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BULLETIN OF THE UNIVERSITY OF NEW HAMPSHIRE

Graduate School Number

Vol. XXXIII, No. 16 *JUNE 15, 1942* *Durham*

BULLETIN

of the

UNIVERSITY OF NEW HAMPSHIRE

Vol. XXXIII No. 16

Published at the University of New Hampshire, Durham, N. H., on the first and fifteenth of each month during the college year, and entered as second class matter August 5, 1907, at the post office at Durham, N. H., under the Act of Congress of July 16, 1894.

UNIVERSITY CALENDAR

1942-43

1942 SUMMER SCHOOL

June 29	Monday	Registration Day, First Session
Aug. 7	Friday	First Session closes at 4 P.M.
Aug. 10	Monday	Second Session classes begin at 7:30 A.M.
Sept. 18	Friday	Second Session closes at 4 P.M.

FIRST SEMESTER

1942

Oct. 5	Monday	Freshman Week begins
Oct. 9	Friday	Registration Day—Transfer students and Graduate students
Oct. 12	Monday	Recitations begin at 8 A.M.
Oct. 14	Wednesday	Meeting of the University Senate at 4:15 P.M.
Oct. 15	Thursday	University Day—Afternoon holiday
Oct. 16	Friday	Annual Meeting of Board of Trustees
Oct. 17	Saturday	Dads' Day
	Saturday	Homecoming
Nov. 25	Wednesday	Thanksgiving Recess—Wednesday, 12:30 P.M. to Monday, 8 A.M.
Dec. 1	Tuesday	Mid-semester reports to be filed, 5 P.M.
Dec. 19	Saturday	Christmas Recess begins at 12:30 P.M.
Dec. 28	Monday	Christmas Recess ends at 8 A.M.

1943

Jan. 1	Friday	New Year's Day—Holiday
Jan. 13	Wednesday	Meeting of the University Senate at 4:15 P.M.
Jan. 15	Friday	Meeting of Board of Trustees
Jan. 18-29		Registration Period
Jan. 30	Saturday	First semester classes end, 12:30 P.M.

SECOND SEMESTER

Feb. 1	Monday	Recitations begin at 8 A.M.
Mar. 9	Tuesday	Town Meeting
Mar. 23	Tuesday	Mid-semester reports to be field, 5 P.M.
Apr. 8	Thursday	Spring Recess begins at 12:30 P.M.
Apr. 12	Monday	Spring Recess ends at 8 A.M.
Apr. 14	Wednesday	Meeting of the University Senate at 4:15 P.M.
Apr. 16	Friday	Meeting of Board of Trustees
May 1	Saturday	Mothers' Day
May 3-14		Registration Period
May 15	Saturday	Classes end, 12:30 P.M.
May 16	Sunday	Baccalaureate Exercises, 10 A.M. Commencement at 2 P.M.
June 12	Saturday	Alumni Day—Meeting of Board of Trustees

1943 SUMMER SCHOOL

June 28-Aug. 6	First Session
Aug. 9-Sept. 17	Second Session

BOARD OF TRUSTEES

His Excellency, Governor Robert O. Blood, m.d., ll.d., *ex officio*

President Fred Engelhardt, a.m., ph.d., ll.d., *ex officio*

Andrew L. Felker, *Commissioner of Agriculture, ex officio*

Roy D. Hunter, ll.d., *President* — West Claremont
June 14, 1916 to June 30, 1945

Harry D. Sawyer — Woodstock
September 15, 1926 to June 30, 1942

James A. Wellman, b.s. — Manchester
January 26, 1928 to June 30, 1943

Robert T. Kingsbury — Keene
January 27, 1928 to June 30, 1944

George T. Hughes, a.m., ll.d. — Dover
July 1, 1931 to June 30, 1943

Jessie Doe — Rollinsford
July 1, 1932 to June 30, 1942

John T. Dallas, a.b., d.d., ll.d. — Concord
July 1, 1933 to June 30, 1945

Frank W. Randall, b.s., *Secretary* — Portsmouth
July 1, 1936 to June 30, 1944

*Henry F. Judkins, b.s. — White Plains, New York
July 1, 1939 to June 30, 1943

*Ernest W. Christensen, b.s. — Dover
July 1, 1940 to June 30, 1944

*Elected by Alumni.

OFFICERS OF ADMINISTRATION

FRED ENGELHARDT, A.M., PH.D., *President of the University*

NORMAN ALEXANDER, PH.D., *Dean of Men*
DAVID JOLLY, B.S., B.S. IN L.S., *Librarian*
RAYMOND C. MAGRATH, *Treasurer*
ARWOOD S. NORTHBY, PH.D., *Assistant to the President*
EVERETT B. SACKETT, PH.D., *Registrar*
HERMON L. SLOBIN, PH.D., *Dean of the Graduate School*
RUTH J. WOODRUFF, PH.D., *Dean of Women*

THE EXECUTIVE COMMITTEE

HERMON L. SLOBIN, PH.D., *Dean of the Graduate School*
EDMOND W BOWLER, S.B., *Chairman, Division of Engineering*
CLIFFORD S PARKER, PH.D., *Chairman, Division of Language and Literature*
THOMAS G. PHILLIPS, PH.D., *Chairman, Division of Physical Sciences*
LAWRENCE W SLANETZ, PH.D., *Chairman, Division of Biological Sciences*
HARRY W. SMITH, A.M., *Chairman, Division of Social Science*
A. MONROE STOWE, PH.D., *Chairman, Division of Education*

THE GRADUATE FACULTY*

ALEXANDER, NORMAN, *Associate Professor of Economics*
B.A., University of North Dakota, 1919; M.A., *ibid.*, 1920; LL.B., Yale university, 1922; PH.D., Columbia university, 1931.

ALLEN, FRED E., *Assistant Professor of Veterinary Science*
B.S., University of New Hampshire, 1932; D.V.M., Ohio State university, 1936.

ATKINSON, EDWARD R., *Assistant Professor of Chemistry*
B.S., Massachusetts Institute of Technology, 1933; PH.D., *ibid.*, 1936.

BABCOCK, DONALD C., *Professor of History*
B.A., University of Minnesota, 1907; M.A., *ibid.*, 1908; S.T.B., Boston university, 1912

BACHELDER, JOSEPH E., JR., *Associate Professor of Sociology*
B.A., Westminster college, 1933; PH.D., Yale university, 1937.

*As of May 1, 1942.

BAUER, GEORGE N., *Professor of Mathematics*
B.S., University of Minnesota, 1894; M.S., University of Iowa, 1898; PH.D., Columbia university, 1900; Goettingen, Germany, 1907-1908.

BENNETT, FREDERICK D., *Assistant Professor of Physics*
B.A., Oberlin college, 1937; M.SC., Pennsylvania State college, 1939; PH.D., *ibid.*, 1941.

BERG, HARRY D., *Assistant Professor of History*
B.A., Iowa State college, 1931; M.A., University of Iowa, 1936; PH.D., *ibid.*, 1940.

BERGETHON, BJORNAR W., *Associate Professor of Music*
B.M., Bush Conservatory of Music, 1929; A.M., Indiana university, 1936.

BINGHAM, SYLVESTER H., *Assistant Professor of English*
A.B., Dartmouth college, 1922; A.M., Harvard university, 1929; PH.D., Yale university, 1937.

BISBEE, HARLAN *M.*, *Associate Professor of Education*
A.B., Bowdoin college, 1898; A.M., Harvard university, 1905.

BLEWETT, EDWARD Y., *Dean of the College of Liberal Arts*
B.A., University of New Hampshire, 1926; M.A., Ohio State university, 1940. (Entered military service, July 1, 1941 -)

BOWLER, EDMOND W., *Professor of Civil Engineering*
S.B., in Sanitary Engineering, Massachusetts Institute of Technology, 1914.

BUFFINGTON, ALBERT F., *Assistant Professor of Languages*
A.B., Bucknell university, 1928; A.M., Harvard university, 1932; PH.D., *ibid.*, 1937.

CASE, GEORGE W., *Professor of Mechanical Engineering*
B.S. in C.E., Purdue university, 1905; M.C.E., Cornell university, 1912. (Entered government service, November 4, 1940) .

CHAPMAN, DONALD H., *Associate Professor of Geology*
B.A., University of Michigan, 1927; M.A., *ibid.*, 1928; PH.D., *ibid.*, 1931.

CHARLES, T. BURR, *Professor of Poultry Husbandry*
B.S., Cornell university, 1915; M.S., *ibid.*, 1938.

COLOVOS, NICHOLAS F., *Assistant Professor of Animal Husbandry*
B.S., University of New Hampshire, 1927; M.S., *ibid.*, 1931; graduate study, Cornell university, 1938-1939.

CONKLIN, JAMES *G.*, *Assistant Professor of Entomology*
B.S., Connecticut Agricultural college, 1926; M.S., University of New Hampshire, 1929; PH.D., Ohio State university, 1941.

CORBETT, ALAN C., *Instructor in Poultry Husbandry*
B.S., University of Maine, 1936; M.S., *ibid.*, 1937; D.V.M., Michigan State college, 1940

COULTER, CHARLES W., *Professor of Sociology*
B.A., University of Toronto, 1908; B.D., Victoria college, 1909; M.A., Yale university, 1910; PH.D., *ibid.*, 1914; Professional study, 1941-42.

CRECELIUS, H. GILBERT, *Instructor in Bacteriology*
B.A., University of South Dakota, 1934; M.A., *ibid.*, 1937; PH.D., Yale university, 1941.

DAGGETT, ALBERT F., *Associate Professor of Chemistry*
B.S., University of New Hampshire, 1928; M.S., *ibid.*, 1930; PH.D., Columbia university, 1934.

DEGLER, CARROLL M., *Assistant Professor of Economics*
A.B., University of Kansas, 1925; M.B.A., New York university, 1927; graduate study, Columbia university, summers 1929, '31, '32 and '33.

DEMOS, MILTIADES S., *Assistant Professor of Mathematics*
B.S.,Robert college, Constantinople, Turkey, 1922; PH.D., Harvard university, 1926; Sheldon Traveling fellow of Harvard university, Munich, Germany, 1926-27.

DOBROVOLNY, CHARLES G., *Assistant Professor of Zoology*
B.A., University of Montana, 1928; M.S., Kansas State College of Agriculture and Applied Science, 1933; PH.D., University of Michigan, 1938.

DONOVAN, EDWARD T., *Assistant Professor of Mechanical Engineering*
B.S., University of Wisconsin, 1921.

DUNN, STUART, *Assistant Professor of Botany*
B.S., University of Minnesota, 1923; M.S., Iowa State college, 1925; PH.D., University of Minnesota, 1931.

EADIE, WILLIAM R., *Assistant Professor of Zoology*
B.S., University of New Hampshire, 1932; M.S., *ibid.*, 1933; PH.D., Cornell university, 1939.

EASTMAN, M. GALE, *Dean of the College of Agriculture*
B.S., New Hampshire college, 1913; M.S., Cornell university, 1916; PH.D., *ibid.*, 1931.

EPPELSHEIMER, DANIEL S., *Research Professor of Industrial Engineering*
B.S., Harvard university, 1932; D.SC., *ibid.*, 1935.

ERIKSON, ARVAL L., *Assistant Professor of Agricultural Economics*
B.S., University of Idaho, 1937; M.S., Iowa State college, 1939; graduate study, *ibid.*, 1939-40. (Entered Government Service, May 1, 1942).

FUNKHOUSER, JAMES A., *Associate Professor of Chemistry*
B.S., Carnegie Institute of Technology, 1925; PH.D., Ohio State university, 1930.

GETCHELL, EDWARD L., *Associate Professor of Mechanical Engineering*
B.S., University of Maine, 1914; E.E., *ibid.*, 1920.

GLOVER, LEON C., *Assistant Professor of Entomology*
B.S., University of New Hampshire, 1923; M.S., *ibid.*, 1928; PH.D., Iowa State college, 1936.

GRIGAUT, PAUL L., *Associate Professor of Languages*
B. ès L., 1926, Certifié de Licence (Sorbonne); Diplôme de l'Ecole du Louvre, 1932.

GRINNELL, HAROLD C., *Associate Professor of Agricultural Economics*
B.S., Cornell university, 1921; M.S., *ibid.*, 1930; graduate study, Cornell university, summer, 1939.

HALL, HARRY H., *Assistant Professor of Physics*
B.S., Union college, 1926; PH.D., Harvard university, 1934. (Entered government service, July 1, 1941)

HALPIN, ROBERT B., *Instructor in Poultry Husbandry*
B.S., University of Wisconsin, 1937; graduate study, Iowa State college, 1937-40. (Entered military service, September 27, 1941)

HARVEY, LASHLEY G., *Assistant Professor of Government*
A.B., William Jewell college, 1925; A.M., Leland Stanford, Jr., university, 1930; PH.D., Harvard university, 1942.

HENNESSY, WILLIAM G., *Associate Professor of English*
A.B., Boston university, 1916; A.M., *ibid.*, 1924.

HEPLER, JESSE R., *Associate Professor of Horticulture*
B.S., Pennsylvania State college, 1911; M.S., University of Wisconsin, 1922.

HESS, CARL W., *Instructor in Poultry Husbandry*
B.S., Iowa State college, 1938; M.S., University of Maryland, 1940; graduate study, University of Maryland, 1940-41.

HITCHCOCK, LEON W., *Professor of Electrical Engineering*
B.S., Worcester Polytechnic institute, 1908.

HODGDON, ALBION R., *Associate Professor of Botany*
B.S., University of New Hampshire, 1930; M.S., *ibid.*, 1932; PH.D., Harvard university, 1936.

HOWES, HORACE L., *Professor of Physics*
B.S., Syracuse university, 1905; PH.D., Cornell university, 1915.

IDDLES, HAROLD A., *Professor of Chemistry*
B.S., Michigan State college, 1918; M.S., University of Iowa, 1921; PH.D., Columbia university, 1925.

JACKSON, C. FLOYD, *Professor of Zoology*
B.A., DePauw university, 1905; M.S., Ohio State university, 1907.

JACKSON, FREDERICK D., *Associate Professor of Electrical Engineering*
B.S., Pennsylvania State college, 1920; E.E., *ibid.*, 1939.

JOHNSON, GIBSON R., *Assistant Professor of History*
A.B., Muskingum college, 1916; M.A., Princeton university, 1920; PH.D., Edinburgh university, 1922.

JONES, HOWARD R., *Associate Professor of Education*
B.S., University of Minnesota, 1933; M.A., *ibid.*, 1934; PH.D., Yale university, 1940.

KALIJARVI, THORSTEN V., *Professor of Government*
A.B., Clark university, 1920; A.M., *ibid.*, 1923; PH.D., University of Berlin, 1935.

KEENER, HARRY A., *Instructor in Animal and Dairy Husbandry*
B.S., Pennsylvania State college, 1936; M.S., West Virginia university, 1938; PH.D., Pennsylvania State college, 1941.

KICHLINE, WILLIAM L., *Assistant Professor of Mathematics*
B.A., Lehigh university, 1924; M.S., *ibid.*, 1928; graduate study, University of Michigan, 1939-40.

LATIMER, L. PHELPS, *Assistant Professor of Horticulture*
B.S., University of California, 1921; M.S., *ibid.*, 1922; PH.D., *ibid.*, 1926.

LEWIS, DANIEL C., *Associate Professor of Mathematics*
A.B., Haverford college, 1926; A.M., Harvard university, 1928; PH.D., *ibid.*, 1932.

MARSTON, PHILIP M., *Assistant Professor of History*
B.A., University of New Hampshire, 1924; M.A., *ibid.*, 1927; graduate study, Harvard university, 1940.

MCGRAIL, THOMAS H., *Assistant Professor of English*
B.A., University of New Hampshire, 1927; M.A., Cornell university, 1931; PH.D., *ibid.*, 1936. (Entered military service, 1942)

McLaughlin, Helen F., *Professor of Home Economics*
B.A., University of Wisconsin, 1909; B.S., Simmons college, 1915; M.A., Teachers college, Columbia university, 1925.

Meyers, T. Ralph, *Associate Professor of Geology*
B.A., Ohio State university, 1926; M.A., *ibid.*, 1929; Austin fellow, Harvard university, 1931-32.

Mills, Marian E., *Assistant Professor of Botany*
B.S., Teachers college, Columbia university, 1917; M.A., *ibid.*, 1920.

Mitcham, Shelby A., *Assistant Professor of Home Economics*
B.S., North Texas State Teachers college, 1934; M.S., Iowa State college, 1940.

Moore, Herbert C., *Assistant Professor of Dairy Husbandry*
B.S., Purdue university, 1923; M.S., University of Minnesota, 1925.

Morrow, Kenneth S., *Professor of Dairy Husbandry*
B.S., University of Minnesota, 1918; M.S., *ibid.*, 1925.

Nulsen, William B., *Assistant Professor of Electrical Engineering*
B.S., California Institute of Technology, 1918; M.S., University of New Hampshire, 1930.

O'Kane, Walter C., *Professor of Entomology*
B.A., Ohio State university, 1897; M.A., *ibid.*, 1909; D.Sc. (hon.), *ibid.*, 1932.

Parker, Clifford S., *Professor of Languages*
A.B., Harvard university, 1912; A.M., *ibid.*, 1914; Ph.D., Columbia university, 1925.

Partridge, Allan B., *Assistant Professor of History*
A.B., Clark university, 1922; A.M., *ibid.*, 1923; graduate study, Harvard university, 1939.

Phillips, Thomas G., *Professor of Agricultural and Biological Chemistry*
B.S., Ohio State university, 1912; M.S., *ibid.*, 1913; Ph.D., University of Chicago, 1918.

Phillips, William T., *Assistant Professor of Economics*
A.B., Allegheny college, 1931; Ph.D., Cornell university, 1942.

Prince, Ford S., *Professor of Agronomy*
B.S., University of Illinois, 1913; graduate study, University of Wales, 1938.

RICHARDS, ALFRED E., *Professor of English*
A.B., Yale university, 1898; A.M., *ibid.*, 1900; PH.D., University of Munich, Germany, 1904; graduate study, University of California, summer 1917, 1927; Columbia university, 1920.

RICHARDS, MATHIAS R., *Assistant Professor of Botany*
B.S., Utah State Agricultural college, 1933; PH.D., Cornell university, 1938.

RICHARDSON, EDYTHE T., *Assistant Professor of Zoology*
B.S., University of New Hampshire, 1922; M.S., *ibid.*, 1924.

RITZMAN, ERNEST G., *Research Professor in Animal Husbandry*
B.S.A., Iowa State college, 1903; M.S. (hon.), University of New Hampshire, 1928.

RUDD, HERBERT F., *Professor of Philosophy*
A.B., Central college, Iowa, 1900; B.D., University of Chicago, 1903; M.A., *ibid.*, 1913; PH.D., *ibid.*, 1914.

SACKETT, EVERETT B., *Associate Professor of Education*
B.A., Hamline university, 1923; M.A., University of Minnesota, 1925; PH.D., Columbia university, 1931.

SCHAEFER, PAUL E., *Assistant Professor of Zoology*
A.B., Bethany college, 1926; M.S., Ohio State university, 1931; PH.D., *ibid.*, 1936.

SCHOEDINGER, PAUL S., *Assistant Professor of English*
A.B., Princeton university, 1920; M.A., Ohio State university, 1921; PH.D., Yale university, 1940.

SCHOOLCRAFT, JAMES T., JR., *Assistant Professor of Languages*
B.S., Union college, 1923; Abgangs-Zeugnis, Heidelberg university, 1924; A.M., Columbia university, 1926.

SCUDDER, HAROLD H., *Professor of English*
B.S., Dartmouth college, 1903; study at Cambridge university, England, 1936.

SHIMER, STANLEY R., *Assistant Professor of Agricultural and Biological Chemistry*
B.S., Muhlenberg college, 1918; M.S., Pennsylvania State college, 1923; graduate study, Cornell university, 1929-30.

SKELTON, RUSSELL R., *Associate Professor of Civil Engineering*
B.S., in civil engineering, Purdue university, 1923; C.E., *ibid.*, 1934; S.M., in engineering, Harvard university, 1939.

SLANETZ, LAWRENCE W., *Associate Professor of Bacteriology*
B.S., Connecticut State college, 1929; PH.D., Yale university, 1932.

SLOBIN, HERMON L., *Professor of Mathematics*
A.B., Clark university, 1905; PH.D., *ibid.*, 1908; study at Cambridge university, England, and in Europe, 1932.

SMITH, HARRY W., *Professor of Economics*
A.B., Hamilton college, 1908; A.M., *ibid.*, 1912; A.M., Columbia university, 1920; Auburn Theological seminary, 1911; studied under appointment of Carnegie Endowment for International Peace, in Europe, 1926.

SMITH, WILLIAM W., *Assistant Professor of Horticulture*
B.S., University of New Hampshire, 1924; M.S., *ibid.*, 1929; PH.D., Michigan State college, 1935.

SOLT, MARVIN R., *Associate Professor of Mathematics*
B.S., Lehigh university, 1918; M.S., *ibid.*, 1925; graduate study, University of California, 1938-39.

STEWART, GLENN W., *Instructor in Geology*
B.S., University of New Hampshire, 1935; M.S., Syracuse university, 1937; graduate study, Harvard university, 1937-38.

STOWE, A. MONROE, *Professor of Education*
PH.B., Northwestern university, 1903; A.M., *ibid.*, 1904; A.M., Harvard university, 1905; PH.D., Columbia university, 1909.

SWANSON, C. LOYAL W., *Instructor in Agronomy*
B.A., Coe college, 1933; M.S., Iowa State college, 1938; PH.D., *ibid.*, 1941.

TEPPER, ALBERT E., *Assistant Professor of Poultry Husbandry*
B.S., Pennsylvania State college, 1928; M.S., University of New Hampshire, 1930; PH.D., University of Maryland, 1941.

THUT, I. N., *Assistant Professor of Education*
B.S., College of Wooster, 1929; M.ED., University of Buffalo, 1938; PH.D., Ohio State university, 1940.

TIRRELL, LORING V., *Professor of Animal Husbandry*
B.S., Massachusetts Agricultural college, 1920; graduate study, *ibid.*, 1940-41. (Entered military service, 1942)

TORGESEN, JOHN L., *Assistant Professor of Chemistry*
B.S., University of Idaho, 1935; M.S., *ibid.*, 1937; PH.D., Columbia university, 1942.

TOWLE, CARROLL S., *Associate Professor of English*
A.B., Bowdoin college, 1922; PH.D., Yale university, 1933.

WALSH, JOHN S., *Associate Professor of Languages*
A.B., Harvard college, 1915; M.A., Boston university, 1928.

WALTER, DAVID O., *Assistant Professor of Government*
A.B., Williams college, 1931; A.M., Harvard university, 1933; PH.D., *ibid.*, 1937; part-time study, Illinois Law school, 1937-40.

WARFEL, HERBERT E., *Assistant Professor of Zoology*
A.B., Western State college, Colorado, 1926; M.S., Oklahoma university, 1928; graduate study, Cornell university, 1937-38.

*WOOD, HOWARD D., PH.D.
Principal, Hope High School, Providence, Rhode Island.

WOODRUFF, RUTH J., *Associate Professor of Economics*
A.B., Bryn Mawr, 1919; A.M., *ibid.*, 1920; PH. D., Radcliffe, 1931.

WOODWORTH, HARRY C., *Professor of Agricultural Economics*
B.S., University of Illinois, 1909; M.S., Cornell university, 1916; study under social science research fellowship, Harvard university, 1929-30.

YALE, WILLIAM, *Assistant Professor of History*
PH.B., Sheffield Scientific school, Yale university, 1910; M.A., University of New Hampshire, 1928.

YEAGER, ALBERT F., *Professor of Horticulture*
B.S., Kansas State college, 1912; M.S., Oregon Agricultural college, 1916; PH.D., Iowa State college, 1936.

ZIMMERMAN, OSWALD T., *Professor of Chemical Engineering*
B.S.E. (Ch.E.), University of Michigan, 1929; M.S.E., *ibid.*, 1931; PH.D., *ibid.*, 1934.

*Summer school, 1942.

THE GRADUATE SCHOOL

RULES AND REGULATIONS

Admission to the Graduate school may be granted to graduates of all colleges and universities of approved standing provided their undergraduate records are satisfactory. Before entering upon graduate work in any division the applicant must present evidence to the effect that he has had the necessary prerequisite training that will enable him to pursue with profit the courses desired. A candidate for admission who intends to work for a master's degree must have had an undergraduate average of not less than 75 throughout his entire program of study. This requirement may be waived in the case of a mature college graduate who gives evidence of adequate professional experience or advanced study since graduation from an undergraduate program, upon petition to the executive committee. 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 course 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 not be less than one semester or two summer sessions. Admission to candidacy for a degree will be determined by the executive committee.

TUITION AND FEES

Tuition is $156 for residents of New Hampshire and $256 for non-residents. Tuition is paid in advance in two equal installments, one on the first day of each semester.

A diploma fee of $5 is charged upon graduation. Charges will be assessed for extraordinary breakage or damage. No laboratory or course fees are charged. Payment of the full tuition entitles the student to admission to all varsity athletic games and contests.

Members of the regular staff and their immediate families electing work in the Graduate school shall be required to pay only $2.60 per credit for eight or less semester credits, or, in the case of graduate assistants, nine semester credits, eleven or less semester credits if Education 161 or 162 is included in the student's registration schedule additional to the 30 credits required for a degree.

Members of the regular college staff and their immediate families electing nine or more semester credits in the colleges of agriculture and technology, and eight or more credit hours in the college of liberal arts, or more than eight credit hours (nine semester credit hours for graduate assistants or eleven for those registering for Education 161 or 162 as noted above) in the graduate school, shall be granted staff scholarships of $75.00 per semester for residents of New Hampshire.

Residents of New Hampshire, not members of the university staff or of their immediate families, who elect less than eight credits in the Graduate school will be expected to pay a registration fee of $1 and a charge of $5.25 for each credit.

Non-residents of New Hampshire registering in the Graduate school for less than eight credits shall be required to pay a registration fee of $2 and tuition at the rate of $10.50 a credit.

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 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 full tuition scholarships are available to legal residents of New Hampshire. These scholarships are granted to students of superior ability who are in need of financial assistance to pursue graduate study. 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 scholarship for the subsequent semester.

The candidates for tuition scholarships must fill out an application form available from the dean of the Graduate school. Completed forms must be filed in the Graduate school office at least twenty-four hours preceding the examination which will be given May 11th. Candidates for these examinations should report to 213 Thompson Hall at 1:45 P. M. If all the scholarships are not awarded to those taking the examination on May 11th, a second examination will be held on September 28th at the same hour and place.

SUPPLIES

Books, drawing instruments, and instructional materials may be purchased at the university bookstore in Thompson Hall.

ROOMS

Because of the congestion of undergraduate students in the dormitories of the university, it is impossible to guarantee reservation of rooms to graduate students. Rooms may be secured in private houses at prices from $85 to $150 a year.

BOARD

The university operates on a self-service basis a modern, well-appointed commons. Regular weekly board and cafeteria service are provided. Exact cost records are kept, and prices adjusted in such a manner as to give students the advantage of changing costs.

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.

ADVANCED DEGREES

The advanced degreees 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.

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.

For any master's degree except that of Ed. M., the candidate must earn not less than 12 semester credits in the courses primarily for graduate students (numbered 101-200 or thesis), and not more than 10 semester credits in courses outside of those offered by his division.

If a student does his work in the general field of a division, he must meet the special requirements of the division and his program must be approved by the chairman of the division and the dean of the school.

If a student does his major work in a single subdivision, he must meet the requirements of that subdivision, and his program must be approved by the advisor, the chairman of the division, and the dean of the school.

The advisor is assigned to the student at registration by the chairman of the division and the dean.

To obtain the degree of master of education, the student must meet the requirements of that division, and his program must be approved by the chairman of the division and the dean of the school.

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

GRADES.—The passing grade in the Graduate school is 70. An average grade of at least 80 is required in all graduate courses, except thesis, which a candidate offers for the degree.

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.

THESIS

If a thesis is required, the candidate must file with the executive committee, for its approval, a statement of the subject not later than January 15th of the year the degree is to be conferred. No credit shall be given until the completed thesis has been approved. The thesis must be approved by a committee of at least three members, named by the division chairman, and including the division chairman and the student's advisor.

All theses must be typewritten upon standard paper, eight and one-half by eleven inches, medium weight. The title page should bear the following statement:

"A thesis submitted to the University of New Hampshire in partial fulfillment of the requirements for the degree of

master of arts
master of science
master of education
master of science in engineering."

Whenever a thesis is printed, it must, if possible, be designated as having been accepted as a master's thesis by the University of New Hampshire.

Two copies of the approved thesis ready for binding, and an approved abstract of not more than 750 words, shall be turned in to the Graduate school office not less than five days before commencement, together with a treasurer's office receipt for binding fee.

EXAMINATIONS

A candidate for a degree must meet the regular requirements as to examinations in the courses for which he is registered, and such further requirements as may be imposed by the university department, or the division in which he has taken his work.

DESCRIPTION OF SUBJECTS

Subjects numbered 51-100 are open to advanced undergraduates and graduate students. Names of the instructors of subjects numbered 51-100 are omitted in this catalog. Subjects numbered 101-200 are primarily for graduate students.

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

Cr.	Credit
Lab.	Laboratory
Lec.	Lecture
Prereq.	Prerequisite
Rec.	Recitation

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 with special needs or qualifications may at times be allowed to take certain courses for fewer than the number of credits shown in the course descriptions. This may be done only on the written recommendation of the head of the department offering the course and with the approval of the division chairman and the dean of the school.

DIVISION OF BIOLOGICAL SCIENCES

Lawrence W. Slanetz, *Associate Professor of Bacteriology,* Chairman; Fred G. Allen, *Assistant Professor of Poultry Husbandry;* T. Burr Charles, *Professor of Poultry Husbandry;* Nicholas F. Colovos, *Assistant Professor of Animal Husbandry;* James G. Conklin, *Assistant Professor in Entomology;* Alan C. Corbett, *Instructor in Poultry Husbandry;* H. Gilbert Crecelius, *Instructor in Bacteriology;* Charles G. Dobrovolny, *Assistant Professor of Zoology;* Stuart Dunn, *Assistant Professor of Botany;* William R. Eadie, *Assistant Professor of Zoology;* Leon C.

GLOVER, *Assistant Professor of Entomology;* JESSE R. HEPLER, *Associate Professor of Horticulture;* CARL W. HESS, *Instructor in Poultry Husbandry;* ALBION R. HODGDON, *Associate Professor of Botany;* C. FLOYD JACKSON, *Professor of Zoology;* HARRY A. KEENER, *Instructor in Animal and Dairy Husbandry;* L. PHELPS LATIMER, *Assistant Professor of Horticulture;* MARIAN E. MILLS, *Assistant Professor of Botany;* HERBERT C. MOORE, *Assistant Professor of Dairy Husbandry;* KENNETH S. MORROW, *Professor of Dairy Husbandry;* WALTER C. O'KANE, *Professor of Entomology;* FORD S. PRINCE, *Professor of Agronomy;* MATHIAS C. RICHARDS, *Assistant Professor of Botany;* EDYTHE T. RICHARDSON, *Assistant Professor of Zoology;* ERNEST G. RITZMAN, *Research Professor in Animal Husbandry;* PAUL E. SCHAEFER, *Assistant Professor of Zoology;* WILLIAM W. SMITH, *Assistant Professor of Horticulture;* C. LOYAL W. SWANSON, *Instructor in Agronomy;* ALBERT E. TEPPER, *Assistant Professor of Poultry Husbandry;* HERBERT E. WARFEL, *Assistant Professor of Zoology;* ALBERT F. YEAGER, *Professor of Horticulture.*

A thesis is required of all graduate students except those who do their work in the general field of the division. No more than 10 credits shall be granted for thesis work. A final oral examination is required of all candidates for the Master of Science degree in the division.

AGRONOMY

51, 54. AGRONOMY SEMINAR. Library and reference work on special phases of soil and crops problems. Practice in looking up literature and in preparation of reports and abstracts.

Prereq.: Agron. 1, 2, 3-4. Number of credits and hours to be arranged.

56. FOREST SOILS. A study of the relationship between soils and forestry, which includes a study of soil type and group identification, identification and analysis of the forest floor and of forest soils, the use of the soil survey for purposes of the forester and a discussion of the fertilization of forest soils.

Prereq.: Chem. 1, Agron. 1 and certain forestry courses. 1 lec.; 2 lab.; 3 cr.

58. SOIL CLASSIFICATION AND MAPPING. A study of the origin, morphology, classification and mapping of soils. Consideration is given to the development of the Great Soil Groups of the world, including their influences

on the agriculture that has developed thereon, and special emphasis will be devoted to the soils of New Hampshire in classification, mapping and the relation of the various groups to crop production.

Prereq.: Agronomy courses at the discretion of the instructor.
1 lec.; 2 lab.; 3 cr.

60. Soil Conservation. The effects and control of erosion in the United States, including a study of the causes of erosion, cropping systems, fertilizer practices and structural devices that have been found of importance in controlling erosion and in preserving the value of the soil for future generations.

Prereq.: Agron. 1 and 2, and either 3 or 4. 1 lec.; 2 lab.; 3 cr.

101, 102. Agronomy. Studies in comparative agronomy. The forage crops of the temperate zone. Origin and classification of the varieties grown. Germination, growth, and maturation of crops; modifications induced by climate and management. Mr. Prince.

Prereq.: A major in agronomy or its equivalent. Conferences, laboratory and field work. Hours to be arranged. 3 cr.

ANIMAL INDUSTRY

51. Animal Breeding. The principles and practices of breeding farm animals, including cross-breeding, in-breeding, selection, inheritance, breed analysis, reproductive efficiency, fertility, sterility, Mendelism in relation to farm animals, acquired characters and variation. Practice is given in tracing and studying pedigrees.

2 lec.; 1 lab.; 3 cr.

52. Animal Husbandry Seminar. Library and reference work and the preparation of papers on various animal husbandry subjects.

Prereq.: Animal husbandry 51. Hours and credits to be arranged.

60. Dairy Seminar. Recent experiment station and other literature covering the field of dairying. Practice in looking up literature and in the preparation of oral and written reports. 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.

Prereq.: Adequate preparation in chemistry and bacteriology.
2 lec.; 2 cr.

64. Milk Production. Feeding and management of dairy animals, calf feeding, raising young stock, feeding for economical milk production.

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. 2 lec.; 1 lab.; 3 cr.

66. Ice Cream. The making, handling, and marketing of ice cream and ices. 2 lec.; 1 lab.; 3 cr.

101. Animal Nutrition. Incidental lectures, assigned reading, laboratory practice in methods of research with major emphasis on basal metabolism. Mr. Ritzman and Mr. Colovos.

Prereq.: A major in animal or dairy husbandry, or equivalent.
3 cr.

102. Advanced Dairy Cattle. Special emphasis will be given to the analysis and formulating of breeding programs and to milk secretion and factors influencing the quantity and quality of milk. Mr. Morrow.

Prereq.; A major in animal husbandry or dairy husbandry.
2 lec.; 1 lab.; 3 cr.

103. Animal Histology. A cellular study of the normal structure of the tissues of the animal's body. Microscopic slides showing the normal tissues will be studied in the laboratory. Mr. Allen.

Prereq.: Zoology 16, or equivalent. 2 lec.; 1 lab.; 3 cr.

104. General Pathology. This course is designed to give a general understanding concerning the alterations in normal structures and functions of the different organs of the body caused by disease processes. Microscopic tissue slides showing these processes will be studied in the laboratory. Mr. Allen.

Prereq.: Animal husbandry 6, or equivalent. 2 lec.; 1 lab.; 3 cr.

105. Problems in Animal Breeding. Studies in practical breeding problems with beef and dual-purpose cattle, sheep, horses, and hogs. The

genetic principles important to successful livestock production will be emphasized. Mr. Tirrell.

Prereq.: A major in animal husbandry or dairy husbandry. 2 lec.; 1 lab.; 3 cr.

106. Meats, Livestock Markets and Products. The essential factors in meat selection, cutting, curing, and smoking; study and discussion relative to the problems of livestock marketing and the procedure in the large central markets. Trips are taken to various packing plants. Mr. Tirrell.

Prereq.: A major in animal husbandry or dairy husbandry. 2 lec.; 1 lab.; 3 cr.

107. Technical Control. Chemical and bacteriological laboratory methods used in the technical control of milk and milk products. Mr. Moore.

Prereq.: Dairy husbandry 10, or equivalent. 2 lec.; 1 lab.; 3 cr.

109, 110. Special Problems in Dairy Manufacture. Detailed study of some special phase of dairy manufacturing. Mr. Moore.

Prereq.: A major in dairy husbandry. Conferences and special assignments. 3 cr.

111, 112. Special Problems in Dairy Production. Study of some special phase of breeding or feeding as related to dairy herd management. Mr. Morrow.

Prereq.: A major in animal husbandry or dairy husbandry. Conferences and special assignments. 3 cr.

BACTERIOLOGY

51. Pathogenic Bacteriology and Serology. The morphological, cultural, biochemical, and serological characteristics of pathogenic micro-organisms. Practical serological technique for disease diagnosis and identification of bacteria.

Prereq.: Bacteriology 2. 2 lec.; 2 lab.; 4 cr.

55, 56. Advanced Bacteriology. Special problems, depending upon the training and desire of the student. Elective only upon consultation.

Prereq.: Bacteriology 2 and chemistry 54, or equivalent. Credits to be arranged.

57, 58. Bacteriology Seminar. Reports and dsicussions on current literature and recent developments in bacteriology.

Prereq.: Bacteriology 2 and consent of instructor. One 2-hour period. 1 cr.

101. Physiology of Bacteria. A study of the growth, nutrition, and metabolism of bacteria; influence of physical and chemical environment on growth; bacterial enzymes; protein decomposition and fermentation. Mr. Crecelius.

Prereq.: Bacteriology 55, 56, or equivalent. 3 lec.; 3 cr.

102. Food and Sanitary Bacteriology. Types and characteristics of bacteria, yeast and molds in foods; methods of food preservation; food infections and intoxications; laboratory methods for the microbiological examination of spoiled foods. Bacteriological and public health aspects of eating utensils sanitation; water supply, swimming pool, lake and salt water sanitation; sewage and garbage disposal; and industrial wastes. Mr. Slanetz.

Prereq.: Bacteriology 55, 56, or equivalent. 3 lec.; 3 cr.

104. Systematic Bacteriology. A study of the development of a systematic classification of bacteria; modern methods of nomenclature and classification; problems encountered in the classification of bacteria. Mr. Slanetz.

Prereq.: Bacteriology 55, 56, or equivalent. 2 lec.; 2 cr.

BOTANY

51. Plant Pathology. Nature of disease in plants; etiology, symptomatology, and classification of plant diseases.

Prereq.: Botany 1 and 2. 1 lec.; 2 lab.; 3 cr.

52. Principles of Plant Disease Control. Studies in the principles of plant disease control, exclusion, eradication, protection, and immunization; and in the specific, practical methods used to control plant disease.

Prereq.: Botany 1 and 2. 1 lec.; 2 lab.; 3 cr.

53, 54. Advanced Botany. The subject matter will depend upon the training and desire of the student. Elective only upon consultation. Credits to be arranged.

55. Advanced Systematic Botany. The higher plants of our native flora. The student is required to collect an herbarium of 60 specimens.

Prereq.: Botany 1. Occasional lectures, laboratory work, field trips. 4 cr.

101. The Chlorophyll-bearing Cryptogams. Morphology and physiology of the ferns, mosses, liverworts, and algae with special reference to the representative forms most commonly met. Miss Mills.

Prereq.: Botany 1-2. 1 lec.; 2 lab.; 3 cr.

102. Plant Ecology. Requirements for growth; specialization and adaptation; geographic and physiographic relations. Regional floras. Interpretation and classification of habitat. Specific problems are assigned. Mr. Hodgdon.

Prereq.: Botany 52. Incidental lectures, laboratory and field work. 4 cr.

103. Mycology. Studies of the parasitic and saprophytic fungi, their growth, reproduction, and identification. Mr. Richards.

105. Advanced Plant Physiology. Absorption, conduction, transpiration, and excretion of water, and effect of environmental factors upon these phenomena; mineral nutrition; carbon and nitrogen assimilation. Mr. Dunn.

Prereq.: Botany 4. Laboratory and assigned reading. 4 cr.

106. Advanced Plant Physiology. Digestion of carbohydrates, fats, and proteins; respiration and fermentation; effect of external conditions on growth; paratonic and autonomous movements. Mr. Dunn.

Prereq.: Botany 4. Laboratory and assigned reading. 4 cr.

107. Advanced Plant Histology. A methods course in embedding, sectioning, and staining the fungi and tissues of higher plants. Mr. Richards.

Prereq.: Botany 1. Laboratory and assigned reading. 3 cr.

ENTOMOLOGY

The following courses represent a sequence of studies arranged to include such branches as insect anatomy, insect toxicology, insect physiology, details

of taxonomy, insect behavior, insect ecology, problems of dispersion, the organization of research, the organization of regulatory measures, and other phases involved in professional entomology.

51. Insects of Orchard and Garden. The application of methods of insect control of typical injurious species. Life histories and habits of important insect pests of orchard, garden, and certain field crops. Adapted especially for students in horticulture and in general agriculture.

Prereq.: Entomology 6. 1 lec.; 1 lab.; 2 cr. (Given in alternate years; not offered in 1942-43.)

53. Insects of Domestic Animals. The insect enemies of domestic livestock; the life histories, habits, and means of control. Adapted especially for students in animal husbandry.

Prereq.: Entomology 6. 1 lec.; 1 lab.; 2 cr. (Given in alternate years; offered in 1942-43.)

54. Household Insects, Medical Entomology. The life histories, habits and means of control of insects of the household and of stored products. The relation of insects to disease. 1 lec.; 1 lab.; 2 cr.

56. Forest Insects. The life histories and habits of the more destructive forest insects and means of their control.

Prereq.: Entomology 6. 1 lec.; 1 lab.; 2 cr.

57-58. Advanced Entomology. The anatomy and physiology of insects. The orders and families of insects.

Open to students only by permission of the head of the department. 2 lec.; 2 lab.; 4 cr.

59-60. Advanced Economic Entomology. Problems involved in applied entomology. The literature of economic entomology. Investigational methods. Practice in arranging projects. Studies in the specialized phases of entomology.

Open to students only by permission of the head of the department. Hours and credits to be arranged.

101, 102. Graduate Entomology. Mr. O'Kane, Mr. Glover, Mr. Conklin. Hours and credits to be arranged.

103, 104. Graduate Entomology. Mr. O'Kane, Mr. Glover, Mr. Conklin. Hours and credits to be arranged.

HORTICULTURE

Students will find the department well equipped for fundamental research on horticultural problems.

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.

Students must obtain permission to register from the head of the department. Hours and credits to be arranged.

53. Pomology: Orchard Fruits. Fundamental principles and experimental data and their applications to orchard problems such as establishing orchards, growth and rest periods, water requirements, soil management, pruning, fruit bud formation, fruit-setting pollination, thinning, and winter injury.

Prereq.: Botany 1. 3 lec.; 3 cr.

54. Pomology: Small Fruit Culture. The culture and economic uses of the strawberry, raspberry, blackberry, blueberry, and grape. Each fruit is considered with relation to its history, propagation, planting, pruning, harvesting, marketing, insects and diseases, and domestic uses.

Elective for any student. 2 lec.; 2 cr.

55. Systematic Survey of Fruits. Important species of fruits and nuts of temperate regions and their botanical relationships. The history, distribution, and merits of each species, and the horticultural varieties developed from it.

Prereq.: Botany 1-2. 2 lec.; 2 cr. (Given in alternate years; offered in 1942-43.)

57. Systematic Survey of Vegetables. Important species of vegetables and culinary herbs and their botanical relationships. The history, distribu-

tion and commercial merit of each species and the horticultural varieties developed from it.

Prereq.: Botany 1-2. 2 lec.; 2 cr. (Given in alternate years; not offered in 1942-43.)

61. Harvesting 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.

Elective for any student. 2 lec.; 1 lab.; 3 cr.

65. Commercial Vegetable Production. The management of commercial vegetable gardens. A study of the important vegetables and their culture including a comprehensive review of recent experimental work in the vegetable field.

Prereq.: Horticulture 14. 2 lec.; 1 lab.; 3 cr.

91, 92. Horticulture Seminar. A review of recent horticultural literature and methods of investigational work. Students required to prepare and present papers on selected topics.

Students must obtain permission to enroll. 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.

Prereq.: Zoology 49. Elective for any student. 2 lec.; 2 cr.

101. Flower Bud Formation. The influence of soil management, orchard fertilization, and resultant chemical composition of fruit plants, on flower bud formation and alternate bearing. Mr. Latimer.

Prereq.: Agricultural chemistry 2, horticulture 53. 2 rec.; 2 cr.

102. Methods of Horticultural Research. An examination of methods used in laboratory and field by horticultural investigators. Mr. Yeager and staff.

Prereq.: Agricultural chemistry 2, botany 4, horticulture 53 or 65, mathematics 5-6 or 21-22. 2 rec.; 2 cr.

103. Winter Injury. The physiology of winter injury to plants. Mr. Smith.

Prereq.: Botany 4, horticulture 53 or 65. 2 rec.; 2 cr.

104. Propagation and Growth. The problems of water relations, rest period, propagation, pruning, and thinning orchard fruits. Mr. Smith.

Prereq.: Agricultural chemistry 2, botany 4, horticulture 53 or 65. 2 rec.; 2 cr.

106. Pollination and Fruit Setting. Genetical and environmental factors affecting the production of fruit. Mr. Latimer.

Prereq.: Botany 4 (may be taken concurrently), horticulture 53, zoology 49. 2 rec.; 2 cr.

108. Vegetable Problems. A study of the physiological problems involved in vegetable production. Mr. Hepler.

Prereq.: Botany 4 (may be taken concurrently), horticulture 53 or 65. 2 rec.; 3 cr.

125, 126. Research in Horticulture. Mr. Yeager and staff.

Prereq.: Horticulture 102 (may be taken concurrently). Credits to be arranged.

POULTRY HUSBANDRY

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 solutions. Hours and credits not to exceed three, are to be arranged.

101, 102. Poultry Pathology and Diseases. A study of the cause and effects of disease applied to the body as a whole. Lectures supplemented by laboratory demonstrations of the basic pathology of diseased tissue. A detailed discussion of diagnosis, prevention, control and treatment of poultry diseases. Mr. Allen and Mr. Corbett.

Prereq.: Poultry Husbandry 25. bacteriology 2, and Zoology 53 and 54. (Zoology 53, 54 may be taken simultaneously with Poultry Husbandry 101, 102.) 3 lec.; 3 cr.

103, 104. Advanced Poultry Science. A comprehensive study of (1) the inheritance of morphological and physiological characters in poultry; (2) problems involved in the production, processing and sale of poultry products, and (3) the study of metabolism and physiology of digestion with special emphasis on mineral needs and deficiency diseases of poultry. Mr. Hess, Mr. Charles, and Mr. Tepper.

Prereq.: Poultry Husbandry 16, 19, and 20, or their equivalent. 2 lec.; 1 lab.; 3 cr.

105, 106. Seminar. A survey of recent literature and research in poultry husbandry. Department staff. 1 cr.

ZOOLOGY

53. Histology. This course gives the students a familiarity with the microscopic anatomy of the principal tissues and organs of vertebrates. Adapted to the needs of the general students and those intending to study medicine.

Prereq.: Biology 1, 2 and one year of zoology and permission of the instructor. 2 lec.; 2 lab.; 4 cr. (Formerly given as first semester course, 53-54, *Histology and Development.*)

54. Embryology. A study of the fundamental principles of development. The origin of the individual and the developmental process from the egg to the formation of the body and the establishment of the principal organs and systems. The laboratory work includes a study of type forms of embryos.

Prereq.: Biology 1, 2 and one year of zoology. 2 lec.; 2 lab.; 4 cr. (Formerly given as second semester course 53-54, *Histology and Development,*)

55. Invertebrate Zoology. A survey of the major invertebrate groups with special emphasis on the anatomy and physiology of free-living forms. The evolution of the various phyla and their ecological relationships will be considered.

Prereq.: One year's work in biology and permission of the instructor. 2 lec.; 2 lab.; 4 cr. (Not open to students who have had Zoology 51, 52.)

56. 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 for study in the laboratory.

Prereq.: One year's work in biology and permission of the instructor. 2 lec.; 2 lab.; 4 cr.

57-58. Laboratory Technique. A general laboratory course in methods used in preparation of zoological material; microscopic slides, mounting embryos, making serial sections, etc. Will be adapted to individual needs as far as possible.

Prereq.: 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.

Prereq.: Biology 1, 2 and one year of zoology. 3 lec. or rec.; 3 cr. (3 lec. or rec.; 1 lab.; 4 cr., by permission of the instructor.)

61-62. Heredity and Variation. A detailed study of the cell, including morphology, the chemical and physical nature of protoplasm, mitosis, meiosis, syngamy, and related phenomena leading up to the physical basis of inheritance of quantitative characters and the types and causes of variations.

Prereq.: Biology 1, 2 and one year of zoology. 3 lec. or rec.; 1 lab.; 4 cr. (Given in alternate years; offered in 1942-43.)

63, 64. Neurology. A comparative study of the nervous systems of the lower animals and a detailed practical study of the morphology, physiology, and histology of the human nervous system.

Prereq.: Biology 1, 2 and one year of zoology. 3 lec. or rec.; 1 lab.; 4 cr. (Given in alternate years; not offered in 1942-43.)

71, 72. Biology and Taxonomy of the Vertebrates. The habits, habitat, life history, and economic importance of vertebrate animals with emphasis on identification. Field methods and technique will be considered.

A basic course for students interested in fish and game management, for forestry students, and teachers of biology.

Prereq.: Permission of the instructor. 3 lec. or rec.; 1 lab.; 4 cr.

91. Biology-Education (bio-ed). Problems in the Teaching of High School Biology. The objectives and methods of teaching high school biology. The selection and organization of subject matter, the use of visual aids, the setting up of aquaria and other class projects will be stressed.

Prereq.: Permission of the head of the department. 3 rec.; 3 cr.

*92. Biology-Education (bio-ed) Biology and the Problems in the Teaching of Biology in the High School. A general survey of the course of study, methods of presenting the subject, choice of subject-matter, collection and preparation of illustrative material, and organization of laboratory and demonstration purposes.

Prereq.: Some teaching experience or training in biology or by permission of the instructor. 3 cr.

95. Limnology. The aquatic life of fresh water ponds and streams with special reference to economically important food and game fishes, adapted primarily for students who are interested in fish and game management, wild life conservation and in teaching of biology.

Prereq.: Permission of the instructor. 1 conference; assigned laboratory work; 4 cr.

96. Problems of Conservation Research. Open to advanced students or those who show unusual promise in the field of research. Problems in all phases of conservation work and specifically in applied chemistry, zoology, ecology, genetics, limnology and silviculture. Nature of problems to be determined by the need of the New Hampshire fish and game department for research and the background and interests of individual students. Representative from the New Hampshire fish and game department.

Prereq.: Permission of the instructor. 1 conference, 2 lab.; 4 cr.

*Not offered in 1942-43, but offered in the 1942 Summer School.

97, 98. Special Problems and Seminar. Seminar discussions on current zoological literature conducted each week. Advanced students may elect a special problem provided they present a detailed outline of the subject and can furnish adequate proof of their ability to carry it out with equipment available.

Prereq.: Permission of the instructor. 1-4 cr.

101, 102. Advanced Vertebrate Taxonomy and Economic Field Zoology. A critical examination of select groups of vertebrates with special reference to local forms, their classification, distribution, and general ecology. The laboratory work will deal with economic field zoology and will consist of special life history studies, detailed ecological surveys of local areas, control of injurious animals, food habit studies, census taking, and study factors controlling animal numbers. Mr. Jackson and Mr. Eadie.

Prereq.: Three years' work in zoology. 2 rec.; 2 lab.; 4 cr.

105, 106. Neurology. A detailed study of the morphology and physiology of the nervous system of vertebrates with special emphasis on the histology and physiology of the human nervous system. Mrs. Richardson.

Prereq.: Three years' work in zoology. 3 rec.; 1 lab.; 4 cr.

107, 108. Biology of Development. A study of the factors involved in the structure of the cell, histogenesis, and in organogeny. The problems related to cell structure and function will be discussed. Cell specificity, physiological maturity, symmetry, organization, rate of development and maturation will be considered. Mr. Dobrovolny.

Prereq.: Histology and embryology. 2 rec.; 2 lab.; 4 cr.

111, 112. Problems in Biology. This course involves reading, laboratory work, and conferences on special problems approved by the staff. Mr. Jackson, Mr. Dobrovolny, Mr. Schaefer, Mr. Warfel, Mr. Eadie.

Prereq.: Permission of the head of the department. 1 to 4 cr.

113, 114. Fish Breeding and Hatchery Practices. Advanced work in limnology including the management of fish hatcheries, hatchery practices, and principles of stocking fresh water streams and ponds. Mr. Warfel.

Prereq.: 3 years' work in biology and permission of the instructor. 2 lec.; 1 lab.; 3 cr.

DIVISION OF EDUCATION

A. Monroe Stowe, *Professor of Education,* Chairman; Bjornar W. Bergethon, *Associate Professor of Music;* Harlan M. Bisbee, *Associate Professor of Education;* Howard R. Jones, *Associate Professor of Education;* Helen F. McLaughlin, *Professor of Home Economics;* Shelby A. Mitcham, *Assistant Professor of Home Economics;* Everett B. Sackett, *Associate Professor of Education;* I. N. Thut, *Assistant Professor of Education.*

The graduate work of students in education is designed to supplement their undergraduate studies in such ways as to prepare them most effectively for the professions of secondary school teaching or public school administration.

For admission to candidacy for a master's degree in education, a student must present, in addition to a bachelor's degree, evidence of having satisfactorily completed (a) the course in psychology principles of secondary education or its equivalent, (b) eighteen semester credits in a teaching major subject, and (3) twelve semester credits in a first teaching minor subject.

Candidates for the master's degree in education must submit evidence of having satisfactorily completed the following courses in education or their equivalents either as undergraduate or graduate students:

Education 51, 52. Social Principles of Secondary Education. (6 cr.)

Education 61 or 62. Principles and Problems of Teaching in the Secondary School. (3 cr.)

Education 65. Educational Tests and Measurements. (3 cr.)

Education 76. Philosophy of Education. (3 cr.)

Education 91 or 92. (A course in problems in the teaching of the major subject, 3 cr.)

Education 91 or 92. (A course in problems in the teaching of the minor subject, 3 cr.)

The candidate must also present evidence of having taught successfully for three or more years, or, in lieu of such successful teaching, evidence of

having satisfactorily completed one semester of supervised teaching, Education 94. Graduate students successfully completing Education 94 with a grade of at least 75 will receive nine semester credits toward the master's degree. In the case of such students it will ordinarily require at least an academic year and a summer school session in which to meet the requirements of the master's degree in education.

51-52. Social Principles of Secondary Education. The educationally significant aspects and needs of modern democratic society. The organization, functions, curriculums, and outstanding problems of American institutions of secondary education.

Prereq.: Education 42. 3 rec.; 3 cr.

*55. General Educational Psychology. A general survey of the applications of psychology to the educational field. The relation of factors 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. 3 cr.

56. Education. Exceptional Children. A study of the characteristics and problems of intellectually atypical children. The first half of the course is devoted to a consideration of gifted children; the second half, to feebleminded and very dull children. Considerable attention is given to the educational procedures to be followed with respect to the two groups.

Prereq.: Psychology 11, or Psychology 31, or equivalent. 2 or 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.

Prereq.: Education 42. 3 rec.; 3 cr.

*Not offered in 1942-43, but offered in the 1942 Summer School.

*62. Problems of Teaching in the Secondary School. This course will include a consideration of the varied techniques which the progressive teacher in the senior and junior high school may use in managing, teaching, and testing boys and girls under modern classroom conditions. The medium and small-sized school, rather than the large city school, will be the center of study.

The following selected topics indicate the nature of the course: the objectives of secondary education; characteristics of adolescence; high school activities; individual responsibilities; personal relationship to staff members, pupils, parents; motivation of the work of students; the teacher's part in student organizations; research by the teacher; the problem child; classroom techniques; the question; the assignment; examinations; materials of instruction; estimating the work of pupils; the lesson plan; teacher-supervisor relationships; some unsolved problems of secondary education.

The work will be of interest and direct help to both the experienced and the inexperienced teacher of pupils above the sixth grade level. There will be informal lectures by the instructor, class discussions, required readings and individual reports. 3 cr.

(This course is not open to students who have had Education 61 within three years.)

*63. Sensory Aids in Teaching. This course is planned to help teachers who wish to employ in their classroom work such instructional aids as photographs, diagrams, posters, glass slides, film slides, silent films, sound films, and radio broadcasts.

The following subjects will be covered in illustrated discussions: the importance of supplementing the textbook in teaching; the classification of sensory aids; the evaluation of visual materials for projection; the glass slide as a teaching aid; the film projectors for still pictures; the opaque projector; the motion picture projector; the sound motion picture in education, and other practical problems in visual instruction. Inquiries relating to extending the use of visual aids will be welcomed. 3 cr.

65. Educational Tests and Measurements. The nature of measure-

*Not offered in 1942-43, but offered in the 1942 Summer School.

ment. The development of the testing movement and its significance to the teacher. Classification and evaluation of tests. Standardized tests in subject matter fields. The construction of tests including feasible procedures and writing everyday 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. 3 cr.

75. Character Education in the Schools. Environmental factors which exert an important influence upon pupils of adolescent and pre-adolescent age; the development of wholesome ideals, attitudes, habits, personality and character traits; direct and indirect methods of character development through school subjects, co-curricular, and extra-curricular activities.

Prereq.: Education 42. 2 rec.; 2 cr.

76. Philosophy of Education. The fundamental concepts and ultimate objectives of education, current educational doctrines and controversies, changes in educational procedures, historical background, and philosophical implications.

Prereq.: Education 51-52. 3 rec.; 3 cr.

*77. The Philosophy and Practice in Vocational Education. Economic and social backgrounds of vocational education. Function of vocational education in a democratic society and its relation to national welfare. Principles underlying teaching methods, curriculum construction, and administration in vocational education. Concrete illustrations demonstrating these principles in practice. 3 cr.

(84). Secondary Education in the Junior High School. The course is designed to trace the evolution of the junior high school and to contrast it with earlier forms of school organization. Among the topics discussed are the particular features and functions of the school; the educational objectives and philosophy underlying its program; the attempt to humanize adolescent education; the school's function in a democracy; the junior high school as a community center; articulation between the junior high school and the elementary and senior high schools. Considerable attention is given to the program of studies and the content of various courses of study in both small and large communities with the purpose of adapting this school

*Not offered in 1942-43, but offered in the 1942 Summer School.

unit to the problems of the present. Consideration will be given in this course to extra-classroom activities and their articulation with classroom procedures. Lectures, assigned readings, problems and discussions. 2 cr.

*85. Principles of 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. 3 cr.

*89. 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 adolescents, especially to those created by wartime conditions. 3 cr.

COURSES IN PROBLEMS IN THE TEACHING OF HIGH SCHOOL SUBJECTS

The following courses in professionalized subject matter 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. A student desiring to do supervised teaching must complete with a grade of at least 75 one of these courses in the subject in which he hopes to do supervised teaching. These courses are taught by instructors in the respective subject matter departments.

Agriculture-Education (ag-ed) 92. Problems in the Teaching of High School Agriculture. 3 lec.; 3 cr.

*Art-Education (art-ed) 91. The Teaching of Art in the Elementary School. A lecture demonstration and laboratory course intended for teachers in the elementary grades who wish to introduce art activities, in-

*Not offered in 1942-43, but offered in the 1942 Summer School.

dividual or group, into their classes. Simplified drawing, crafts, and design will be demonstrated with the objective of presenting definite projects for class use. Accepted methods of the selection, organization and evaluation of art activities in the various grades will be presented and discussed. 3 cr.

Biology-Education (Bio-Ed) 91. Problems in the Teaching of Biology in the High School. 3 cr.

*Biology-Education (Bio-Ed) 92. Problems in the Teaching of Biology in the High School. 3 cr.

English-Education (Eng-Ed) 91. Problems in the Teaching of High School English. 3 cr.

*English-Education (Eng-Ed) 92. Problems in the Teaching of High School English. 3 cr.

French-Education (Fr-Ed) 91. Problems in the Teaching of High School French. 3 cr.

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 will be developed with the subject matter presentations. There will be opportunity for students to participate in lecture demonstraions. 3 lec. or rec.; 3 cr.

History-Education (Hist-Ed) 91. Problems in the Teaching of High School History. 3 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.

Home-Economics-Education (He-Ed) 91. Problems in the teaching of High School Home Economics. 3 cr.

*Problems in Home Economics-Education (He-Ed) 92. *Unit I, New Methods of Teaching Consumer Buying in the Field of Clothing and Textiles,* 2 weeks; *Unit II, New Methods of Teaching Related Art in Clothing and Textiles,* 2 weeks; *Unit III, New Methods of Preparing and Using*

*Not offered in 1942-43, but offered in the 1942 Summer school.

Illustrative Material in Textile and Clothing Classes, 2 weeks. Students may register for the whole course or for any single unit. 3 cr. (1 cr. for each unit.)

Home Economics-Education (He-Ed) 94. Supervised Teaching in High School Home Economics.

Twelve weeks supervised teaching, 10 cr.

*95. Home Economics-Education. New methods of teaching the family and family relationships in the high school. This course is planned primarily for teachers in service, but others may be admitted by special permission. 3 cr.

Home Economics-Education (He-Ed) 96. Seminar in Home Economics Education. Methods of interpreting and adapting courses of study to the war emergency. 3 cr.

*97. Problems in Experimental Foods and Nutrition. Individual experimental investigation of factors affecting the cooking qualities or nutritive value of New Hampshire grown products. Problems planned and conducted in cooperation with the department of horticulture. Individual student reports on cooking qualities and nutritive value of food. This course may be taken more than once for credit. Meetings to be arranged. 2-4 cr.

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. Open to those who have taken or are taking another course in college Latin and recommended for prospective teachers of Latin.

3 rec.; 3 cr. (Formerly given as Latin 63-64.)

Mathematics-Education (Math-Ed) 91. Problems in the Teaching of High School Mathematics. 3 cr.

(Mu-Ed) 71. Music Teaching in the Elementary School. An integrated course dealing with problems involved in the organization of a well-rounded music program in the elementary grades, taught from the standpoint of the grade teacher. A study of inspirational song materials for units of

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work, fundamental skills in music, the child voice, teaching of rote songs and music reading, simple rhythmic experiences, diction, phrasing, interpretation, directing, and materials for different age levels to provide for individual differences. It gives essentials, standards and techniques for vitalization of elementary school music and should be especially helpful to grade school teachers in service. 3 cr.

*(Mu-Ed) 73. The Teaching of Elementary Grade Music from the Appreciative Basis. An investigation of the appreciative aspects of song literature and recorded music for elementary grades. A complete basic outline of materials and methods will be presented. Various procedures are considered involving the relation and use of music with other subjects of the activity program. This course is pertinent to those engaged in elementary grade teaching or supervising of music in the public schools. 2 cr.

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.

Prereq.: Music 11-12. 3 rec.; 3 cr. (Not offered in 1942-43.)

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.

Prereq.: Mu-Ed 91. 3 rec.; 3 cr. (Not offered in 1942-43.)

Music-Education (Mu-Ed) 95. The Teaching of Stringed Instruments. A demonstration course in class-teaching of string instruments designed to stimulate classroom situations and methods as far as possible. Problems of the school orchestra will be discussed.

*Not offered in 1942-43, but offered in the 1942 Summer school.

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. Consideration to the school band as a concert organization will be given.

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. Consideration will also be given to the school band as a marching unit and to elementary instruction in drum-majoring.

Prereq.: Permission of the instructor. 2 rec.; 2 cr.

(P-E) 61. Problems of Teaching in Physical Education. Methods and materials of instruction, theories of play and actual practice for the successful teaching of recreational activities in school, on the playground and in the community. Studies of activities adapted to different levels of maturity. 3 rec.; 3 cr.

(P-E) 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. 2 lec. or rec.; 4 lab.; 3 cr.

(P-E) 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 interscholastic 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.

Prereq.: Zoology 17, 18; physical education 23 and 61; and two courses in the coaching of sports. These last may be taken concurrently. 3 rec.; 3 cr.

(P-E) 66. Administration of Physical Education in Secondary Schools. Administration relationships and procedures in the conduct of physical education and health education in the secondary schools. Preparation of general administrative policies; facilities and equipment; adaptation of physical activity to individual needs. 3 lec.; 3 cr.

*(P-E) 69. Organization of Health Education in Secondary Schools. The course is designed to give superintendents, headmasters, classroom teachers or supervisors of health and physical education a better understanding of problems associated with health education in the secondary school. Health education is considered in terms of health supervision, instruction and service. The course deals with an analysis of techniques used in solving problems, critical evaluation of programs of health education and the implications of the present national crisis to the responsibilities of the teacher and school in the education of youth for healthful living. 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.

3 lec. or rec.; 2 lab.; 4 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.

Prereq.: (P-E) 91. 1 lec. or rec.; 2 lab.; 2 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.: Zoology 17, 18; physical education 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.

*Not offered in 1942-43, but offered in the 1942 Summer school.

Prereq.: Zoology 17, 18; physical education 23, 65 and 35 or 36, methods courses in those sports in which the student intends to become actively engaged. 2 to 4 cr.

*Social Studies-Education (SS-Ed) 92. Wartime Problems in the Teaching of Social Studies in High School. 3 cr.

COURSES IN SUPERVISED TEACHING

94. Supervised Teaching. This work is required in the teacher preparation curriculum. 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 in October 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 75 the following courses: psychology 11 (formerly education 11) and education 42, 51, 52, and 61, and, with an average grade of 75 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 75 a course in the problems of teaching the subject in which he desires to do supervised teaching.

Graduate students may be enrolled for 9 credits of work in supervised teaching in the second semester of the academic year.

ELEMENTARY EDUCATION

The program in Elementary Education is organized on a workshop plan. Students will have the advantage of a curriculum laboratory set-up in Room 8 of Murkland Hall. A competent assistant will be available in the laboratory to aid students.

The University has arranged for two demonstration, or laboratory classes as an aid in teaching teachers how to teach Reading, Language, Speaking, Arithmetic, etc. Also these classes will serve as a laboratory for the workshops in Supervision, Principles and Practices of Elementary Education, and Observation in Social Studies. One class will be composed of 2nd and 3rd grade pupils; the other of 5th and 6th grade children. They will meet in Rooms 24 and 26 of Murkland Hall daily from 9:00 to 12:00. Both classes are to be taught by superior and experienced teachers.

*Not offered in 1942-43, but offered in the 1942 Summer school.

*(El-Ed) 90. Workshop in the Language Arts. The Workshop in the Language Arts is planned for elementary teachers from Grades 1-8; for supervisors and administrators who are interested in studying language as a form of social behavior—an experience in *thinking* and *feeling*; and in the *expression* of one's thoughts and emotions. Language in this sense is both the warp and the woof of every activity, manual and mental, in which the children engage no matter what the particular field of study may be. It includes getting ready to learn to read; learning to read; learning how to think; to select the author's main points in history, geography, science, and all the other subject-matter textbooks; how to evaluate and appraise; to accept and reject the points under discussion; how to organize and summarize significant data for purposes of remembrance. It includes reading for inspiration and recreation; and speaking and writing as means of oral and written expression. A special unit will be devoted to the supervisory techniques as they are related to the language arts program.

The course offers demonstration lessons with children in the usual classroom situations, illustrating the objectives to be achieved; the *techniques* for accomplishing the objectives; and the outcomes in terms of both the learners' and the teachers' personal growth and development. This workshop may be taken with number 91 or as a separate unit. 4 cr.

*(El-Ed) 91. Workshop in Arithmetic. The function of the Teaching of Arithmetic is to present to the children the number system and number relations so that number will function in the social and economic living of boys and girls. The aim of the workshop will be to appraise present practices critically and to pose new learning experiences in arithmetic which are meaningful. The principles set up in the Sixteenth Yearbook of the National Council of Teachers of Mathematics will be basic in this course. The demonstration classes will be used as an aid in this workshop. This workshop may be taken with number 90 or as a separate unit. 2 cr.

*(El-Ed) 92. Choral Speaking as related to the Teaching of Reading. This course deals with the study of phonetics as applied to choral speaking and the reading program in the elementary grades. The instructor demonstrates the application of phonetics to the teaching of reading, and to the dramatic interpretation of poetry in choral speaking. The demon-

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stration is preceded by a statement of the purpose of the lesson and followed by an informal discussion of the skills, attitudes, and outcomes of the teacher-pupil activity. 2 cr.

*(El-Ed) 93. Laboratory Equipment in the Teaching of Arithmetic. This is a practical course that evaluates the use of actual objects useful in teaching of arithmetic so that meanings become clear for children. Also there is a small amount of field work . 1 cr.

*(El-Ed) 94. Observation in Social Studies. The teaching of social studies through the unit of work procedure will be demonstrated in the laboratory classes. Students in this course are to observe the work in the primary and upper grade classrooms. The instructor will hold individual and group conferences as may be required to gain an understanding of the unit of work in social studies. 2 cr.

*(El-Ed) 95. Workshop in Principles and Practices of Elementary Education. A study of the underlying principles of Education as applied to the teaching of children in our elementary schools will be co-ordinated with the fundamentals of educational psychology and translated in terms of methods of teaching. Adaptation of various methods and plans as carried on in modern elementary schools will be considered. Students in this course will have the opportunity of observation in demonstration classes, and individual conferences with the instructor. 3 cr.

*(El-Ed) 97. Workshop in Administration and Supervision of the Elementary School. This course will be concerned with the problems arising in the administration and supervision of a modern elementary school. Some of these are: relation of supervision and administration; supervision and functions of the present elementary school; types of organization; classification and promotion of pupils; "marks" and "report cards"; organization and supervision of the program of instruction; provisions for exceptional children; supervision of teacher improvement; public relations; autocratic versus democratic methods of supervision; supervisory techniques for different types of teaching; development of cooperation among teachers; evaluation of the school program. Students will be encouraged to work out problems in relation to teaching positions held by each. This course is intended for superintendents of schools, elementary supervisors or principals,

*Not offered in 1942-43, but offered in the 1942 Summer School.

or persons preparing for such positions. The demonstration classes will be used as laboratories for the work in supervision. Opportunities will be provided for individual conferences. 3-6 cr.

*111. Administration in the Junior High School. This course is intended primarily for graduate students who have had teaching experience and wish to prepare themselves for administrative work as well as for principals and supervisors who wish to study the problems in the field. The course will utilize the workshop technique discussing practical problems in the organization, administration and supervision of the junior high school. Particular emphasis will be placed on the changes in the curriculum made necessary by the present emergency. It is hoped that members of the group bring problems for further study and discussion. There will be assigned readings in the available modern literature, class discussions, group conferences, individual and group reports, and lectures by the instructor. Mr. Wood. 3 cr.

*112. Administration in the Senior High School. A study of basic principles of educational administration with their application to the following problems in the secondary school; the internal organization of the school, selection of the standards for the staff, making of the school schedule, organization and direction of guidance and extra-curricular activities, the development of school control, problems relating to instruction and student personnel, office organization, records and reports, and public relations and publicity. Mr. Thut. 3 cr.

114. Curriculum Construction. Changing concepts of the curriculum; educational principles and socio-economic factors in curriculum construction; determination of objectives from primary and secondary sources; selection and organization of teaching materials; appraisal of the outcomes of instruction. Assistance will be given members of the class in the solution of curriculum problems in which they are particularly interested. Mr. Jones. Not offered in 1942-43. 3 cr.

*119. Wartime Problems in Educational and Vocational Guidance. This war is requiring counselors, teachers and principals to solve many new problems the answers to which are not found in the textbooks.

*Not offered in 1942-43, but offered in the 1942 Summer school.

This course, which is designed primarily for those persons who are facing new problems in the field of guidance in small or large secondary schools, will be organized as a workshop to pool the resources and experiences of the members of the class in solving problems introduced by them as well as by the instructor. Mr. Wood. 3 cr.

*122. Problems in the Supervision of High School Teaching. This course is designed to be of service to supervising classroom teachers, headmasters and superintendents. It will be devoted to the consideration of the meaning of supervision, its organization, and methods and techniques for evaluating and improving instruction in the secondary school. Mr. Thut. 3 cr.

131, 132. Seminar in Educational Problems. The problems to be studied will depend upon the interests of the students enrolled in the seminar. Mr. Stowe.

Open to graduate students majoring in education. Credits to be arranged.

Home Economics Education 131, 132. Home Economics Education Research. The problems to be studied will depend upon the interests of the students enrolled. Mrs. McLaughlin.

Open to graduate students majoring in Home Economics Education. 3 cr.

Music-Education (Mu-Ed) 131, 132. Music Education Research. The problems to be studied will depend upon the interests of the students enrolled. Mr. Bergethon. 3 cr.

*141. Workshop in Educational Measurement and Evaluation. The Workshop in Educational Measurement and Evaluation will provide teachers, counselors, and administrators an opportunity to work together in the solution of school problems involving the use of tests, scales, and other measurement tools and techniques. The keynote of the Workshop will be "learning by doing".

The departure from formal class instruction will enable each Workshop member to undertake the solution of problems that are of direct concern

*Not offered in 1942-43, but offered in the 1942 Summer school.

to him in his own professional situation. The Workshop has these specific aims: (1) to provide instruction in educational measurement and evaluation articulated with the needs and problems of Workshop members; (2) to furnish an opportunity for the exchange of ideas concerning various aspects of educational measurement and evaluation to the mutual benefit of all participants; and (3) to synthesize the accumulated knowledge in a form that is directly useful in applying measurement techniques to everyday problems of the classroom teacher, the counselor, and the school administrator.

Projects. Workshop registrants will have facilities available which will permit the undertaking of projects in all phases of applied measurement and evaluation. Participation in the Workshop will be most fruitful if each member formulates in advance one or more problems in this field which have direct bearing on his own school work. In lieu of such problems, the director will furnish project specifications in keeping with the interests and needs of each registrant.

The following categories of projects are proposed although work may be done in other aspects of measurement than those indicated.

A. *Basic Training in Tests and Measurements and Evaluation Techniques.* All participants in the Workshop will attend the daily lectures and discussions of Education 65 unless they give evidence of satisfactory knowledge of the content of the course. Such evidence will be (a) graduate credit in either Education 65, or 71-72; or (b) satisfactory performance on a comprehensive test to be administered by the Workshop director. For the topics covered in this unit, see the description of Education 65.

B. *Test Construction.* Each person registering for projects in this category will construct one or more tests in his teaching field or in connection with a particular measurement problem in his own school system. Opportunity will be given for two or more persons to undertake the construction of several tests for coordinate use in connection with some larger school problem.

C. *Test Appraisal.* Projects in this category involve the detailed evaluation of tests and measures available for use in particular subject-matter fields or in connection with a specified school program.

D. *Tests in Counseling and Guidance.* Projects in this category will involve the planning, selection, and development of measurement materials

and techniques for a specified guidance program. Each person undertaking such a project will furnish a detailed statement of a particular counseling and guidance program and will complete his project so as to articulate the tests and techniques investigated with the complete guidance program.

E. *Evaluation Techniques for the Classroom Teacher.* Such projects will involve applying simple statistical procedures to such problems as measurements of pupil growth in specified areas by pre-testing—post-testing techniques; relationship between achievement and aptitude in appraisal of individual accomplishments; the appropriate methods for combining recitation marks, quiz marks, etc., to obtain final grades; and interpreting the performance of classroom groups in the light of published norms on standardized tests.

F. *Evaluation Techniques for the School Administrator.* This category of projects will include the application of appropriate statistical techniques to diverse school problems; the planning and application of special procedures concerned with the appraisal of teachers and other school personnel; feasible methods for planning and budgeting school testing programs.

Organization. The Workshop will consist of basic lectures and discussions, weekly roundtables, and individual conferences. The lectures and discussions will comprise project A. Each week there will be five roundtables, one each class day connected with one of the categories of projects listed. Persons registering for work in a particular category will be expected to take an active part in the organization of the roundtable peculiar to the project. Other Workshop members will attend and participate in the discussion. One hour each day will be set aside by the director for individual conferences.

Facilities. The room provided for the Workshop will contain a desk for each member, calculating machines, a file of standardized tests, and a reference shelf. Keys will be issued to registrants on a deposit basis so that each person may set his own schedule for work except for the previously mentioned group activities, namely, lectures and roundtables.

Credits and Fees. Registration in the Workshop may be made for a maximum of six credit hours; credit will be allocated in accordance with the breadth, scope, and significance of the projects undertaken. A maximum of two credits may be taken in any category of projects. A laboratory fee of

$1.25 per credit hour will be charged registrants over and above the basic tuition fee. Persons registering for four hours or more will be charged a laboratory fee of $5. Mr. Crissy. 2-6 cr.

161, 162. American College and University Education—Principles and Problems. This course is devoted to a comparative and historical study of American college and university education. Among the topics studied are the following: a liberal education in a democracy; American colleges as agencies of American democracy; purposes and objectives in American collegiate education; academic college admission and degree requirements; American college curricula problems including curricula provisions for junior college and senior college years; selecting college students; educational and vocational guidance needed by college students; student activities; educational activities under the direction of college teachers and college teaching and testing techniques; college teaching as a profession in America; professional preparation for successful college teaching; and college and university administrative problems of interest to college teachers.

Assigned readings, class discussions, tests, and term papers embodying results of individual studies of problems investigated by members of the class. Mr. Jones.

Open to graduate assistants, to assistants and members of the instructional staff of the university, and to graduate students planning to teach in the college or university field. 1 rec.; 2 cr.

COURSES IN PSYCHOLOGY

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. The origin of language and the acquisition of habits of thought and action considered together with the development of proper balance of emotional behavior. Of interest to students preparing to be teachers, homemakers, social workers, nurses, school psychologists, and clinicians.

Prereq.: Psychology 11 or 31. 3 rec.; 3 cr.

(52) 52. Mental Hygiene. The problem individual from the point of view of prevention as well as of detection, diagnosis, and treatment. Ways and means of maintaining a normal mind and of re-educating the individual

of distorted attitudes. Case studies presented for purposes of illustrating various types of maladjustment and suggestions offered for their improvement. Of interest to students preparing to be teachers, homemakers, social workers, physicians, nurses, school psychologists, and clinicians.

Prereq.: Psychology 11 or 31. 3 rec.; 3 cr.

53. Psychological Tests and Measurements. A survey of measurements of intelligence and mental aptitudes. Demonstrations and actual experience in the administration of both individual and group intelligence tests. Interpretations and suggested applications of test results.

Prereq.: Psychology 31. 3 rec.; 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 presented to enable the student to recognize typical cases. Prophylaxis through the cultivation of healthful attitudes and activities in the home, school and community is emphasized.

Prereq.: Psychology 11 or 31. 3 rec.; 3 cr.

57-58. Psychology Laboratory. Standard experiments on sensation, perception, association, imagination, learning, and reasoning. Emphasis on the development of the proper technique of psychological investigation.

Prereq.: Psychology 11 or 31, or in conjunction with psychology 31. 1 lec.; 2 lab.; 3 cr.

66. Comparative Psychology. Psychogenesis beginning with one-celled animals. Simple experiments in animal learning.

Prereq.: One year of psychology. 3 lec. or rec.; 3 cr.

71-72. Seminar in Psychology. 3 cr.

DIVISION OF ENGINEERING

Edmond W. Bowler, *Professor of Civil Engineering,* Chairman; George W. Case, *Professor of Mechanical Engineering;* Edward T. Donovan, *Assistant Professor of Mechanical Engineering;* Daniel S. Eppelsheimer, *Professor of Industrial Engineering;* Edward L. Getchell, *Associate*

Professor of Mechanical Engineering; Leon W. Hitchcock, *Professor of Electrical Engineering;* Frederick D. Jackson, *Associate Professor of Electrical Engineering;* William B. Nulsen, *Assistant Professor of Electrical Engineering;* Russell R. Skelton, *Associate Professor of Civil Engineering.*

Graduate work is offered in civil, electrical and mechanical engineering leading to the degree of master of science in engineering. A thesis of professional character and no fewer than eighteen semester credits of course work constitute the requirements for the degree.

Courses with numbers over 100 require as prerequisites the completion of the undergraduate curriculum indicated.

CIVIL ENGINEERING

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.

Prereq.: Mathematics 18. 3 rec.; 1 lab.; 4 cr.

61. Highway Engineering and Transportation. The economics of location and design of highways and city streets; methods of construction, maintenance and specifications governing the various types of surfaces; administration and financing of highway systems; special emphasis on highway transportation. Field location and the complete design of a section of highway are included.

Prereq.: Civil engineering 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. In the laboratory tests are made on various soils for classification, grain size, permeability and consolidation. Reports and typical problems are included.

Prereq.: Civil engineering 65. Required of seniors in civil engineering. 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. Computations, reports, and problems of design are included.

Prereq.: Civil engineering 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.

Prereq.: Civil engineering 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. Problems related to construction and to illustrations of the theory.

Prereq.: Civil engineering 65. 2 rec.; 2 lab.; 4 cr.

101, 102. Advanced Hydraulics. Dimensional analysis, dynamic similarity, mechanics of viscous fluids, fluid flow in pipes, non-uniform flow, alternate stages of flow in open channels, hydraulic jump, and their application to engineering practice. Mr. Bowler.

Prereq.: Civil engineering 64. 3 rec.; 3 cr.

103, 104. Soil Mechanics. The physical and mechanical properties of soil in relation to engineering structures. The theory of consolidation, shearing resistance, bearing capacity, settlement, earth pressure, and their applications. Mr. Skelton.

Prereq.: Permission of the instructor. 3 lec.; 3 cr.

105. Soil Testing for Engineering Purposes. This course is arranged to cover the essential soil tests for engineering purposes. Identification of soils, determination of water content, void ratio, specific gravity, grain size distribution, and Atterberg limits. Tests for the physical properties include:

permeability, capillarity, compressibility, rate and magnitude of consolidation, and shearing resistance. Mr. Skelton.

Prereq.: Civil engineering 103 in parallel or as a prerequisite. 1 lec.; 3 lab.; 4 cr.

ELECTRICAL ENGINEERING

53-54. Electrical Engineering. Direct current generators, direct current motors, alternating current circuits, alternators, and transformers.

Prereq.: Physics 8, mathematics 18, and electrical engineering 2. 3 rec.; 3 cr.

55. Electrical Engineering. A continuation of electrical engineering 54. Induction motors, regulators, synchronous motors, converters, and rectifiers; transmission line regulation, efficiency, insulation, lightning protection, sag and tension, etc.

Prereq.: Electrical engineering 54. 3 rec.; 3 cr.

58. Radio and Wire Communication. Radio frequency amplifiers and oscillators and the principles of radiation. Principles of basic telephone apparatus and circuits. A detailed study of telephone transmission including inductive interference, equivalent networks, the infinite transmission line, the determination of line and cable characteristics, repeaters, filters, measurement of transmission characteristics.

Prereq.: Electrical engineering 7. Elective for seniors in electrical engineering. 3 rec.; 1 lab.; 5 cr.

60. Advanced Circuit Theory. Application of mathematics to the solution of electrical circuit problems, including the use of differential equations, Heavisides' operators, and derivation of fundamental formulas and constants.

Prereq.: Electrical engineering 55. 3 rec.; 1 lab.; 4 cr.

76. Laboratory. Advanced laboratory testing and special problems. The student works on problems of his own selection which have been outlined by him and have received approval. This may be in the form of a semester thesis or a series of original experiments.

Prereq.: Electrical engineering 25. 4 lab.; 4 cr.

78. Advanced Electronics Laboratory. Special radio problems, electron tube applications of a research nature, or studies and applications of audio frequency amplifier systems.

Prereq.: Electrical engineering 7. Lab and conferences. 4 cr.

101, 102. Advanced Circuit Theory. A continuation of electrical engineering 60, including the treatment of unbalanced circuits by the method of symmetrical components. Mr. Nulsen. 3 rec.; 3 cr.

103, 104. Electrical Transmission of Power and Communication. A study of the electrical and mechanical factors involved in the design, construction, and operation of recent power system installations. An investigation of some of the more advanced problems in the field of communication. Mr. Hitchcock, Mr. Jackson. 3 rec.; 3 cr.

MECHANICAL ENGINEERING

52. Mechanical Laboratory. Testing of steam and gas engines in accordance with A. S. M. E. power test codes.

Prereq.: Mechanical engineering 30 2 lab.; 2 cr.

53-54. Power Plants. A study of the steam generating power plant dealing with its equipment and costs.

Prereq.: Mechanical engineering 24. 53: 2 rec.; 2 cr. 54: 1 rec.; 1 lab.; 2 cr.

55-56. Automatic Engineering. The internal combustion engine, including its thermodynamics, carburetion, lubrication and vibration. Some features of the design of the principal moving parts of the automotive vehicle.

Prereq.: Mechanical engineering 8 and 24. 2 rec.; 1 lab.; 3 cr.

65. Contracts and Specifications. Legal principles underlying engineering work, including contracts, negotiable instruments and specifications. 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. 3 rec.; 3 cr.

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

103, 104. Engineering Economy. Social aspects of engineering economy, studies and methods of investigation of the safety and earning power of invested funds in old and new enterprises. Mr. Case. 3 rec.; 3 cr. (Not offered in 1942-43.)

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

Prereq.: Mechanical engineering 8. 3 rec.; 3 cr.

107, 108. Research. Research on selected problems in ferrous and nonferrous metallography. The physical properties of metals and alloys. The constitution of alloys and the nature of intermetallic compounds. Transformations and phase changes in the solid state in binary, ternary and more complex alloys. Diffusion in solid metals. X ray diffraction techniques. Mechanical deformation of metals and alloys. Destructive and non-destructive testing including gamma ray radiography. Mr. Eppelsheimer.

Prereq.: Permission of the instructor. Hours and credits to be arranged.

DIVISION OF LANGUAGES AND LITERATURE

Clifford S. Parker, *Professor of Languages,* Chairman; Sylvester H. Bingham, *Assistant Professor of English;* Albert F. Buffington, *Assistant Professor of Languages;* Paul L. Grigaut, *Associate Professor of Languages;* William G. Hennessy, *Associate Professor of English;*

ALFRED E. RICHARDS, *Professor of English;* PAUL S. SCHOEDINGER, *Assistant Professor of English;* JAMES T. SCHOOLCRAFT, JR., *Assistant Professor of Languages;* HAROLD H. SCUDDER, *Professor of English;* CARROLL S. TOWLE, *Associate Professor of English;* JOHN S. WALSH, *Associate Professor of Languages.*

SPECIAL REQUIREMENTS FOR CANDIDACY

To be admitted to candidacy for the degree of master of arts in language and literature, the student must show by his academic or professional record that he is prepared to take the courses in his field of study.

To be admitted to candidacy for the degree of master of arts in English or languages, the student must have met requirements substantially equal to those set up for the fulfillment of an undergraduate major in English or languages at the University of New Hampshire.

DIVISIONAL REQUIREMENTS FOR THE MASTER'S DEGREE

The student who is a candidate for a master's degree in the general field of the division of language and literature will take a program of courses in two foreign languages and in English.

SPECIAL REQUIREMENTS FOR THE MASTER'S DEGREE

ENGLISH

The student who is a candidate for a master's degree in English must earn at least six credits in the courses which are primarily for graduate students (numbered 101 to 200); six credits in allied subjects; and no more than twelve credits in courses numbered 51 to 100. If he presents a thesis it must be one worth no fewer than six credits. The writing of a thesis may under some circumstances be omitted and in such cases an additional three-credit course in English and an additional three-credit course in an allied subject will be required, each numbered 101 or higher.

A reading knowledge of French, German, or Latin will be required of the candidate, and a certificate from the department of languages will be accepted as satisfactory proof that this requirement has been met.

FRENCH, GERMAN, LATIN

The special requirements for the degree of master of arts in French, German, and Latin are as follows: the writing of an acceptable thesis embodying the results of independent investigation (equivalent to 4 to 9 semester credits in courses primarily for graduate students); the passing of a special oral or written examination at the end of the period of graduate study.

A student in languages may take all his work in French or in combinations of French and Latin, French and German, or French and English. No more than six semester credits may be earned for courses outside this division.

GENERAL LANGUAGE AND LITERATURE

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. Literature interpreted as a product of changing patterns of civilization and social ideas. Required reading in the original language or in translations. Conducted in English. 3 rec.; 3 cr.

Languages 73-74. General Introduction to the Science of Language. An introduction to the science of linguistics. The origins of language; the languages of the world; phonology; morphology; syntax; semantics; etymology; language and writing; the science of comparative philology and its development; dialect divergence; the principles of linguistic change; race, culture, and language; the psychology of language. The course, though designed particularly for majors in English or other languages, is open to all graduate students. 3 lec.; 3 cr.

Literature 101, 102. Collateral Reading. A study, in translation, of selections from the great writers of literature. In the first semester special attention is given to Dante's *Divine Comedy;* in the second, to Cervante's *Don Quixote* and to Goethe's *Faust.* Lectures, recitation, and written reports. Mr. Richards. 3 rec.; 4 cr.

ENGLISH

*51. Methods of Speech Re-Education. A course designed to give an acquaintance with common speech defects and simple remedial measures for special problems in delayed speech, indistinct pronunciation, stuttering, and inappropriate use of the voice. Procedures of effective use of the speech mechanism in various speech activities will be discussed and demonstrated. Constant use of the voice recording machine. 3 cr.

52. Introduction to Drama. A comprehensive survey of dramatic literature from the Greek drama to the present. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1942-43.)

53-54. Shakespeare's Plays. A study of the major histories, comedies and tragedies. Shakespeare is interpreted as poet and as dramatist. 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. 3 lec.; 3 cr. (Given in alternate years; not offered in 1942-43.)

56. Johnson and his Circle. Boswell, Johnson and their time. Elective for juniors, seniors, and graduate students. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1942-43.)

*56. Advanced Stage Direction. A laboratory course designed primarily for teachers and others who produce plays. As part of the course work one or more one-act plays will be publicly produced. Registration is by permission of the instructor and is limited. 3 cr.

57. The English Novel in the Eighteenth Century. The novel from Defoe through the Gothic Romance. Lectures and constant outside reading. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1942-43.)

59. The English Novel in the Nineteenth Century. The novel from Jane Austen to Thomas Hardy. Lectures, recitations and constant reading. 3 lec.; 3 cr. (Given in alternate years; offered in 1942-43.)

*60. Radio Workshop. A laboratory course affording daily practice in radio speaking and analysis of radio continuity. Students may con-

*Not offered in 1942-43, but offered in the 1942 Summer school.

centrate on announcing, writing, managing, directing, or sound effects. All students will participate in readings, sketches, news processing, and broadcasting, announcing, and "ad-libbing." The Radio Market, Getting a Radio Job, and Education by Radio, will be presented. Recordings will be frequent. The public address system and broadcasting facilities of the university will be used. 3 cr.

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 minor writers especially those of the late eighteenth century. One hour of the week devoted to round-table discussion with small groups. 2 lec.; 1 rec.; 3 cr.

63, 64. Advanced American Literature. A series of studies in special fields, the subjects to be announced. In 1942-43 the subjects are: American Renaissance and American Humor. 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.

Prereq.: English 7. 2 lec.; 1 rec.; 3 cr. (Given in alternate years; not offered in 1942-43.)

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 Cressida,* and *The Canterbury Tales.* 3 lec. or rec.; 3 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 teaching of high school English.

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 English

19, or by examination. Recommended for all students who plan to teach English in secondary schools. Elective for students majoring in language, history, or education. 2 lec.; 1 lab.; 3 cr.

*English-Education (Eng-Ed) 92. Problems in the Teaching of English in the High School. This course deals with methods of organizing and presenting courses in both composition and literature. In the first part of the course, the development of composition interests will be discussed, followed by problems of structure, diction, and minimum essentials of grammatical and mechanical skills. In the second, the relation of literature to its historical and social background and its application to contemporary life will be stressed, along with the development of comprehension, interpretation, and appreciation. The course is also concerned with the correlation and coordination of English composition and literature with other subjects, and with motivation, testing, and the selection of course material. The sixth week of the course will be devoted to participation in and reporting on the work of the Writers' conference. 3 cr.

103, 104. The Faust Story. A study of the Faust legend as it is found in the literature of Germany and of England. Special attention is given to Marlowe's drama and to the later forms of the legend in English literature. Mr. Richards. 3 rec.; 3 cr.

105, 106. Spenser and His Times. A study of the life and works of Edmund Spenser as they mirror the development of English poetry and history in the sixteenth century. Mr. Richards. 3 rec.;4 cr.

**107, 108. Studies in American Literature. An intensive study of the life and work of a single author. In some cases the course will be concluded in a single semester, in others, continued throughout the year. The assignments will vary with the individual student . Mr. Scudder.

Prereq.: English 11 and 12, or their equivalent. Special conferences and written reports. 3 cr.

109, 110. Shakespeare. An intensive study of from four to six of Shakespeare's plays, supplemented by a study of the history of Shakespearean scholarship from the seventeenth century to the present. Mr. Hennessy.

*Not offered in 1942-43, but offered in the 1942 Summer school.

**This course may be taken more than once, as the subject varies for each student.

Prereq.: English 53-54, or its equivalent. 3 lec.; 3 cr.

111, 112. Contemporary Drama. A study of the modern drama in Europe and America from Ibsen to the present day. Mr. Hennessy.

Prereq.: English 52 or its equivalent. 3 lec.; 3 cr.

113, 114. The Seventeenth Century. Seventeenth century prose and verse, and the drama after 1660. A survey of the whole period, with special emphasis on the historical background, the Restoration theatre, and the changes in prose and verse styles. Mr. Towle. 3 rec.; 3 cr.

115, 116. The Augustan Age. General and special studies in the works and lives of Swift, Pope Gay, Arbuthnot, Addison and Steele, and their associates. Mr. Schoedinger. 3 lec.; 3 cr.

117, 118. The Non-Dramatic Literature of the English Renaissance. Poetry and prose from Erasmus to John Donne, exclusive of Spenser. Lectures, reports and constant outside reading. Mr. McGrail. 3 lec.; 3 cr.

119. Carlyle. A critical study of Thomas Carlyle as a writer and thinker. Mr. Bingham. 3 lec.; 3 cr.

120 Tennyson and Browning. Studies of the two major poets of Victorian England. Mr. Bingham. 3 lec.; 3 cr.

FRENCH

53-54. French Romanticism. The period from 1750 to 1850: J. J. Rousseau's work and influence; the important writers of the Romantic school; analysis of the intermingling of romanticism and realism in the work of Balzac.

Prereq.: French 12. 3 rec.; 3 cr.

57-58. French Literature from 1850 to the Present. Realism and naturalism in the novel and drama, the Parnassian and symbolist schools in poetry, the psychological novels of Bourget, and the various schools and trends of the late 19th and early 20th centuries. Conducted largely in French.

Prereq.: French 12 or 54. 3 rec.; 3 cr.

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.: Junior, senior, or graduate standing. Permission of instructor or head of department. 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 of the year 1600, with consideration of their historical and social background.

Prereq.: French 12 or 54. 2 lec.; 2 cr.

*73. Survey of French Literature in the Nineteenth Century. Against a broad background of nineteenth-century history and literature, concentrated attention will be given to those authors, such as Victor Hugo, Balzac, Mérimée, Maupassant, Labiche, Augier, and Daudet, whose works are most often read in secondary school French courses. For teachers who wish to enrich their work by a study of the literary significance of the books they use in teaching, for graduate students who require knowledge of the nineteenth century, and for students in any field, for whom a knowledge of nineteenth-century France will be helpful in understanding contemporary France. 3 cr.

French-Education (Fr-Ed) 91. Problems in the Teaching of French in the High School. The special objectives, methods, and problems of high school French. Open only to seniors and graduate students who are planning to teach. Visits to schools to observe the work of experienced teachers arranged. Students may be given opportunity to assist in the work of French 1-2.

Prereq.: Permission of head of department. 3 rec.; 3 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 French-education 91. 2 rec.; 2 cr.

101, 102. History of French Literature. This course is not an introduction to French literature, but complements what the student has previously learned. The work consists of individual conferences between instructor and student and a large amount of reading. In general, each student

*Not offered in 1942-43, but offered in the 1942 Summer school.

is expected to study more carefully the authors of whom he has some knowledge, to fill in the gaps between courses he has taken, and to obtain an integrated knowledge of all French literature. Mr. Parker.

Prereq.: 18 credits in undergraduate courses in French literature. 3 cr.

103, 104. Special Studies in French Literature. An intensive study of one or two important authors each semester; their lives, works, and times. Molière and Alfred de Vigny, for example, might supply the material for an entire year's work. The particular authors studied, however, may be changed from year to year in accordance with the needs and tastes of the students electing the course. The work will be conducted largely in French. Mr. Grigaut.

Prereq.: 18 credits in undergraduate courses in French literature. 3 cr.

GERMAN

53-54. German Romanticism. The revival of the historical and imaginative Middle Ages in the first half of the nineteenth century.

Prereq.: Two years of college German or the equivalent. 3 class hours; 3 cr. (Given in alternate years; not offered in 1942-43.)

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. (Given in alternate years; offered in 1942-43.)

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. (Given in alternate years; offered in 1942-43.)

115. 116. History of the German Language. A systematic presentation of the development of the German language from the time of the earliest records to the present, with special emphasis on the historical explanation of living forms. Characteristic works, or parts of them, of all periods will be studied with reference to changes in language and style. Mr. Buffington. 3 rec.; 3 cr.

LATIN

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. (Given in alternate years; not offered in 1942-43.)

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. (Given in alternate years; offered in 1942-43.)

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. (Formerly given as Latin 63-64.)

Prereq.: Permission of the instructor. 3 rec.; 3 cr.

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

DIVISION OF PHYSICAL SCIENCES

THOMAS G. PHILLIPS, *Professor of Agricultural and Biological Chemistry,* CHAIRMAN; EDWARD R. ATKINSON, *Assistant Professor of Chemistry;* GEORGE N. BAUER, *Professor of Mathematics;* FREDERICK D. BENNETT, *Assistant Professor of Physics;* DONALD H. CHAPMAN, *Assistant Professor of Geology;* ALBERT F. DAGGETT, *Assistant Professor of Chemistry;* MILTIADES S. DEMOS, *Assistant Professor of Mathematics;* JAMES A. FUNKHOUSER, *Associate Professor of Chemistry;* HORACE L. HOWES, *Professor of Physics;* HAROLD A. IDDLES, *Professor of Chemistry;* WILLIAM L. KICHLINE, *Assistant Professor of Mathematics;* DANIEL C. LEWIS, *Associate Professor of Mathematics;* T. RALPH MEYERS, *Associate Professor of Geology;* STANLEY R. SHIMER, *Assistant Professor of Agricultural and Biological Chemistry;* HERMON L. SLOBIN, *Professor of Mathematics;* MARVIN R. SOLT, *Associate Professor of Mathematics;* GLENN W. STEWART, *Instructor in Geology;* JOHN L. TORGESEN, *Assistant Professor of Chemistry;* OSWALD T. ZIMMERMAN, *Professor of Chemical Engineering.*

AGRICULTURAL AND BIOLOGICAL CHEMISTRY

Students majoring in this department are expected to have had preparation in the biological sciences, in mathematics, in physics, and in general, analytic, and organic chemistry.

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.

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.

Prereq.: Satisfactory preparation in organic chemistry and quantitative analysis. 1 lec.; 3 lab.; 4 cr.

101, 102. ADVANCED BIOCHEMISTRY. The preparation, composition and analysis of carbohydrates, fats, and proteins. Discussions and laboratory. Mr. Phillips and Mr. Shimer.

Prereq.: Satisfactory preparation in analytical, organic, and biological chemistry. 4 cr.

103, 104. Special Problems. Conferences and library and laboratory work on special phases of chemistry in its relation to agriculture and biology. Mr. Phillips and Mr. Shimer.

Prereq.: Satisfactory preparation in analytical, organic, and biological chemistry. Subject matter and credits to be arranged.

CHEMISTRY

51. Organic Chemistry. An intensive review of the methods of preparation and reactions of the principal classes of organic compounds. The review also includes a consideration of important individual substances within each class. Emphasis is placed on the working of assigned problems.

Prereq.: Chemistry 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 carbohydrates and proteins follows. The laboratory technique of organic chemical methods as illustrated in the preparation and purification of typical organic compounds.

Prereq.: Chemistry 3-4, and 26 when possible. 3 lec.; 2 lab.; 5 cr. Deposit: Ten dollars for the year.

55, 56. Theoretical Problems of Modern Organic Chemistry. The principles underlying the behavior of organic compounds. A discussion of valence leads to a study of the electron theory of organic chemistry, and this is used as a basis for subsequent discussions of unsaturation, tautomerism, free radicals, color and chemical constitution (including an abbreviated treatment of dyestuffs), polymerization and molecular rearrangements. The latter part of the course includes a study of alicyclic compounds, the physical methods used in investigations of organic compounds, and an extensive study of stereoisomerism. The historical background is emphasized.

Prereq.: Chemistry 48 or 54. 3 lec.; 3 cr. (Credit may be arranged.)

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.

Prereq.: Chemistry 22. 3 lec.; 2 lab.; 5 cr. (Credit may be arranged.) 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.

Prereq.: Chemistry 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.

Prereq.: Chemistry 71, 83. 3 lec.; 3 cr.

76. Chemical Engineering Economy. The economic factors involved in industrial chemical processes and the application of economic balances to the design and selection of chemical engineering equipment.

Prereq.: Chemistry 75, 77. 3 lec.; 3 cr.

77. Unit Operations Laboratory. Experiments based upon the unit operations are performed on typical chemical engineering equipment.

Prereq.: Chemistry 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.

Prereq.: Chemistry 75, 77. 3 lab.; 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.

Prereq.: Chemistry 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.

Prereq.: Chemistry 2, physics 2, 6, and 8, mathematics 6 or equivalent. 3 lec.; 3 cr.

83-84. Elementary Physical Chemistry. The properties of gases, liquids and solids; principles of thermodynamics and applications; solutions, ionic theory, chemical equilibria, thermochemistry, conductance and electromotive force; principles of kinetics and their application to reaction rates. The laboratory work will include accurate measurements illustrating the principles studied in the lectures.

Prereq.: Chemistry 22, mathematics 18, physics 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.

Prereq.: Chemistry 84 or equivalent. 2 lec.; 2 cr.

87-88. Chemical Literature and Seminar. Instruction in the use of the chemical library. Problems which require the use of all types of chemical literature, not only for locating specific factual material but also for the purpose of carrying out detailed searches on the laboratory and economic phases of typical chemical problems, are assigned. In the seminar individual student reports on recent topics of interest in chemistry are given.

Prereq.: Chemistry 32 and Chemistry 48. 1 lec.; 1 cr.

102. History of Chemistry. A course tracing the growth of chemistry, particularly theories of the science. The course also endeavors to give an insight into the personalities of famous chemists and lays some stress on the better known contemporary chemists and their work. Mr. Funkhouser.

Prereq.: Acceptable courses in organic chemistry. 2 rec.; 2 cr.

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

112. Organic Chemistry. The chemistry of natural products. Mr. Iddles. 3 rec.; 3 cr.

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

116. Organic Chemistry Laboratory. Micro-Quantitative Analysis. The combustion for carbon and hydrogen, Dumas nitrogen, Kjeldahl nitrogen, estimation of halogens, of sulphur, and of organic radicals. Mr. Atkinson. 1 rec.; 2 lab.; 3 cr.

121. Physical Chemistry. Chemical Thermodynamics. The application of thermodynamics to chemistry. The principles of thermodynamics will be thoroughly reviewed. These principles will be applied in detail to the phase rule, chemical equilibrium, electromotive force, theory of solutions, specific heats, and similar topics. Mr. Torgesen.

Prereq.: One year of physical chemistry. 3 rec.; 3 cr.

122. Physical Chemistry. Chemical Kinetics. A study of the kinetics of homogeneous and heterogeneous reactions in gaseous and liquid systems, including an introduction to photo-chemistry. Mr. Daggett.

Prereq.: One year of physical chemistry. 3 rec.; 3 cr.

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

131, 132 Colloquium in Organic Chemistry. The lectures will consider a special field of organic chemistry and will be varied from year to year. Mr. Iddles, Mr. Funkhouser, Mr. Atkinson. 1 lec.; 2 cr.

133, 134. Colloquium in Physical Chemistry. The lectures will consider a special field of physical chemistry and will be varied from year to year. Mr. Torgesen, Mr. Daggett, Mr. Zimmerman. 1 lec.; 2 cr.

135. Unit Operations—Fluid Flow, Heat Flow, and Evaporation. An advanced course dealing with the fundamental theory and applications of these operations. Mr. Zimmerman.

Prereq.: Chemistry 74 or equivalent. 2 lec. or rec.; 2 cr.

136. Unit Operations—Diffusion Operations. An advanced study of the principles of diffusion and their application to the unit operations of distillation, absorption, drying, humidification and extraction. Mr. Zimmerman.

Prereq.: Chemistry 75 or equivalent. 2 lec. or rec.; 2 cr.

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

151, 152. Problems in Chemistry. Conferences, library and experimental work in some field of chemistry. Analytical chemistry and photo-chemistry —Mr. Daggett. Organic chemistry—Mr. Iddles, Mr. Funkhouser, Mr. Atkinson. Physical chemistry—Mr. Torgesen. Chemical engineering—Mr. Zimmerman.

Prereq.: Special permission. Credits to be arranged.

GEOLOGY

Students majoring in this department are expected to have had preparation in physical, historical, and structural geology, mineralogy, mathematics and chemistry.

Southern New Hampshire presents many attractive geologic problems, especially in the fields of physiographic, glacial, structural, metamorphic, and igneous geology.

51-52. Mineralogy. The minerals that make up the earth's crust: crystals; minerals and their determination by means of physical characteristics; and the aggregation of minerals to form rocks.

Prereq.: One course in geology and one course in chemistry.
2 lec. or rec.; 1 lab.; 3 cr.

53, 54. Economic Geology. First semester: the types of coal and their occurence 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.

Prereq.: One year's work in geology. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1942-43.)

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.

Prereq.: One year's work in geology or zoology. 2 lec. or rec.; 1 lab.; 3 cr. (Given in alternate years; not offered in 1942-43.)

57, 58. Geologic Problems. Special problems by means of conferences, assigned readings and field work fitted to individual needs.

Prereq.: Permission of the instructor. Credits to be arranged.

*65. Geography of the Current War Areas. Intelligent reading and interpretation of the news today requires, first of all, a working knowledge of the physical setting of that news. A better understanding of the events which occur in parts of the world involved in conflict, through a study of the physical geography of those areas, is the purpose of this course. Constant reference will be made to well executed, up-to-date maps of the war areas, and in particular the geographic background of the news, day-by-day, will be studied and interpreted. The distribution of land and sea, of mountain ranges, plains and plateaus, the courses of important rivers and the significance of other landscape features, the position of cities, centers of population and industrial and economic areas, will each be treated. The influence of climate, and the geology and mineral resources of areas which come under discussion will receive their due attention. 3 cr.

101, 102. Glacial Geology. A detailed study of glacial geology, principally of North America, with special emphasis on New England. Mr. Chapman.

Prereq.: Courses in physical geology and physiography. 2 rec.; 2 lab.; 4 cr.

*Not offered in 1942-43, but offered in the 1942 Summer school.

103, 104. Optical Crystallography and Petrography. A study of minerals and rocks in powder and in thin sections by means of the petrographic microscope. Mr. Meyers.

Prereq.: Courses in mineralogy and physics. 1 rec.; 2 lab.; 3 cr.

105, 106. Research. Work on special problems.
Geomorphology—Mr. Chapman.
Glacial Geology—Mr. Chapman.
Sedimentation—Mr. Stewart.
Areal Geology and Petrography—Mr. Meyers.

Prereq.: Special permission. Credits to be arranged.

MATHEMATICS

51-52. Advanced Calculus, Differential Equations and Their Application to Engineering Problems.

Prereq.: Mathematics 18. Mathematics 51: 3 rec.; 3 cr. Mathematics 52: 1 rec.; 1 cr.

55-56. Advanced Plane and Solid Analytical Geometry.

Prereq.: Mathematics 18. 3 rec.; 3 cr. (Given in alternate years. Not offered in 1942-43.)

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.: Mathematics 18. 3 rec.; 3 cr.

58. Vector Analysis. Vector and scalar algebra and geometry, differentiation and differential operators, applications to electrical theory and to mechanics, dynamics, and hydro-dynamics.

Prereq.: Mathematics 18. 2 rec.; 2 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. This course is listed as Social Statistics 51. (see page 80)

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

61-62. Introduction to Statistical Methods. Graphical representation of statistical data, frequency distribution, averages, measures of dispersion, index numbers, linear correlation, time series.

Prereq.: One year of college mathematics, or its equivalent. Students who have credit for mathematics 41-42 cannot register for this course. 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.

Prereq.: Mathematics 61-62. 3 rec.; 3 cr.

71-72. Advanced Algebra. Matrix theory, including elementary divisors and invariant factors; linear transformations; quadratic bi-linear, and Hermitian forms; invariants and covariants with geometric applications; and topics from the theory of equations, including symmetric functions, and groups of substitutions.

Prereq.: Mathematics 18. 3 rec.; 3 cr. (Given in alternate years; offered in 1942-43.)

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.

Prereq.: Mathematics 18, or 34 and 17. Students preparing to teach mathematics in high school should register for this course. 3 rec.; 3 cr.

101, 102. Complex Variable. The theory of analytic functions of a single complex variable by the methods of Cauchy (integrals), Riemann

(derivatives) and Weierstrass (series), conformal mapping and Riemann's surfaces, and the elementary theory of elliptic functions. Mr. Demos.

Prereq.: Mathematics 51. Hours to be arranged. 3 cr.

103, 104. Functions of a Real Variable. The subject matter of this course may vary from year to year, but the following subjects will always be treated: the real number system, the theory of point sets, Lebesgue integration, the Riesz-Fischer theorem, and functions of bounded variation. Mr. Lewis.

Prereq.: Mathematics 51. Hours to be arranged. 3 cr.

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

Prereq.: Mathematics 61-62. 3 rec.; 3 cr.

107, 108. Infinite Series and Products. This course includes selections from the following topics: theories of irrationals; series of positive terms; convergence tests; general series; double series; transformation of series; infinite products; Fourier, Dirichlet, and power series; special series; and divergent series. Mr. Slobin.

Prereq.: Mathematics 51. Hours to be arranged. 3 cr.

109, 110. Analytical Mechanics. Statics and dynamics of particles and rigid bodies. Lagrange's equations. Mr. Solt.

Prereq.: Mathematics 51. 3 rec.; 3 cr.

111, 112 Potential Theory and Integral Equations. The elementary properties of the Newtonian and logarithmic potential functions with some of their applications to physics and analysis, the general theory of linear integral equations, and the Dirichlet and Neumann problems. Mr. Lewis.

Prereq.: Mathematics 51. Hours to be arranged. 3 cr.

113, 114. Advanced Statistics. This course centers about the problem of sampling and includes such topics as the normal distribution and the

problem of inference, the chi-square test, the t-test, and a study of variance and covariance. Numerous applications are introduced. A general review of the more important statistical methods is included. Mr. Kichline.

Prereq.: Mathematics 63-64. Hours and credits to be arranged.

PHYSICS

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.: Physics 8; mathematics 18. *2* lec.; *2* cr.

54. Acoustics. The principles of sound origins, propagation, and reception. Lectures and recitations.

Prereq.: Physics 1, *2*, or physics 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 are discussed in the lecture periods.

Among topics studied are: cardinal points of a lens system, resolving power, Fraunhofer and Fresnel diffractions, Cornu spiral, Michelson's interferometer, polarization by reflection and by Nicol's prisms, wave plates, the comparison of luminous intensities, and some aspects of spectroscopy.

Prereq.: Physics 1, *2*, *7*, or 8; mathematics 18. *2* lec.; 1 lab.; 4 cr.

56. Modern Experimental Physics. Measurement of the charge on the electron by the Millikan oil drop method; of $\frac{e}{m}$ by cathode ray deflection; of Planck's constant by the investigation of photoelectric cells. Verification of Einstein's photoelectric equation. Work function by Richardson's equation. Experiments with thermocouples, resistance thermometer, optical phyrometer and black body radiation. Modern acoustics. Debye-Sears effect, supersonic acoustic interferometer, radio-activity, geiger counter,

cloud chamber. A part of the course will consist of a development project for each student.

Prereq.: Physics 1, 2; mathematics 18. 2 lec.; 1 lab.; 4 cr.

57-58. Introduction to Theoretical Physics. Equations 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 electro magnetic field; waves; dispersion; Huygens' principle.

Prereq.: Mathematics 18; either physics 1, 2, or physics 7-8. 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.: Physics 7-8; mathematics 18. 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 photo-electric cells.

Prereq.: Physics 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. Mr. Hardy.

Prereq.: Physics 1, 2 or physics 7, 8; mathematics 17-18. 3 lec.; 3 cr.

101, 102. Introduction to Atomic Physics. A course of lectures with accompanying problems and outside reading treating the following subjects: The fundamental experiments and equations of static and dynamic electricity

leading to the electromagnetic theory of Maxwell; various experimental methods of determining the Avogadro number by diffusion, Brownian movement, and measurement by dielectric constant; radiation from accelerated charges, and special relativity; various black body radiation laws and the quantum hypothesis; the Bohr postulates and hydrogenic solution of the Schrodinger equation. Time permitting, other topics will be discussed depending on the interests of the class, such as the photo electric effect, the quantum theory of specific heats, or the electron theory of metallic conduction. Mr. Bennett.

Prereq.: Physics 57, 58. 3 lec.; 3 cr.

104. Luminescent Radiation. Lectures descriptive of experimental researches in the luminescence of solids; with some attention to the luminescence of gases, and non-blackbody radiation in general. Mr. Howes.

Prereq.: Physics 7, 8, 9, 10, 14, or the equivalent. 3 lec.; 3 cr.

105, 106. Electric Oscillations and Electric Waves. Free and forced oscillations of coupled circuits, applications of Fourier's theorem to steady state and transient response of networks, Maxwell's field equations, free and guided waves, reflection, refraction, absorption, application to shielding, waves on wires, wave guides, radiation. Mr. Hall.

Prereq.: Physics 7, 8, 61; mathematics 51-52.

DIVISION OF SOCIAL SCIENCE

Harry W. Smith, *Professor of Economics,* Chairman; Norman Alexander, *Associate Professor of Economics;* Donald C. Babcock, *Professor of History;* Joseph E. Bachelder, Jr., *Associate Professor of Sociology;* Harry D. Berg, *Assistant Professor of History;* Charles W. Coulter, *Professor of Sociology;* Carroll M. Degler, *Assistant Professor of Economics;* M. Gale Eastman, *Dean, college of Agriculture;* Arval L. Erikson, *Assistant Professor of Agricultural Economics;* Harold C. Grinnell, *Associate Professor of Agricultural Economics;* Lashley G. Harvey, *Assistant Professor of Government;* Gibson R. Johnson, *Assistant Professor of History;* Thorsten V. Kalijarvi, *Professor of Government;* Philip M. Marston, *Assistant Professor of History;* Allan B. Partridge, *Assistant Professor of History;* William T. Phillips, *Assistant Professor of*

Economics; Herbert F. Rudd, *Professor of Philosophy;* David O. Walter, *Assistant Professor of Government;* Ruth J. Woodruff, *Associate Professor of Economics;* Harry C. Woodworth, *Professor of Agricultural Economics;* William Yale, *Assistant Professor of History.*

Requirements for Admission to Candidacy

The candidate for admission who intends to do work in the general field of the social studies should qualify to take advanced work in three of the fields of work within the division. To qualify to take advanced work in a field is generally interpreted to mean that the candidate has had one year's work with an average record of 75 in the field as an undergraduate student or its equivalent.

The candidate for admission who intends to do work in a special field (agricultural economics, economics, government, history, or sociology) shall be admitted by agreement between the dean of the Graduate school, the chairman of the division, and the head of the department in which the major is to be taken. The candidate for admission should qualify to do advanced work in the special field chosen. This is generally interpreted to mean that the candidate has had not less than two years' work with an average record of 75 in the special field or its equivalent and one year's work in another field in this division or its equivalent. However, it is highly desirable that the candidate complete three years' work in the special field before being admitted to candidacy.

Requirements for Master of Arts Degree

Additional requirements for the master of arts degree in a social study:

A minimum of 18 and a maximum of 24 credits, including the thesis, in the major field.

A thesis carrying from 3 to 10 credits.

An oral examination on the thesis may be required at the discretion of the department.

Additional requirements for the master of arts degree in social studies:

A thesis carrying from 3 to 6 credits on which an oral examination may be required at the discretion of the departments concerned.

A minimum of 12 and a maximum of 15 credits, including the thesis, in a major field, of which at least six credits must be in courses primarily for graduate students (numbered 101 to 200 or thesis.)

Of the remaining credits, at least three must be from each of two of the other three fields and of these remaining credits, at least three must be in courses primarily for graduate students (numbered 101 to 200).

By vote of the heads of the departments in which the student is offering work for the degree, a written comprehensive examination may be substituted for the thesis, but in such cases the credits allotted for the thesis must be made up by courses. The field or fields of the written comprehensive examination will be agreed upon by the adviser and the candidate before February 1 preceding that June in which the degree is to be taken. The examination will be given during the second week preceding the beginning of final course examinations in the spring semester.

If an oral examination is required, it will be given by a committee appointed by the head of the department with the approval of the chairman of the division.

Social Statistics 51. 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 mathematics 61. 3 lec. or lab.; 3 cr.

*Social Studies-Education (Ss-Ed) 92. Wartime Problems in the Teaching of Social Studies. (First session) Attention will be given to the cooperative adaptation of the content of present courses and the construction of new units to provide for a better understanding of America's role in the war. Publications useful for this purpose will be maintained in a social studies workroom. Any discussion of methods will be closely related to the above objective. 3 cr.

*Not offered in 1942-43, but offered in the 1942 Summer school.

AGRICULTURAL ECONOMICS

51, 52. Special Agricultural Economics. Graduate or undergraduate credit to satisfy a student's needs may be obtained in this course in special cases by permission of the head of the department. Hours of meeting and number of credits to be arranged.

In each of the three seminar courses listed below the needs and interests of each student will be appraised and the readings and conferences will be scheduled accordingly. This schedule may bring the student in contact with several members of the staff.

53. Agricultural Prices. Quantity-price relationships, measures of shifts in demand and supply, determination of prices, price stabilization, market discrimination, time elements in prices, commodity futures, etc.

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, storage control, dumping, reclamation, effect of various patterns of land utilization, the objectives and effect of various action programs.

Elective subject to approval of instructor. 3 lec.; 3 cr.

101, 102. Seminar in Advanced Farm Management. Principles and problems of farm management as applied to the organization and operation of individual farms. Mr. Grinnell. 3 cr.

103. Seminar in Agricultural Prices. The history of agricultural prices and the major factors determining prices. Methods of price analysis. Assigned readings and conferences. Mr. Erikson. 3 cr.

106. Seminar in Land Utilization and Agricultural Policy. An appraisal of national and local policies and proposed action programs affecting American agriculture. Assigned readings and conferences. Mr. Woodworth. 3 cr.

181, 182. Reading and Research in Agricultural Economics. With the advice and consent of the instructor, a student prepared by training and experience to do independent work may register for a reading and research course. The student will undertake assigned problems and readings under the guidance of the instructor.

Hours and credits by arrangement.

Advanced Farm Management—Mr. Grinnell.

Agricultural Prices—Mr. Erikson.

Land Use and Agricultural Policy—Mr. Woodworth.

Experiment Station Research—Mr. Eastman and Mr. Erikson.

ECONOMICS

51. Labor Problems. Historical background and present status of labor organizations and problems.

Prereq.: Economics 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 semester credits in economics and consent of the instructor. 3 lec. or rec.; 3 cr.

53. Money and Banking. Theory and practice of money and banking.

Prereq.: Economics 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 Economics 53. 3 lec. or rec.; 3 cr.

55. Corporations. Development and forms of business organization and combination.

Prereq.: Economics 2. 3 lec. or rec.; 3 cr.

56. Corporation Finance. Methods of financing corporate enterprise.

Prereq.: Economics 2. 3 lec. or rec.; 3 cr.

59, 60. Seminar in Current Economic Problems.

Recitations and reports. 3 cr.

61. Public Regulation of Business. The federal control of business organizations and their activities with special reference to recent legislation affecting industry.

Prereq.: Economics 2. 3 lec. or rec.; 3 cr.

*72. Economics of Consumption. (First session) This course is intended to acquaint the student with the problems met by the consumer and with the literature of the field. Attention will be given to the importance of consumption, the ways in which consumers arrive at choices, the factors that bear on choices, consumer standards, the price system, the part the government plays, consumer cooperation, and related topics. Attention will be given also to the sellers' side of the problem. Open to graduate students and upperclassmen.

Prereq.: Economics 1-2 or its equivalent. 3 cr.

106. Public Administration and Business. A study of the various administrative agencies established by the state and federal governments for the regulation of business. Special attention will be given to the economic and legal problems of the control of business by commissions as exemplified by recent federal legislation. Mr. Alexander.

Prereq. Economics 61. 3 cr.

109, 110. Problems of Corporations. This course is intended to give the properly qualified graduate student an opportunity to pursue his interests in the field of corporations. The topics included for study are corporate organization, combinations, the corporation as a social institution, corporate financial problems, and the governmental regulation of corporations. The course will be conducted entirely by conference and the student will be largely on his own under the guidance of the instructor. Frequent reports on progress and a final written report are required. Attention to sound methods of research will be stressed. Mr. Degler.

Prereq.: Two years' work in economics including at least one year's work in principles or theory. Credits to be arranged.

157, 158. History of Economics. A critical account of the development of economic thought in the leading nations of the western world; the eco-

*Not offered in 1942-43, but offered in the 1942 Summer school.

nomic systems of Greece, Rome, medieval and modern Europe, including the manorial, guild, mercantile, kameralistic, physiocratic, laissez faire, classical, historical, and socialistic systems; and the important relations of economic philosophy to historical, political, and social environment. Mr. Smith.

Prereq.: A satisfactory average in 12 semester credits in economics. 3 lec. or rec.; 3 cr.

181, 182. Reading and Research in Economics. With the advice and consent of the instructor, a student prepared by training and experience to do independent work may register for a reading and research course. The student will undertake assigned problems and readings under the guidance of the instructor. Hours and credits by arrangement.

Labor—Mr. Smith.
American Economic History—Miss Woodruff.
Government Regulation—Mr. Alexander.
Corporations and Marketing—Mr. Degler.
Banking—Mr. Phillips.

GOVERNMENT

51. Constitutional Law. The case study of the constitutional development of the United States in terms of supreme, federal, and state court decisions.

Prereq.: One year's work in government. 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.: Government 7-8 or 51, or economics 21-22. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1942-43.)

55, 56. International Relations and World Government. The forms of international organizations and world politics. The rise of the modern nations and their relation to each other. The international world in which we live.

Prereq.: Two years' work in government. 3 lec. or rec.; 3 cr.

58. Public Administration. The administration of modern states; administrative law; public relations; personnel; financial administration;

governmental reporting; staff functions; public health; welfare; judicial administration; conservation of natural resources; government in business; government promotion of commerce and industry; and the construction of public works.

Prereq.: Government 3-4 or equivalent. 3 lec.; 3 cr. (Given in alternate years; offered in 1942-43.)

61, (61). Community Planning. An introduction to the subject of community planning having as purposes: (1) the acquainting of the student with planning programs and what has been done in the field, and (2) the introduction of the student to specialized training for planning. Detailed techniques and design will be avoided. The department of civil engineering will cooperate with the department of government in offering this course. 3 rec.; 3 cr.

*62. Public Administration. The administration of modern states; administrative law; public relations; personnel; financial administration; governmental reporting; staff functions; public health; welfare; judicial administration; conservation of natural resources; government in business; government promotion of commerce and industry; and the construction of public works. 3 cr.

*71. Government in the United States. A survey of the organization, functions, policies, and work of the federal, state, and local governments in the United States, with special emphasis upon the more recent and important changes. 3 cr.

*73. History of Peace Programs. The proposals and plans projected in the past and present to eliminate war and to establish permanent peace. Some examples of plans to be studied are that of Pierre Dubois, Sully's "Grand Design," the "League of Nations," and the "Atlantic Charter." 3 cr.

*75. Government of the Dictatorships. A factual study of the form, practices, and character of the governments of Italy, Japan, Germany, Russia, and such other dictatorial states as time will permit. 3 cr.

63, 64. Seminar. Papers on assigned topics, and reports under the guidance of the department head. Hours to be arranged. 1-4 cr.

*Not offered in 1942-43, but offered in the 1942 Summer school.

101, 102. Internships. A limited number of graduate students will be appointed each year by the department of government to serve in some department of the state or local government. The work of the student during this period will count toward a master's degree in the social studies. If consistent with the interneship, and it is possible for the interne to visit the campus once a week, he may take special seminar work not to exceed five credits. Details will be arranged individually in each case, and all work off campus will be closely supervised. Mr. Kalijarvi, Mr. Harvey.

Credits not to exceed 10 semester hours per semester.

103, 104. Seminar in Public Administration. This course is concerned with administrative techniques and procedure and deals with budgetory process, personnel direction, administrative organization and management, public reporting, control standards of administrative effectiveness, the interrelations of local, state, and federal governments along functional lines, and comparative material drawn from administrative procedure abroad. Mr. Kalijarvi, Mr. Harvey. 1 rec.; 3 cr.

107, 108. Political Theory. A study of the classics of political thought: Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, Burke, Paine, Adam Smith, Ricardo, Bentham, Marx, and others. Analysis of the political philosophy of the several 19th century schools. A philosophical approach to modern political problems. Mr. Walter.

Prereq.: Two years' work in government. 3 lec. or rec.; 3 cr.

*111. United States at War. A seminar dealing with the impact of the current war on the government, people, and institutions of the United States. Among the topics to be covered are the war budget, new governmental agencies such as the O.C.D. and W.P.B., production for defense, problems of education, and the correlation of policy with generalship. The changes will be studied jointly by the instructor and the class. Work will consist of class papers and reports on topics assigned by the instructor. Some work in American government or history is prerequisite. Mr. Kalijarvi. 3 cr.

181, 182. Reading and Research in Government. With the advice and consent of the instructor, a student prepared by training and experience

*Not offered in 1942-43, but offered in the 1942 Summer school.

to do independent work may register for a reading and research course. The student will undertake assigned problems and readings under the guidance of the instructor. Hours and credits by arrangement.

International Law and Relations—Mr. Kalijarvi.
Current Political Problems and Public Policy—Mr. Kalijarvi.
Governmental Administration—Mr. Harvey.
Legislation—Mr. Harvey.
Political Theory—Mr. Walter.

HISTORY

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. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1942-43.)

53-54. Latin America. A study of the transplanting of Iberian civilization to the New World and an analysis of Latin-American institutions from the colonial epoch to the present time (an extramural course).

Prereq.: Permission of the instructor. 2 lec. or rec.; 2 cr.

55, 56. The Philosophy of History. (1) Chronology and periodizing, and teaching methods having to do with dates. (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. 2 lec. or discussions; 2 cr. (Given in alternate years; not offered in 1942-43.)

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.

Prereq.: History 7-8 or 51-52. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1942-43.)

61, 62. The World War. The 19th and 20th century background and causes for the world war; the military, political, economic and social developments during the course of the war; the Paris peace conference.

Prereq.: Permission of instructor. 3 rec.; 3 cr.

63, 64. Recent World History. The post-war world, exclusive, for the most part, of American affairs, and stressing the historical developments in Europe, the Near and Far East.

Prereq.: Permission of instructor. 3 lec. or rec.; 3 cr.

65-66. Recent and Contemporary American History. Developments in American life since the opening of the twentieth 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. 2 lec., rec., or discussions; 2 cr.

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. 2 lec., or discussions; 2 cr. (Given in alternate years; offered in 1942-43.)

*69. Foundations of Democracy. Starting with the assumption that there will be, following the present war and as a result of it, a renewed attempt at world organization, and with a further assumption that this will be largely shaped by the democratic nations, this course of study attempts to clarify such topics as: The European backgrounds of American democratic ideas; the origin of the Bill of Rights and of responsible government; American variants of the democratic pattern; and the philosophical basis for democracy. 3 cr.

*72. Modern Europe, 1714-1914. A continuation of the evolution of modernEurope from 1714 to the opening of the first world war. 3 cr.

*76. History of England and the British Empire in the 19th and 20th Centuries. The development of the democratic reform in England and its spread throughout the Empire. 3 cr.

*78. History of the United States, 1789-1861. The evolution of the United States as a constitutional democratic republic; the development of

*Not offered in 1942-43, but offered in the 1942 Summer school.

American nationality; the westward movement; immigration; industrial development and sectional interest. 3 cr.

*86. The History of Latin America. The relationship between the countries of Latin America and the United States in the 19th and 20th centuries. 3 cr.

History-Education (Hist-Ed) 91. Problems in the Teaching of High School History. The purposes and objectives of teaching high school history; selection and organization of teaching material; teaching and testing techniques which may be advantageously used in teaching high school history; experiments in studying and teaching history.

Open to students who have satisfactorily completed history 7-8, government 1, 2, economics 1-2 or 3, 4, and education 61. 3 class meetings; 3 cr.

History-Education (Hist-Ed) 92. Practicum in the Teaching of History in the High School.

**111, 112. Seminar in the History of New England. For graduate students who wish to specialize in some phase of New England history or the history of New Hampshire. The work is concerned primarily with the study and interpretation of source material and can be correlated with the preparation of a thesis. Only students who are especially well prepared should attempt the work. Mr. Marston.

Prereq.: Permission of the instructor. Hours and credits to be arranged. (Not offered in 1942-43.)

121, 122. Seminar in the History of Religions. An investigation of the origin and development of primitive religion. The nature of religion as indicated by its historic manifestations. One or more of the living religions will be selected for special study. Opportunity will be given for individual investigation of topics. Mr. Johnson.

Prereq.: Permission of the instructor. Hours and credits to be arranged. (Not offered in 1942-43.)

123, 124. Historiography. The lives and writing of some leading historians from earliest times to the present, and their contributions to scope, method, viewpoint, and literary achievement. Mr. Partridge.

*Not offered in 1942-43, but offered in the 1942 Summer School.

**History 111 will be offered in the 1942 Summer School.

Prereq.: Permission of the instructor. Hours and credits to be arranged. (Not offered in 1942-43.)

181, 182. Reading and Research in History. With the consent of the instructor, a student prepared by training and experience to do independent work may register for a reading and research course. The student will undertake assigned problems and reading under the guidance of the instructor. Hours and credits to be arranged.

Philosophy of History—Mr. Babcock.
History of Religions—Mr. Johnson.
Colonial and New England History—Mr. Marston.
Latin America—Mr. Partridge.
Philosophy—Mr. Rudd.
Recent and Contemporary Europe—Mr. Yale.
History of the United States since 1789—Mr. Berg.

PHILOSOPHY

Philosophy 71. Art of Thinking: Logic. The many factors which determine the quality of human thinking as trustworthy or untrustworthy; the aids to better thinking practices. 3 lec. or rec.; 3 cr.

Philosophy 81, 82. Historical Introduction to Philosophy. Two objectives are approached simultaneously: (1) an understanding of the succession of philosophic systems and the great philosophers who projected them, from the beginning of Greek philosophy to the present; (2) a systematic survey of the persistent problems of life as philosophers have seen them, and of the types of philosophic world-view that have contested for acceptance. 3 lec. or rec.; 3 cr. (Given in alternate years; not offered in 1942-43.)

Philosophy 83, 84. Ethics; Historical and Applied. First semester: Social values and ethical judgments as they have evolved in the history of man. Second semester: Problems of conduct in this changing world including personal, vocational and institutional ethics. 3 lec. or rec.; 3 cr. (Given in alternate years; offered in 1942-43.)

Philosophy 101, 102. Problems in Philosophy: Seminar. A study of special problems by means of conferences, assigned readings, and term papers. The study of recent philosophical writings provides a great variety of materials for this course. Students are admitted only by special permission. Mr. Rudd. Hours and credits to be arranged.

SOCIOLOGY

53. Cultural Anthropology and Ethnology. (1) A comparative study of primitive folkways, 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.

Prereq.: Sociology 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.

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

*55. Science of Society. This course will include a survey of the field of sociology; underlying laws of social interaction; ecological factors; social processes; institutions; social trends, problems, and controls. Emphasis will be placed on the synthesis of theories; books and writers in the field. A rapid reading of typical literature will be required. This course is designed for seniors and graduates desirous of getting a perspective of the recent contributions of sociology and their practical contemporary application. 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.

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

*Offered alternate years in Summer school, offered in 1942.

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 areas of homes; the effect of the city upon community life, the family, church, school, unorganized group behavior, and attitudes and life organization of the person.

Prereq.: Sociology 1 and 2. 3 lec. or rec.; 3 cr.

61. Social Pathology. Personal, institutional and community disorganization. The social factors involved in alcoholism, drug addiction, prostitution, poverty, vagrancy, juvenile and adult delinquency, divorce and desertion; instances of the break-down of public opinion, and of community, family, religious and legal sanctions as forces for social control. 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.

Prereq.: Sociology 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.

Prereq.: Sociology 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.

Prereq.: Sociology 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.

Prereq.: Sociology 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.

Prereq.: Sociology 1 and 2. 3 lec. or rec.; 3 cr.

75. Methods of Social Research. The application of the historical survey, statistical, and case methods to social data; the use of bibliography, definition and selection of the problem, determination of the data needed, collection and arrangement of data for presentation and exposition.

Prereq.: Sociology 1 and 2. 3 lec. or rec.; 3 cr.

84. Methods of Social Progress. Efforts to improve social conditions and attain a larger measure of social justice; community experiments; development of modern social legislation; application of principles of insurance to social problems; various forms of mutual aid and philanthropy; endowments and special foundations.

Prereq.: Sociology 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, and social welfare agencies; significance to the community of its organization and financing; church federation and union.

Prereq.: Sociology 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.

Prereq.: Sociology 1 and 2. 3 lec. or rec.; 3 cr.

95, 96. Sociological Research. A workroom course for students who have had at least twelve hours in sociology and who have completed sociology 75. Research projects will be set up in conference with the instructor and worked out individually or in groups by members of the class. Emphasis is placed on techniques of gathering data and on presentation of the findings.

Prereq.: Sociology 75. Hours to be arranged. 3 cr.

105, 106. Development of Sociological Thought. The history of sociological thought, with special reference to the writings of Comte, Spencer, and the later writers of the nineteenth-century; a comparison of contemporary sociological systems. Mr. Coulter.

Prereq.: Permission of the instructor. 3 lec. or rec.; 3 cr.

107. Social Trends. A study of the efforts to improve conditions in the United States and to attain a larger measure of social justice; communal experiments and theories, social legislation, philanthropy, social work, cooperatives, foundations, European influences, and the New Deal program. Mr. Coulter. 3 cr.

181, 182. Reading and Research in Sociology. With the consent of the instructor, a student prepared by training and experience to do independent work may register for a reading and research course. The student will undertake assigned problems and readings under the guidance of the instructor. Hours and credits by arrangement.

Social Control—Mr. Coulter.
Consumer Credit—Mr. Coulter.
Social Disorganization—Mr. Bachelder.
Research Technique—Mr. Bachelder.

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