. Prereq.: Spanish 4 or grade of B in Spanish 2. 3 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 1945-1946.)

57-58. LATIN-AMERICAN AUTHORS. A careful study of six important writers from three countries (two authors from each country) in each semester will give to students some insight into the literature and social conditions of Latin-America. Certain works will be discussed in class while others will be assigned for collateral reading. This course will not repeat the content of Spanish 55-56, with which it will alternate in successive years. Prereq.: Spanish 4. 3 rec.; 3 cr. (Offered in 1945-1946.)

63-64. 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.

LATIN

(See LANGUAGES, page 26.)

LAW

(See PRE-LAW, page 108.)

MATHEMATICS

HERMON L. SLOBIN, *Professor*; GEORGE N. BAUER, *Professor Emeritus*; MARVIN R. SOLT, *Associate Professor*; DANIEL C. LEWIS,* *Associate Professor*; HORACE A. GIDDINGS, *Associate Professor*; MILTIADES S. DEMOS,* *Assistant Professor*; WILLIAM L. KICHLINE, *Assistant Professor*; DAWSON G. FULTON,* *Assistant Professor*; DONALD M. PERKINS, *Assistant Professor*.

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.

*On leave of absence.

MATHEMATICS

5. (5), 6. FIRST YEAR MATHEMATICS. Algebra, Trigonometry, and Analytic Geometry. Prereq.: See requirements of Math. for admission to College of Technology. 6 rec.; 5 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. Prereq. for 8: Math. 7. 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. 1 rec.; 1 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. 2 rec.; 2 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

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dispersion, index numbers, linear correlation, time series. Mr. Kichline. Prereq.: One year of college Math. or its equivalent. 3 rec.; 3 cr.

63-64. ECONOMIC AND SOCIAL STATISTICS. 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 Economics, 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 268.)

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

71-72. ADVANCED ALGEBRA. Matrix theory, including elementary divisors and invariant factors; linear transformations; quadratic bilinear, and Hermitian forms; invariants and covariants with geometric applications; and topics from the theory of equations, including symmetric functions, and groups of substitutions. Prereq.: Math. 8. 3 rec.; 3 cr.

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.

MECHANICAL ENGINEERING

GEORGE W. CASE,* *Professor*; EDWARD L. GETCHELL, *Professor*; E. HOWARD STOLWORTHY, *Associate Professor*; EDWARD T. DONOVAN,* *Assistant*; LYMAN J. BATCHELDER, *Instructor*; JOHN C. TONKIN,* *Instructor*; ELIAS O'CONNELL, *Instructor*; TENHO S. KAUPPINEN, *Instructor*; NESTOR E. TORAN, *Instructor*.

*On leave of absence.

MECHANICAL ENGINEERING

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. Stolworthy and Kauppinen. 2 lab.; 2 cr.

(1) **MECHANICAL DRAWING.** Lettering, plotting, and interpretation of charts and graphs, use of instruments. Projections of machinery and simple construction problems. 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. 2 rec.; 2 lab.; 3 cr.

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. Kauppinen. 1 lab.; 1 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. Getchell. Prereq.: Math. 8 and Phys. 7. Mechanical Engineering 9: 3 rec.; 3 cr. M.E. 10: 3 rec.; 1 lab.; 4 cr.

11-12. **MECHANICS.** Principles of mechanics as applied to architectural work. Force systems, moments, equilibrium, trusses, center of gravity and moment of inertia; tension, compression and shear; riveted

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joints; strength and deflection of beams; columns; reinforced concrete. Mr. Getchell. Prereq.: Math. 2, Phys. 2. 3 rec.; 3 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.

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. Kauppinen. Prereq.: Math. 7 and Phys. 8. 3 rec.; 3 cr.

22. METEOROLOGY. Fundamental physical and thermodynamic laws and general structure of the atmosphere. Air mass theory and a brief study of the technicalities underlying forecasting. Mr. Stolworthy. Prereq.: Phys. 7 or its equivalent. 2 lec.; 1 lab. (two-thirds semester); 2 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. Prereq.: Math. 7. 3 rec.; 3 cr.

25-26. HEAT POWER ENGINEERING. The laws of engineering thermodynamics and a consideration of steam power plant and internal combustion engine equipment. For electrical engineers. Mr. Stolworthy. Prereq.: Math. 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. Kauppinen. 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. Kauppinen. Parallel requirement: Enrollment in M.E. 23. 29: 2 lab.; 2 cr. 30: 1 lab.; 1 cr.

MECHANICAL ENGINEERING

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

37. AERONAUTICS. Elementary aerodynamics and aircraft construction; the use of the wind tunnel. 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. The aeronautical knowledge required of a Private Pilot: civil air regulations, meteorology, navigation, servicing of aircraft. Mr. Stolworthy and assistants. No prerequisite. 3 rec.; 3 cr.

47, 48. CONTRIBUTION OF ENGINEERS AND SCIENTISTS TO THE FIELD OF ENGINEERING. The personal characteristics and life work of engineers and scientists. Intended for Engineering students who are disqualified from Military Science and Physical Education; less reading will be required if disqualified only from the former. Mr. Kauppinen. 2 rec.; 2 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 and turbines, nozzles, and condensers. Application of the laws of thermodynamics to steam power plant equipment. Mr. Kauppinen. 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. Kauppinen. 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. Fuels, carburetion,

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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 of Juniors and Seniors in M.E. No credit. Students passing this course will receive a grade of Cr.

65. 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.

66. 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.

71-72. AIRPLANE DESIGN. Airplane layout and stress calculations. Mr. Stolworthy. Prereq.: M.E. 8 and 37 in parallel. Not offered in 1944-1945. 3 rec.; 3 cr.

For courses primarily for Graduate students, see Catalogue of the Graduate School.

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 who wish to cover ground work leading to a Private Pilot Certificate, M.E. 31, (31) for the Commercial Pilot Certificate. M.E. 22 is designed for Science or Engineering students interested in Meteorology. M.E. 37 and 38 are offered to Mechanical Engineering students wishing to specialize in Aeronautics.

M.E. 22. METEOROLOGY. (2 cr.)

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

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

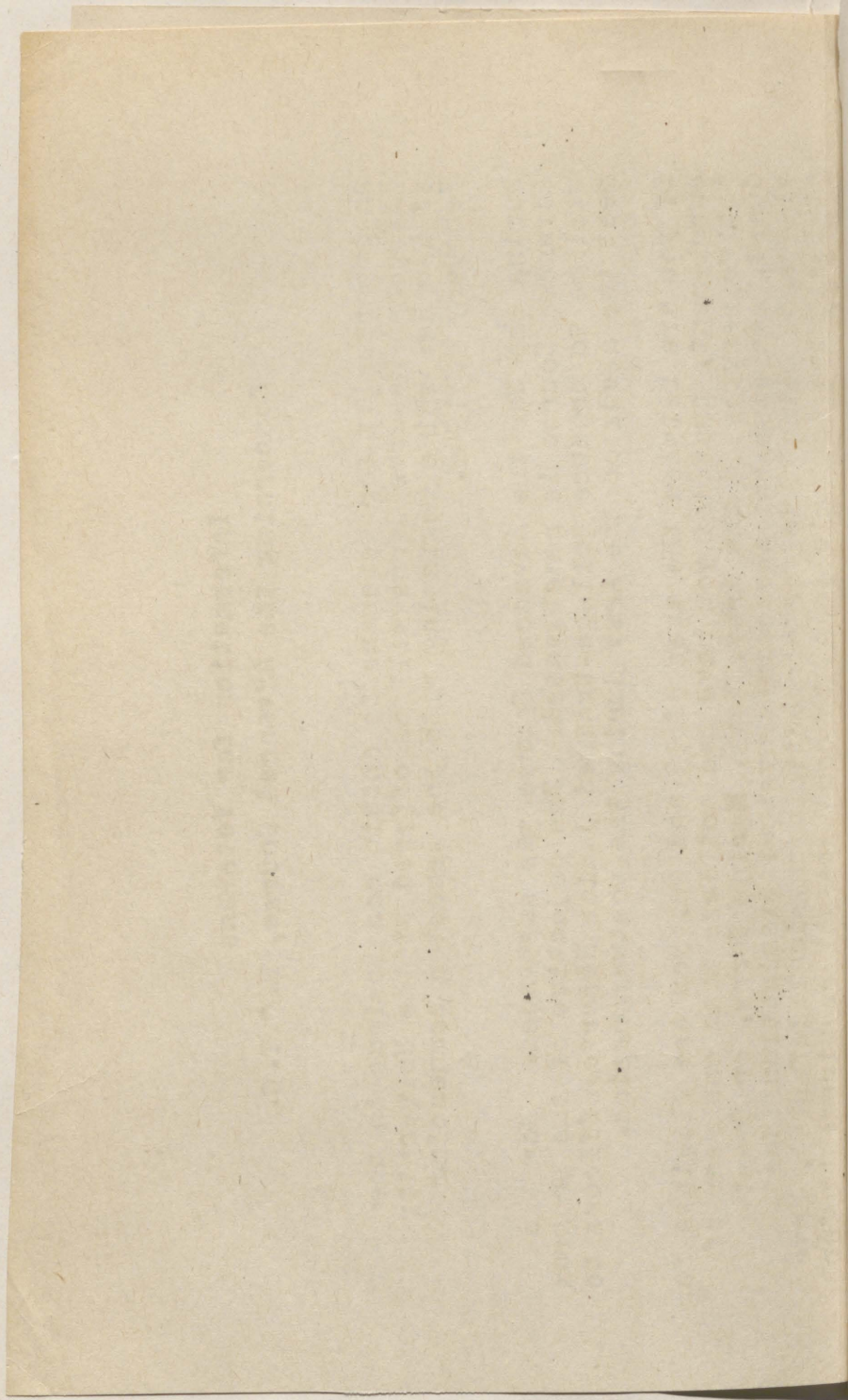
M.E. 38. METEOROLOGY AND NAVIGATION. (3 cr.)

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

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

MECHANICAL ENGINEERING SHOP COURSES

S1, S2, S3. ELEMENTARY SHOP PRACTICE. For shop work, Freshmen in Technology are divided into three groups meeting simultaneously in Wood Shop, Machine Shop, and Forge Shop. Wood shop: pattern



Information for Veterans
Concerning the Advanced Course, R.O.T.C.

An opportunity for Veterans to obtain commissions in the Officers' Reserve Corps will be offered at the University of New Hampshire beginning with the semester commencing February 4, 1946.

During the War the Advanced Course was suspended. Now the Advanced Course is reactivated. The objective of the program will be to produce college-trained Junior Reserve officers to meet the needs of the Army during the postwar period.

If you are between the ages of 19 and 26, you are eligible for enrollment, provided you have had not less than one year of active service in the Army, Navy, Marine Corps, or Coast Guard, can pass the necessary physical examination (due allowance being made for correctible physical defects), have at least two academic years to complete all requirements for graduation from the University, and can make a score of not less than 110 in the Army General Classification Test.

At present the University of New Hampshire is authorized to offer enrollment in two branches of the service -- Coast Artillery and Infantry.

Certain financial inducements are offered the applicant who is accepted for enrollment in the Advanced Course, R.O.T.C.

It is the hope of the War Department that the great majority of college students with military experience will take advantage of this opportunity to become officers. The Officers' Reserve Corps in the postwar period will have a great need for officers possessing the experience these men can offer.

Applications for enrollment and more detailed information may be obtained at the Military Department, Room 106 Pettee Hall.

MECHANICAL ENGINEERING

making and elementary foundry practice. 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 in 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. These groups interchange at the end of each twelve week period, so that all three subjects are covered during the year. (S1 is Forge Shop, S2 is Machine Shop, S3 is Wood Shop.) Messrs. O'Connell, Toran, and Batchelder. 2 lab.; $1\frac{1}{2}$ cr. per semester. (Each Shop is given 1 cr.)

(S4), S4. WOOD WORK. Plain cabinet making and finishing; use of stain filler, varnish, shellac, enamels, etc. Mr. Batchelder. 2 lab.; 2 cr.

S5, (S5). WOOD SHOP. Practice teaching under the supervision of the instructor in Wood Working. Mr. Batchelder. 2 lab.; 2 cr.

S6. WOOD SHOP. Advanced pattern making or advanced cabinet making. Mr. Batchelder. Prereq.: M.E. S3. 2 lab.; 2 cr.

S12. FORGE SHOP. The forging of iron and steel. The operations of drawing, welding, upsetting, twisting, splitting, and punching of iron; the hardening, tempering, and annealing of steel; and the case hardening of mild steel as adapted to agricultural work. Mr. O'Connell. 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. Toran. Prereq.: M.E. S2. 2 lab.; 2 cr.

S19-S20. MACHINE SHOP. Advanced work on the lathe, milling machine, planer, shaper, and turret lathe, involving making of tools and special machinery apparatus. Mr. Toran. Prereq.: M.E. S17. 2 lab.; 2 cr.

S21, (S21). MACHINE SHOP. Manufacturing. The appreciation and measurement of skill, production methods, shop management, and time study. Mr. Toran. Prereq.: M.E. S20. 2 lab.; 2 cr.

S23. FARM SHOP. A short course in general shop work to suit the individual needs of Agricultural Teacher Preparation Juniors. Adjusted to meet previous experience in shop work. Mr. Toran and Mr. O'Connell. Prereq.: Junior standing in Agriculture Teacher Preparation. 2 lab.; 2 cr.

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S29-S30. INDIVIDUAL PROJECTS. Students and other qualified persons may work in the shops on projects of their own selection. It is required that the project receive the approval of the instructor in the particular shop to be used and be supervised by him. Prereq.: M.E. S1, S2, or S3 or its equivalent. Hours and credits to be arranged.

MEDICINE

(See PRE-MEDICINE, page 119.)

METEOROLOGY

(See page 218.)

MILITARY SCIENCE AND TACTICS

LT. COL. JOSEPH F. DALY, *Infantry, Professor*; 1ST LT. JOHN J. McDONOUGH, *Infantry, Assistant Professor*; 1ST LT. WINFORD E. LABOMBARDE, JR., *Infantry, Assistant Professor*; M/SGT. FRED H. BROWN, *Assistant Instructor*; M/SGT. JOHN A. MANN, *Assistant Instructor*; SGT. PHILIP J. WHELAN, *Assistant Instructor*; JOHN O. SKARET, *Assistant Instructor*.

BASIC COURSE, BRANCH IMMATERIAL

1-2. MILITARY FUNDAMENTALS. Organization of the Army; Military Courtesy and Discipline; Personal and Sex Hygiene; Field Sanitation, First Aid. Interior Guard Duty; Dismounted Drill; Clothing and Equipment; Formations and Ceremonies; and Safeguarding Military Information. Required of Freshmen: 2 rec. and 1 drill or 3 rec., according to seasons. 1½ credits.

3-4. SECOND YEAR, BASIC. Extended Order; Dismounted Drill; Map and Photograph Reading; Weapons; Formations and Ceremonies. Required of Sophomores. 2 rec. and 1 drill or 3 rec., according to seasons. 1½ credits.

MUSIC

BJORNAR W. BERGETHON, *Associate Professor and Head of Department*; ROBERT W. MANTON, *Professor*; CHARLES W. TRITT,* *Instructor*; DOROTHY E. KLINE, *Instructor*; RUTH E. MCDANIEL, *Instructor*; MARGARET OLSON, *Assistant*.

MUSICAL ORGANIZATIONS

All the University musical organizations are under the direction of Mr. Bjornar W. Bergethon.

Registration for these courses should be completed during the registration period. These courses cannot be used to satisfy major requirements.

*On leave of absence.

MUSIC

1, (1). UNIVERSITY BAND. Open to all undergraduates on basis of individual try-outs. The University Band furnishes music for the R.O.T.C. drills, all athletic events at home, and also gives several concerts during the college year. Prereq.: Permission of the instructor. 2 rec.; 1½ cr.

3M, (3M). MEN'S GLEE CLUB.

3W, (3W). WOMEN'S GLEE CLUB. Open to all students interested in singing who fulfill the requirements of a try-out. Prereq.: Permission of the instructor. 2 rec.; 1 cr.

5, (5). UNIVERSITY CHOIR. An advanced choral group devoted to the study and performance of the best classical and modern choral literature. Prereq.: Permission of the instructor. 3 rec.; 1 cr.

7, (7). ENSEMBLE. Small groups of instrumentalists and vocalists organized to provide advanced students experience in such groups as the Madrigal Singers, the string quartet, the men's quartet and the women's sextet. Prereq.: Permission of the instructor. 2 rec.; 1 cr.

9, (9). UNIVERSITY ORCHESTRA. Open to all students on basis of individual try-outs. The orchestra gives several concerts during the year and also accompanies the vocal groups and solo instrumentalists on various occasions. Prereq.: Permission of the instructor. 2 rec.; 1 cr.

APPLIED MUSIC

Lessons in Applied Music are based on one-half hour private instruction. One semester hour of credit will be given for one lesson and four hours of practice a week; two semester hours of credit will be given for one lesson and eight hours practice a week; and three semester hours of credit will be given for two lessons and ten hours practice a week. The special semester fee for Applied Music is \$25 for one and \$50 for two lessons a week. These fees include the use of a practice room for the required preparation. Organ students will be charged an additional fee for the use of the practice organ.

Registration in Applied Music is subject to approval by the Head of the Music Department.

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

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possibilities of musical expression. Miss Kline and Miss McDaniel. 1 or 2 lessons; 1-3 cr.

24, (24). ORGAN. The instruction requires that the pupil have an adequate background of pianistic ability. It includes a fundamental study of the manual touch, pedal technique, the independence of the hands and feet, and elementary and advanced registration. In addition to the normal course of organ study, sight reading, modulation, and improvisation will be emphasized. Miss Kline. 1 or 2 lessons; 1-3 cr. (Not offered in 1945-1946.)

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 of 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; 1-3 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. 1 or 2 lessons; 1-3 cr.

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; 1-3 cr.

28, (28). WOODWIND. Courses in the technique and literature of clarinet, flute, oboe, bassoon, and saxophone are given. Miss McDaniel. 1 or 2 lessons; 1-3 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. Miss Kline. 1 or 2 lessons; 1-3 cr.

THEORY AND COMPOSITION

11, (12)-(11), 12. ELEMENTS OF MUSIC. Designed to familiarize the student with the elements of music and to give him a general appre-

MUSIC

ciation of pitch, rhythm, and harmony. Sight singing and rhythmic, melodic, and harmonic dictation. Music notation and terminology.

Recommended to students who wish to prepare themselves for intelligent listening to music and for participation in musical activities such as glee clubs, etc. Miss Olson and Mr. Manton. 3 rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

21-22. HARMONY AND BEGINNING COUNTERPOINT. Designed to supplement the technical training begun in Music 11-12. Seventh chords, altered chords, suspensions, modulation, imitation, analysis, and the five orders of simple two-part counterpoint together with the commencement of composition in the smaller forms. Mr. Manton. Prereq.: Music 11-12. 3 rec.; 3 cr.

51. COUNTERPOINT. Three- and four-part counterpoint, the free harmonization of chorals and melodies, double counterpoint, imitative counterpoint, together with beginnings of canonic and fugal writing. Composition will include the writing of inventions, choral preludes, and simple forms of free instrumental composition. Mr. Manton. Prereq.: Music 21-22. 3 rec., 3 cr. (Not offered in 1945-1946.)

52. COMPOSITION. Elementary composition in the smaller forms. Designed to furnish thorough training in detail relating to sentence formation, two- and three-part forms, the variation forms, and the various rondo forms up to sonata form. This course requires knowledge of harmony and counterpoint and proficiency in pianoforte playing. Mr. Manton. Prereq.: Music 51. 3 rec.; 3 cr. (Not offered in 1945-1946.)

53. ORCHESTRATION. Designed to ground the student in idiomatic writing and technique necessary to score effectively for the modern symphony orchestra and the band. The characteristics and tone quality of the instruments; transcriptions with various combinations—strings, wind, and brass. Mr. Bergethon. Prereq.: Music 21-22. 3 rec.; 3 cr.

54. CONDUCTING. The technique of the baton; simple and complex rhythms; specific problems from various choral and symphonic works; score reading; problems of choral and instrumental technique will be discussed. Mr. Bergethon. Prereq.: Music 53. 3 rec.; 3 cr.

HISTORY, LITERATURE, AND APPRECIATION

13, 14. 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, Schumann, Mendelssohn, Chopin, Liszt, Brahms, Franck, Tchaikow-

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sky, d'Indy, and many others, analyzed by the students and the instructor and played several times in the classroom. Mr. Manton. 3 rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

37-38. MUSIC HISTORY AND LITERATURE. An intensive study of the actual systems, spirit, and content of the music of the period rather than résumés of biography and critical evaluations. Music of Greece and Rome, the early church, evolution of notation, beginnings of harmony and counterpoint, the Troubadours and Minnesingers, the Netherland and Roman masters of church music, the secular music of the English Madrigalists, beginnings of instrumental music, and opera and oratorio, etc., through the classic composers to Schumann. Lectures, readings, and reports. Mr. Manton. Prereq.: Music 11-12 or 13, 14. 3 rec.; 3 cr.

47-48. MUSIC HISTORY AND LITERATURE. This course supplements music 37-38 and continues the study of the great romantic composers and their works, the neo-classicism of Brahms and Franck, d'Indy, etc., and on into the 20th century with special emphasis upon the works of such composers as Debussy, Ravel, Sibelius, Delius, Vaughan Williams, Stravinsky, Hindemith, and many others. Lectures, readings, and reports. Mr. Manton. Prereq.: Music 11-12 or 13, 14. 3 rec.; 3 cr. (Not offered in 1945-1946.)

MUSIC EDUCATION

The Department of Music offers a Four-Year Curriculum for Teachers and Supervisors of School Music (see page 140).

MUSIC-EDUCATION (MU-ED) 91. PROBLEMS IN THE TEACHING OF ELEMENTARY SCHOOL MUSIC. Aims, scope, and organization of materials and activities in the elementary schools in keeping with modern trends in educational philosophy. Particular attention will be given to the child voice, its care and development. A thorough study and demonstration of materials and methods for the various grades will be made. Observation of elementary school music. Mr. Bergethon. Prereq.: Music 11-12. 3 rec.; 3 cr.

MUSIC-EDUCATION (MU-ED) 92. PROBLEMS IN THE TEACHING OF SECONDARY SCHOOL MUSIC. The application of principles of education to the music curriculums of the junior and senior high school. Consideration will be given to the adolescent voice and the classification of voices; the selection of materials for study, performance, and discriminative listening; and building a course of study on student needs and interests. Observation of music programs in secondary schools. Mr. Bergethon. Prereq.: Mu-Ed. 91. 3 rec.; 3 cr.

OCCUPATIONAL THERAPY

MUSIC-EDUCATION (MU-ED) 95. THE TEACHING OF STRINGED INSTRUMENTS. A demonstration course in class-teaching of stringed instruments designed to simulate classroom situations and methods as far as possible. Miss Olson. Prereq.: Permission of the instructor. 2 rec.; 2 cr.

MUSIC-EDUCATION (MU-ED) 96. THE TEACHING OF WOODWIND INSTRUMENTS. A study of correct tone production and technique of woodwind instruments. Materials and procedures for class and individual instruction will be emphasized. Miss McDaniel. Prereq.: Permission of the instructor. 2 rec.; 2 cr.

MUSIC-EDUCATION (MU-ED) 97. THE TEACHING OF BRASS AND PERCUSSION INSTRUMENTS. A study of correct tone production and technique of brass instruments and of rudimentary percussion technique. Materials and procedures for class and individual instruction will be emphasized. Miss Kline. Prereq.: Permission of the instructor. 2 rec.; 2 cr.

NATURE STUDY

(See BIOLOGY, page 182.)

NURSING

(See page 117.)

OCCUPATIONAL THERAPY

These courses are for majors in Occupational Therapy. 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 weaving, leatherwork, chip carving, stenciling, and basketry. Miss Wilkins. Prereq.: O.T. 1. 3 lab.; 3 cr.

O.T. 5, 6. HANDICRAFTS. Covers the use of plastic and synthetic materials, dyeing, chair seating, and other popular handicrafts used in Occupational Therapy. Miss Wilkins. Prereq.: O.T. 4. 3 lab.; 3 cr.

O.T. 8. PRINCIPLES OF WOODWORKING. Practical experience in the design and construction of wooden articles. Use of working drawings; estimating; selection of stock; care and use of tools; application of common finishes. Mr. Brett. 2 lab.; 2 cr. (Formerly given as M.E. 54.)

O.T. 9. LETTERING AND PRINTING. Freehand lettering, hand and power press printing; operation of various duplicating devices; silk

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screen process; poster design. A survey of graphic arts methods and processes as employed in Occupational Therapy. Mr. Brett. 2 lab.; 2 cr.

O.T. 15-16. CERAMICS (Pottery). Design and constructions. 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 and its therapeutic value to varying personalities. Mr. Brett. 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 circulating library. Miss Lindquist. 1 lab.; 1 cr.

O.T. 47-48. THEORY OF OCCUPATIONAL THERAPY. Historical background and evolution of Occupational Therapy. Techniques and their application to disease and injury. Instruction trips to hospitals, clinics, and demonstrations. Miss Wilkins. 2 lec.; 2 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, orthopedics, ophthalmology, otology, and psychiatry. Dr. Roberts and visiting lecturers. Prereq.: Zool. 17-18. 2 lec.; 2 cr. (Not offered in 1945-1946.)

ORAL ENGLISH

(See SPEECH, page 212.)

PAINTING

(See THE ARTS, page 179.)

PHILOSOPHY

DONALD C. BABCOCK, *Professor*; HERBERT F. RUDD, *Professor*.

Courses in this Department are open to Sophomores, Juniors, and Seniors.

1-2. BUILDING A PHILOSOPHY. An introduction or "invitation to philosophy." Since a "true" philosophy depends not only on a correct understanding of the objective universe but on an adjustment of the self to that universe, this course will be a cooperative enterprise, analogous to a laboratory or craft course, in which each student will be given an opportunity to begin the construction of his own inclusive

PHILOSOPHY

plan and understanding of life. There will be a tracing of some of the principal paths laid out by philosophers in the past; a sharing of experience by members of the class and the instructor; and critical discussion of tentative views put forward by any member of the group. The course as offered rests on the belief that the universe and human life have a meaning, that this meaning is, in part, discoverable, and that youth is not too young to have a philosophy. Mr. Babcock. 3 lec. or rec.; 3 cr.

3-4. ETHICS. Human beings behave as if there were standards by which conduct could be evaluated. What are "values"? What norms 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.

5-6. CHANGING INSTITUTIONS AND BELIEFS.

1. What new forces generate new ways of living and thinking?

The continuing development of science, the cumulative industrial revolution, the new transportation and communication, the new and expanding economic and cultural interdependence, the new knowledge of man and society (anthropological, sociological, psychological, acquaintance with diverse civilizations and patterns of living), the new programs of controlled social change (communism, fascism, planned society), the new ideologies.

2. What old or new ways of living promise the best adjustment to the conditions of the middle years of the 20th century?

3. What general orientation or system of beliefs can best meet the requirements of a thoroughgoing realism and at the same time provide appreciation of values and provide morale for constructive effort? Mr. Rudd. 3 lec. or rec.; 3 cr.

15-16. PHILOSOPHIC VALUES IN LITERATURE. This course aims at revealing the store of affirmations of, and allusions to, the great truths of philosophy, ethics, and religion which is to be found in the world's literature. In poetry, drama, and in fact every kind of writing, are profound and subtle statements, sometimes seemingly intuitive or prophetic. This course attempts to relate them to the great ethical or spiritual system of cosmic truth which philosophy always seeks. So-called "secular" literature will be used for sources, rather than the sacred writings of the great living religions or the Bible. Mr. Babcock. 3 lec. or rec.; 3 cr.

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11-12. HISTORY OF RELIGIONS. (Formerly History 25-26.) 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. (Offered in 1945-1946.)

13-14. HISTORICAL ORIGINS AND DEVELOPMENT OF CHRISTIANITY. (Formerly History 23-24.) 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. (Not offered in 1945-1946.)

PHILOSOPHY OF HISTORY. (See Hist. 55-56.)

PHOTOGRAPHY

(See THE ARTS, page 179.)

PHYSICAL EDUCATION FOR MEN

CARL LUNDHOLM, *Professor, Director of Physical Education and Athletics*; HENRY C. SWASEY, *Associate Professor*; PAUL C. SWEET, *Associate Professor*; *GEORGE H. SAUER, *Assistant Professor*; *CHARLES M. JUSTICE, *Assistant Professor*; *ANTHONY A. DOUGAL, *Assistant Professor*; *EDWARD J. BLOOD, *Instructor*; *JOHN DURIE, *Instructor*

REQUIREMENTS: All Freshman 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.

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-

*On leave of absence.

PHYSICAL EDUCATION

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.

61. PROBLEMS OF TEACHING IN PHYSICAL EDUCATION. Methods and materials of instruction, theories of play, and actual practice for the

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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: Phys. Ed. 40, 45, 46, 47, 48. 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.: Zool. 17, 18; Phys. Ed. 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.: Zool. 17, 18; Phys. Ed. 23, and 61 or 35. 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.: Zool. 17, 18; Phys. Ed. 23, 65 and 35 or 36, methods courses in those sports in which the student intends to become actively engaged. 2 to 4 cr.

MAJOR COURSES

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.

55. REMEDIAL GYMNASTICS. The adaptation of exercise to individual needs, capacities, and limitations; physical abnormalities and their correction. Miss Browne. Prereq.: Zool. 17, 18. 2 lec. or rec.; 2 lab.; 3 cr.

PHYSICAL EDUCATION FOR WOMEN

63, 64. THE THEORY AND COACHING OF SPORTS FOR WOMEN. The principles involved in the teaching of team games and individual sports with emphasis on coaching methods and officiating. Miss Bancroft and Miss Ongley. 2 lec. or rec.; 4 lab.; 3 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.

(P-E) 91. PROBLEMS IN THE TEACHING OF PHYSICAL EDUCATION FOR WOMEN. The organization of a comprehensive program of activities for use from the primary grades through college. Mrs. Rettig. 3 lec. or rec.; 2 lab.; 4 cr.

ELECTIVE COURSES OPEN TO ALL STUDENTS INTERESTED IN HEALTH, PHYSICAL EDUCATION, AND RECREATION

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 necessary for organized camps; camp departments, programs, and camp leadership qualifications. Mrs. Wooster. 3 lec.; 3 cr.

36. RECREATION LEADERSHIP. Philosophy of recreation, organization, and administration of social recreation, clubs, and playgrounds; recreation as therapy, application of recreation to wartime and postwar situations. Miss Beckwith. 2 lec. or rec.; 1 lab.; 3 cr.

(P-E) 92. DIRECTED TEACHING OF PHYSICAL EDUCATION FOR WOMEN. Opportunity for teaching of Physical Education activities under direction in the elementary and secondary schools. Mrs. Rettig. Prereq.: (P.E.) 91. Open to Seniors. 1 lec. or rec.; 2 lab.; 2 cr.

PHYSICAL EDUCATION FOR WOMEN

MARION C. BECKWITH, *Associate Professor*; DOROTHEA J. BANCROFT, *Instructor*; EVELYN BROWNE, *Instructor*; CAROLINE S. WOOSTER, *Instructor*; PHYLLIS ONGLEY, *Instructor*; HAZEL W. RETTIG, *Instructor*.

The Department of Physical Education for Women aims to develop in each individual the physical, social, and mental qualities which will enable her to meet successfully the demands of a war and post-war world. 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 Athletic Association.

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REQUIREMENTS. All women students are required to register for 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. In addition, Freshmen women are required to take Freshman Problems, P.E. 1.5, 2.5. One additional activity 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 assigned 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. This test is also 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 substitute club activities for their basic course in rhythemics if the results of the motor ability test show they are qualified to do so.

Clubs:

Dance — Instructor, Mrs. Rettig.

Riding — Instructor, Miss Browne.

Skating — Instructor, Miss Ongley.

W.A.A. — Instructor, Miss Bancroft and staff.

Women students following any Teacher Training Curriculums in the University are urged to elect for required Physical Education the fol-

PHYSICAL EDUCATION FOR WOMEN

lowing activities: Folk dancing, community games, speedball, hockey, basketball, and American country dancing.

REQUIRED COSTUME AND EQUIPMENT. Special gymnasium uniform consists of blue cotton shorts and shirt, cotton fleece warm-up suit, white socks, and regulation gymnasium shoes. Students are required to furnish their own individual equipment for such activities as tennis, contemporary dancing, individual gymnastics, skiing, and skating. Equipment is furnished for golf, fencing, badminton, hockey, archer, lacrosse, and softball.

1.5, 2.5. FRESHMEN PROBLEMS. The art of healthful living. Problems of health, personal appearance, conduct and personality. Required of Freshmen. Miss Beckwith and Mrs. Wooster. 1 lec.; 1 cr.

1, 2; 3, 4; 2, 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.

ACTIVITY COURSES

(elect one a quarter)

First Quarter: Archery, badminton, contemporary dance, hockey, individual gym, riding (beg. + inter.), riding (advanced), soccer, speedball, tennis (beg.), tennis (inter.)

Second Quarter: Basketball, badminton, contemp. dance, community games, individual gym, folk dancing, fencing, bowling, skating, skiing, riflery.

Third Quarter: Basketball (inter), badminton, contemp. dance, community games, individual gym, Am. country dance, fencing, bowling, skating, skiing, riflery.

Fourth Quarter: Archery, badminton, contemp. dance, golf, individual gym, riding (beg. + inter.), riding (advanced), lacrosse, softball, tennis (beg.), tennis (inter.).

Required of Freshmen, Sophomores, and Juniors. 3 periods; 1 cr.

7, 8. PHYSICAL EDUCATION. Elect courses 7 from the list under Phys. Ed. 1, 2. Elective for Seniors. 3 periods; 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 Phys. Ed. 1, 2. 2 periods; 1 cr.

*See Advanced Instruction for substitutions.

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PHYSICS

HORACE L. HOWES, *Professor*; HARRY H. HALL,* *Professor*; WILLIAM H. HARTWELL, *Associate Professor*; GREGORY K. HARTMANN,* *Assistant Professor*; HAROLD I. LEAVITT, *Associate Professor*; DUANE F. CARLISLE, *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.

4. **ELEMENTS OF PHYSICS.** A brief treatment of mechanics and heat; followed by studies in light and electricity. A working knowledge of arithmetic, algebra, and plane geometry is essential. Prereq.: Sophomore standing in Agr. 2 lec.; 1 rec.; 1 lab.; 4 cr.

5-6. **PRE-MEDICAL PHYSICS.** This course offers the same lectures and recitations as Physics 1, 2 (Introductory Physics). In a separate laboratory, however, special attention is paid to the needs of students in preparation for medical work. 1 lec.; 2 rec.; one 3 hr. lab.; 5 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, 3 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. 2 lab.; 3 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. 2 lab.; 3 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 this course and Phys. 16 to meet their Physical Science requirements for the degree. 3 lec. or rec.; 3 cr.

*On leave of absence.

PHYSICS

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.

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. The 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 phenomena 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.

*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; electrostatics; potential theory; energy in electromagnetic field; waves;

*Course to be given at the discretion of the Head of the Department.

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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.

*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.

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.

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.

GENERAL SCIENCE-EDUCATION (GEN. SCI-ED) 91. PROBLEMS IN THE TEACHING OF GENERAL SCIENCE. Units of subject matter presented in the form of lecture-demonstrations and discussions, accompanied by assigned readings. The objectives and methods of teaching general science developed with the subject matter presentations. Opportunity for students to participate in the lecture demonstrations. Mr. Leavitt. 3 lec. or rec.; 3 cr.

For courses primarily for Graduate students, see Catalogue of the Graduate School.

POLITICAL SCIENCE

(See GOVERNMENT, page 219.)

*Course to be given at the discretion of the Head of the Department.

POULTRY HUSBANDRY

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. (Formerly given as P.H. 5.) 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. (Formerly given as P.H. 20.) 2 lec.; 1 lab.; 3 cr.

8. POULTRY HOUSING. Design and construction of poultry houses and equipment; costs of materials; management principles. Mr. Charles. (Formerly given as P.H. 22.) 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 incubation and brooding of poultry; embryonic development. Students individually operate incubators and care for groups of chicks. Mr. Charles. 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.

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.)

25. 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.

26. POULTRY MANAGEMENT. The application of successful business principles to poultry farming; study of surveys and production costs.

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As a part of the laboratory work, a detailed "three year" development plan of a poultry farm will be studied. Mr. Charles, Mr. Ringrose. (Formerly given as P.H. 23.) 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. (Formerly given as P.H. 16.) 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.

For courses primarily for Graduate students see Catalogue of the Graduate School.

PRE-DENTAL

(See page 119.)

PRE-LAW

(See page 108.)

PRE-MEDICINE

(See page 119.)

PSYCHOLOGY

HERBERT A. CARROLL, *Professor*; ADOLPH G. EKDAHL,* *Associate Professor*; FRANKLIN J. SHAW, *Assistant Professor*; RUTH B. KELLY, *Instructor*.

Except for Psych. 11, courses in this Department are not open to Freshmen.

11, (11). **PRINCIPLES OF HUMAN BEHAVIOR.** The purpose of this course is to offer opportunities to students to acquire such appreciative knowledge of important principles of human behavior as will be helpful to them in controlling their own conduct and understanding others more intelligently. Mr. Shaw and Miss Kelly. Open to Freshmen and Sophomores only. 3 lec.; 3 cr.

31, (31). **GENERAL PSYCHOLOGY.** A systematic study of essential facts and principles of Psychology, including sensation and perception, the nervous system, emotion, development, and personality. Mr. Shaw.

*On leave of absence.

PSYCHOLOGY

Prereq.: Psych. 11, except for Hotel Administration, Nursing, Pre-medical, and Social Service students. 3 lec.; 3 cr.

33. **INDUSTRIAL PSYCHOLOGY.** A study of the fundamental principles of Psychology in a setting of direct application to personal and social problems met with in business and industry. Mr. Shaw. 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. (Formerly Psych. 81.) 3 lec.; 3 cr.

51. **PSYCHOLOGY OF CHILDHOOD.** The mental processes and reactions of the normal child from early infancy 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. Ekdahl. Prereq.: Psych. 11 or 31. 3 lec.; 3 cr.

54. **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 defectiveness and the more common forms of the psychoses and neuroses are presented to enable the student to recognize typical cases. Mr. Shaw. Prereq.: Psych. 31. 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. Shaw. Prereq.: Psych. 31. 3 lec.; 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. Ekdahl. Prereq.: Psych. 31. 3 lec.; 3 cr.

62. **PSYCHOLOGY OF PERSONNEL.** The application of Psychology to personnel management in business and industry. The use of intelligence, trade, and aptitude tests, and interest questionnaires in employment. The development and maintenance of morale through efficiency methods, favorable conditions of work, and intelligent leadership. Mr. Shaw. Prereq.: Psych. 33. 3 lec.; 3 cr. (Formerly Psychology 36.)

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63. INDIVIDUAL DIFFERENCES. A study of individual differences with special emphasis on intellectually gifted and mentally subnormal children. Mr. Carroll. Prereq.: Psych. 31. 3 lec.; 3 cr. (Formerly Psych. 56.)

66. COMPARATIVE PSYCHOLOGY. (Not offered in 1945-1946.)

67. PRINCIPLES OF MEASUREMENT. A study of the problems involved in objectively measuring mental aptitudes and the results of learning by means of standardized group tests. Special attention will be given to the statistical interpretation of scores. Mr. Carroll. Prereq.: Psych. 11. 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. Mr. Carroll. Prereq.: Psych. 67. 3 lec.; 3 cr.

74. PSYCHOLOGY OF PERSONALITY. The course is concerned with the study of the attitudes and motives of the individual. Attention will be given to attempts to classify personality and temperament and methods of measuring personality traits. Mr. Shaw. Prereq.: Psych. 31 and 47. 3 lec.; 3 cr.

82. CLINICAL PROBLEMS. An examination of the objectives, theories, and methods of psychological counseling. Mr. Carroll. Prereq.: Psych. 54 or Psych. 54 taken concurrently. 3 cr.

98. SEMINAR IN PSYCHOLOGY. Mr. Carroll. Prereq.: 18 semester credits in Psych. 3. 3 cr.

PUBLICITY

The courses in Publicity (communications, propaganda—courses which will assist one in mastering the technique of the dissemination of ideas) offered by several departments within the University are here grouped for the convenience of students who wish to elect work in this field.

Students who wish to extend their major programs with courses in Publicity, or who wish to major in this field, should consult Professor Harold H. Scudder of the College of Liberal Arts.

COURSES OF DIRECT APPLICATION TO PUBLICITY

Public Speaking—English 35

Radio Speaking—English 39 (39)

Advanced Composition—English 7, 8

News Writing—English 9, 10

Expository Writing—English 41 (41)

SOCIAL SCIENCE

Free-hand Drawing—Arts 23, 24, 25, 26

Water color and Modeling—Arts 27, 28, 11

Personal Use Typewriting—Secretarial Studies 5 (5) (required, but not to be used for major credit)

Photography—Arts 39, 52

Grammar—English 19

COURSES IN SUBJECTS CLOSELY ALLIED TO PUBLICITY

**Principles of Human Behavior—Psychology 11*
(11)

Industrial Psychology—Psychology 33

Psychology of Personnel—Psychology 62

Principles of Economics—Economics 1-2

Economic and Commercial Geography—Economics 4

Geography of the Western and Eastern Hemispheres—Geography 1-2

Geography of North America—Geography 52

**Citizenship—Government 1*

**Current Problems—Government 2*

American Government—Government 3-4

International Relations and Organizations—Government 55, 56

**Principles of Sociology—Sociology 1*

**Social Psychology—Sociology 2*

American Society—Sociology 21, 22

The United States from 1790 to 1900—History 7-8

The History of England—History 21-22

Introduction to the Arts—Arts 31, 32

PUBLIC SPEAKING

(See page 212.)

RADIO

(See page 213.)

RELIGION

(See courses in Department of Philosophy, page 252.)

SECRETARIAL STUDIES

(See page 197.)

SOCIAL SCIENCE

The courses listed below are given under the auspices of the Division of Social Science of the Faculty of the College of Liberal Arts.

*Cannot be used to satisfy major requirements.

UNIVERSITY OF NEW HAMPSHIRE

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 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. (Not offered in 1945-1946.)

79, 80. SEMINAR IN STATE PROBLEMS. A research course in problems of current import to this state 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., Acc., Hist., or Soc. For Juniors and Seniors. Not more than 18 credits. No more than 9 credits may be counted toward the completion of major requirements.

SOCIAL SERVICE

(See page 123.)

SOCIOLOGY

CHARLES W. COULTER, *Professor*; *JOSEPH E. BACHELDER, JR., *Associate Professor*; ARNOLD W. GREEN, *Instructor*.

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 social control. Mr. Green. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

*On leave of absence.

SOCIOLOGY

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. Green. 3 lec. or rec.; 3 cr. *This course cannot be used to satisfy major requirements.*

21-22. AMERICAN SOCIETY. A content course in Educational Sociology designed to acquaint the student with the nature and inter-relations of the institutions in democratic society. Especially adapted for Sophomores and Juniors who require a single survey course in the field of the Social Sciences. Mr. Coulter. 3 lec. or rec.; 3 cr.

53. 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.

54. 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.

57. RURAL SOCIOLOGY. The foundation materials of rural life; the physical setting—land, land-policies, land-tenure; land-economics; farm and village population—its composition, its changes; the income basis of rural life, the standard of living; rural habits, attitudes; rural groupings, arrangements, the mechanisms of communication and social control; rural institutions with respect to welfare, sociability, education, and religion. Mr. Green. Prereq.: Soc. 1 and 2, or by special permission. 3 lec. or rec.; 3 cr.

60. URBAN SOCIOLOGY. The changes in community life that have come with the shift of population from rural districts; factors involved in the rapid growth of cities since 1800; physical structure of the city, processes of internal growth; the segregation which makes of the city a mosaic of distinct cultural worlds; increase in mobility which multiplies social stimuli; typical areas within the city—foreign colonies, rooming house districts, apartment and hotel areas, outlying

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areas of homes; the effect of the city upon community life, the family, church, school, unorganized group behavior, attitudes and life organization of the person. Mr. Green. Prereq.: Soc. 1 and 2. 3 lec. or rec.; 3 cr.

61. 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. Green. Prereq.: Soc. 1 and 2. 3 lec. or rec.; 3 cr.

62. 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. Green. Prereq.: Soc. 1 and 2, or by special permission. 3 lec. or rec.; 3 cr.

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. Coulter. 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

SOCIOLOGY

the data needed, collection and arrangement of data for presentation and exposition. Mr. Green. 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.

The Departments of Economics, 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 268.

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. Green. 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. Coulter. Prereq.: 12 credits in Sociology including Soc. 75. 3 cr.

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,

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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.

SPANISH

(See LANGUAGES, page 237.)

SPEECH CORRECTION

(See page 212.)

STENOGRAPHY

(See page 197.)

TEACHER PREPARATION

(See page 136.)

THERAPY

(See OCCUPATIONAL THERAPY, page 251.)

TYPING

(See page 197.)

ZOOLOGY

(See page 185.)

UNIVERSITY OF NEW HAMPSHIRE CALENDAR

1945-46

1945 SUMMER SCHOOL

July 2	Monday	Registration Day
July 4	Wednesday	Holiday (Classes make up July 7)
Aug. 10	Friday	Summer Session closes

FIRST SEMESTER, 1945

Sept. 18	Tuesday	Orientation Week begins
Sept. 24	Monday	Registration Day
Sept. 25	Tuesday	Classes begin at 8 A.M.
Nov. 13	Tuesday	Mid-Semester Reports are to be filed, 5 P.M.
Nov. 21-26	Wed.-Mon.	Thanksgiving Recess—Wed., 12:30 P.M., to Mon., 8 A.M.
Dec. 21	Friday	Christmas Recess begins at 12:30 P.M.

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Jan. 2	Wednesday	Christmas Recess ends at 8 A.M.
Jan. 28 to Feb. 2	Mon.-Sat.	Examination Week

SECOND SEMESTER

Feb. 4	Monday	Recitations begin at 8 A.M.
Mar. 12	Tuesday	Town Meeting, classes excused 10 A.M.-12:30 P.M.
Mar. 30	Saturday	Spring Recess begins at 12:30 P.M.
Apr. 2	Tuesday	Mid-Semester Reports to be filed, 5 P.M.
Apr. 8	Monday	Spring Recess ends at 8 A.M.
May 29 to June 5	Wed.-Wed.	Examination Week
June 9	Sunday	Baccalaureate Exercises, 10 A.M. Commencement at 2 P.M.

NOTE: Intersession Classes may be scheduled for August 13 to September 15 if there is sufficient demand.

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