

LYMAN BRIGGS SCHOOL

LBS

Lyman Briggs School College of Natural Science

117 College Algebra and Trigonometry

Fall, 3(3-0) P:M: Designated score on Mathematics placement test. R: Open only to students in Lyman Briggs School. Not open to students with credit in MTH 103 or MTH 116.

Rational and real numbers. Functions and inverses. Equations, simultaneous equations. Inequalities.

118 Calculus I

Fall, Spring, 5(5-0) P:M: (LBS 117 or MTH 116 or MTH 114) or designated score on Mathematics placement test. R: Open only to students in Lyman Briggs School. Not open to students with credit in MTH 132 or MTH 133 or MTH 152H.

Limits, continuity, differentiation, integration, and elementary applications.

119 Calculus II

Fall, Spring, 4(4-0) P:M: LBS 118 R: Open only to students in Lyman Briggs School. Not open to students with credit in MTH 133 or MTH 153H or MTH 235.

Continuation of LBS 118. Further applications of one variable calculus. Infinite series. Ordinary differential equations.

126 Personal Computers and Networks

Fall, Spring, 3(3-0) R: Open only to students in Lyman Briggs School. Not open to students with credit in CSE 101.

Selecting, installing and using personal computer software and hardware. Computer networks.

133 Introduction to Science and Technology Studies

Fall, Spring, 4(4-0) P:M: Designated score on English placement test. R: Open only to students in Lyman Briggs School. Not open to students with credit in AL 192 or AL 192H or ATL 110 or ATL 120 or ATL 125 or ATL 130 or ATL 135 or ATL 140 or ATL 145 or ATL 150 or ATL 195H or MC 111 or MC 112 or ATL 115.

Instruction and practice in expository writing. Paper and report topics drawn from readings in the history, philosophy, and other areas of science and technology.

144 Biology I: Organismal Biology

Fall, Spring, 4(3-3) R: Open only to students in Lyman Briggs School. Not open to students with credit in BS 110.

Modern biology at the organismal level of integration. Principles of genetics, evolution, ecology, and organismal diversity as interactive units.

145 Biology II: Cellular and Molecular Biology

Fall, Spring, 5(3-4) P:M: (LBS 144 or BS 110 or LBS 148H) and (CEM 141 or (CEM 151 or concurrently) or (CEM 181H or concurrently) or (LBS 171 or concurrently)) R: Open only to students in Lyman Briggs School. Not open to students with credit in BS 111.

Modern biology mainly at the cellular level of integration. Principles of cell structure and function are used to explain processes of bioenergetics, protein synthesis, and development.

148H Honors Organismal Biology

Fall, 3(3-0) Interdepartmental with Biological Science. Administered by Biological Science. Not open to students with credit in BS 110 or LBS 144.

Diversity and basic properties of organisms, with emphasis on genetic principles, ecological interactions, and the evolutionary process. Historical approach to knowledge discovery.

149H Honors Cell and Molecular Biology

Spring, 3(3-0) Interdepartmental with Biological Science. Administered by Biological Science. P:M: (CEM 141 or concurrently) or (CEM 151 or concurrently) or (CEM 181H or concurrently) or (LBS 171 or concurrently) Not open to students with credit in BS 111 or LBS 145.

Exploration of the physicochemical and molecular organization of cells as the unifying framework for genetics, evolution, and the social relevance of biology.

158H Honors Organismal Biology Laboratory

Fall, 2(1-3) Interdepartmental with Biological Science. Administered by Biological Science. Not open to students with credit in BS 110 or LBS 144. C: BS 148H concurrently.

Basic procedures used by organismal biologists, including experimental design and statistical methods. Development and implementation of research projects to test hypotheses in genetics, ecology, and evolution.

159H Honors Cell and Molecular Biology Laboratory

Spring, 2(1-3) Interdepartmental with Biological Science. Administered by Biological Science. Not open to students with credit in BS 111L or LBS 145. C: BS 149H concurrently.

Basic techniques of cellular and molecular biology including experimental design and hypothesis formulation. Student-initiated projects to test hypothesis-driven projects in biochemistry, molecular biology or genetics.

171 Principles of Chemistry I - Structure

Fall, 4(4-0) P:M: (LBS 117 or concurrently or MTH 116 or concurrently or MTH 132 or concurrently or MTH 133 or concurrently or MTH 152H or concurrently or LBS 118 or concurrently or LBS 119 or concurrently) R: Only open to students in Lyman Briggs School. SA: LBS 165 Not open to students with credit in CEM 141 or CEM 151 or CEM 181H. C: LBS 171L concurrently.

Chemical principles: structure and bonding, periodic properties. Stoichiometry, states of matter. Solutions, acids and bases, equilibria, thermodynamics, and kinetics.

171L Introductory Chemistry Laboratory I

Fall, 1(0-3) R: Open only to students in Lyman Briggs School. SA: LBS 165L Not open to students with credit in CEM 161 or CEM 185H. C: LBS 171 concurrently.

Determination of density and molecular weight. Stoichiometry. Acid-base titration, redox titration. Reaction kinetics, thermochemistry, Beer's law, freezing point depression, and equilibrium constants.

172 Principles of Chemistry II - Reactivity

Spring, 3(4-0) P:M: (LBS 171 or CEM 141 or CEM 151 or CEM 181H) and (LBS 171L or CEM 161 or CEM 185H) R: Only open to students in Lyman Briggs School. SA: LBS 266 Not open to students with credit in CEM 142 or CEM 152 or CEM 182H.

Spectroscopy, coordination chemistry, solubility and stability constants. Electrochemistry, main group chemistry, atmospheric chemistry, and organometallic chemistry. Polymers and biochemistry.

172L Principles of Chemistry II - Reactivity Laboratory

Spring, 1(0-3) P:M: (LBS 171 or CEM 141 or CEM 152 or CEM 182H) and (LBS 171L or CEM 161 or CEM 185H) and (LBS 172 or concurrently) R: Open only to students in Lyman Briggs School. SA: LBS 266L Not open to students with credit in CEM 162 or CEM 186H.

Synthesis and characterization of chemical systems.

220 Calculus III

Fall, Spring, 5(5-0) P:M: (LBS 119 or MTH 133) R: Open only to students in Lyman Briggs School. Not open to students with credit in MTH 234 or MTH 235 or MTH 254H or MTH 255H.

Continuation of LBS 119. Three-dimensional vector geometry, differential calculus of functions of two or three variables. Double and triple integrals, line integrals.

246 Experimental Projects in Biology

Spring, 1 to 3 credits. A student may earn a maximum of 5 credits in all enrollments for this course. P:M: (LBS 145) or (BS 111 and BS 111L) or (LBS 149H and LBS 159H) and completion of Tier I writing requirement. R: Open only to students in Lyman Briggs School.

Experiments and field studies. Selected problems in biology such as cell structure and metabolism, diversity, stability, evolution of natural communities, and reproductive biology.

271 Physics I

Fall, 3(4-0) P:M: MTH 132 or LBS 118 or MTH 152H R: Open only to students in Lyman Briggs School. SA: LBS 164 Not open to students with credit in PHY 181B or PHY 183 or PHY 183B or PHY 193H or PHY 231 or PHY 231B or PHY 231C.

Basic physics principles, problem solving techniques. Mechanical systems, elementary thermodynamics, vibrations and waves. Atoms and nuclei.

271L Physics Laboratory I

Fall, 1(0-3) P:M: LBS 271 or concurrently R: Open only to students in Lyman Briggs School. SA: LBS 164L Not open to students with credit in PHY 191 or PHY 251.

Techniques and instruments in the physics laboratory. Selected experiments in classical and modern physics.

272 Physics II

Spring, 3(4-0) P:M: (LBS 118 or MTH 133 or MTH 153H) and LBS 271 R: Open only to students in Lyman Briggs School. SA: LBS 267 Not open to students with credit in PHY 182B or PHY 184 or PHY 184B or PHY 232 or PHY 232B or PHY 294H or PHY 232C.

Principles of electromagnetic theory, special relativity, quantum physics, optics, atomic and subatomic physics.

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- 272L Physics Laboratory II**
Spring. 1(0-3) P:M: LBS 271L and (LBS 272 or concurrently) R: Open only to students in Lyman Briggs School. SA: LBS 267L. Not open to students with credit in PHY 192 or PHY 252.
Selected experiments in classical and modern physics.
- 290A Directed Study-Multidisciplinary**
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open to undergraduate students in the Lyman Briggs School or approval of school.
Directed studies involving at least two Lyman Briggs School curricular areas: biology, chemistry, physics, mathematics, history, philosophy, and sociology of science.
- 290B Directed Study--Biology**
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to students in Lyman Briggs School.
Directed studies in biology.
- 290C Directed Study--Chemistry/Physics**
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to students in Lyman Briggs School.
Directed studies in chemistry and physics.
- 290D Directed Study--Mathematics**
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to students in Lyman Briggs School.
Directed studies in mathematics.
- 290E Directed Study--Science and Technology Studies**
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to students in Lyman Briggs School.
Directed study in science and technology studies.
- 290F Directed Study--Computing**
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to students in Lyman Briggs School.
Directed studies in computing.
- 330 Topics in Science and Technology Studies**
Fall, Spring. 4(4-0) P:M: (LBS 133) and completion of Tier I writing requirement R: Open only to students in Lyman Briggs School majors. SA: LBS 239
Topics in history, sociology, and philosophy of science and technology. Science policy.
- 331 Literature and Science**
Spring. 4(4-0) P:M: Completion of Tier I writing requirement. R: Open only to sophomores or juniors or seniors in Lyman Briggs School.
Representations of science and technology in texts drawn from science fiction, Gothic, and utopian literature or mainstream writings.
- 332 Technology and Culture**
Fall. 4(4-0) Interdepartmental with American Studies. Administered by Lyman Briggs School. P:M: Completion of Tier I writing requirement. R: Open only to juniors or seniors in the American Studies major or in Lyman Briggs School.
History of technology with special emphasis on the interaction of technical innovation and other elements of culture.
- 333 Topics in History of Science**
Fall, Spring. 4(4-0) A student may earn a maximum of 8 credits in all enrollments for this course. P:M: Completion of Tier I writing requirement. R: Open only to juniors or seniors in Lyman Briggs School.
Various themes or periods in physical/biological science. May emphasize patterns of theory development, changes in explanatory aims and standards or interaction of social and cultural factors with scientific ideas, practices, instrumentation or experimentalism.
- 334 Science, Technology and Public Policy**
Spring. 4(4-0) P:M: Completion of Tier I writing requirement. R: Open only to sophomores or juniors or seniors in Lyman Briggs School.
Science and technology in public policy formation considered from the perspectives of the history, philosophy, and sociology of science and technology.
- 335 The Natural Environment: Perceptions and Practices**
Fall of even years, Spring. 4(4-0) Interdepartmental with American Studies. Administered by Lyman Briggs School. P:M: (LBS 133) or completion of Tier I writing requirement R: Open to students in the Lyman Briggs School or in the American Studies major or in the Science, Technology, Environment and Public Policy Specialization.
American attitudes toward the natural environment and related public and private institutions.
- 336 Gender, Science, Technology (W)**
Spring. 4(4-0) P:M: (LBS 133) or completion of Tier I writing requirement RB: LBS 144 and LBS 145 R: Open to students in the Lyman Briggs School or in the Bioethics, Humanities, and Society Specialization. Approval of school.
Significance of gender in relation to science, technology, the environment, and medicine.
- 347 Advances in Applied Biology**
Fall. 3(2-3) P:M: (LBS 145) or (BS 111 or concurrently and BS 111L) or (LBS 149H or concurrently and LBS 159H) and completion of Tier I writing requirement. R: Open only to juniors or seniors in Lyman Briggs School.
Advances in cell and molecular biology and application: plant and animal breeding, environment, and therapeutics.
- 355 Philosophy of Technology**
Spring. 4(4-0) Interdepartmental with Philosophy. Administered by Lyman Briggs School. P:M: Completion of Tier I writing requirement. R: Open only to sophomores or juniors or seniors in Lyman Briggs School or the Department of Philosophy.
Examination of the desirability of technology, its social forms, and its alternatives. Conventional productivist, ecological progressive, and radical humanist outlooks.
- 368 Science, Technology and Society**
Fall. 3(3-0) Interdepartmental with Sociology. Administered by Sociology. RB: (LBS 133) or some familiarity with basic concepts and methods in sociology. R: Not open to freshmen or sophomores.
Role of science and technology in social change. Values and ethics in contemporary perspectives, controversies, and cases. Science and technology as forms of knowledge.
- 415 Methods of Theoretical Physics**
Spring of odd years. 4(4-0) Interdepartmental with Physics. Administered by Lyman Briggs School. P:M: ((MTH 234 or concurrently) or (LBS 220 or concurrently) or (MTH 254H or concurrently)) and (LBS 271 or PHY 183 or PHY 193H) and (LBS 272 or PHY 184 or PHY 294H) RB: (MTH 235 or concurrently) or (MTH 255H or concurrently)
Mathematical methods as applied to physical problems in mechanics, electromagnetism, and thermodynamics. Topics include multiple integration, vector calculus, Fourier series, ordinary and partial differential equations, eigenvector problems, coordinate transformations, and complex analysis. Applications include Newtonian mechanics, rigid body dynamics, heat flow, electrostatics, harmonic motion, and wave propagation.
- 425 American and European Health Care since 1800**
Spring. 4(4-0) Interdepartmental with History. Administered by History. P:M: Completion of Tier I writing requirement. R: Not open to freshmen.
Social and cultural transformation in health care delivery since 1800, primarily in North America and western Europe. Therapeutic revolutions. Medical education and professionalization. Social and alternative medicine. Managed care.
- 483 Literature and Medicine**
Spring. 3(3-0) Interdepartmental with English. Administered by English. P:M: Completion of Tier I writing requirement. R: Not open to freshmen or sophomores.
Human dimensions of medicine as seen in literature. Health, illness, mortality. Medical dilemmas. Physical and psychological self. Psychological theories used in interpreting literature.
- 490A Advanced Directed Study--Multidisciplinary**
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open to juniors or seniors in the Lyman Briggs School.
Directed advanced studies involving at least two Lyman Briggs School curricular areas: biology, chemistry, physics, mathematics, history, philosophy, sociology of science, and computing.
- 490B Advanced Directed Study--Biology**
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to juniors or seniors in Lyman Briggs School.
Directed advanced studies in biology.

490C Advanced Directed Study--Chemistry or Physics

Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to juniors or seniors in Lyman Briggs School.

Directed advanced studies in chemistry or physics.

490D Advanced Directed Study--Mathematics

Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Not open to freshmen or sophomores. Open only to Lyman Briggs School majors.

Directed advanced studies in mathematics.

490E Advanced Directed Study--Science and Technology Studies

Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to juniors or seniors in Lyman Briggs School.

Directed advanced studies in science and technology studies.

492 Senior Seminar

Fall, Spring. 4(4-0) RB: (LBS 239 or LBS 330 or LBS 331 or LBS 332 or LBS 333 or LBS 334 or LBS 335 or LBS 355 or LBS 490E or HST 425) or completion of Tier I Writing requirement R: Open only to juniors or seniors in Lyman Briggs School.

Selected problems in the study of science and technology as human activities, using philosophical, historical, literary, social science or interdisciplinary perspectives or methods. Development and defense of thesis paper.

493 Field Experience

Fall, Spring. 1 to 10 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to juniors or seniors in Lyman Briggs School.

Experiential learning related to the public or private practice of science and technology.