

## LYMAN BRIGGS

## LB

## Lyman Briggs College

**105C Preparatory - Physics**

Summer. 1(1-0) Interdepartmental with Physics. Administered by Lyman Briggs. RB: College Algebra

Preparation for the introductory physics sequence: mathematical concepts, notations, representations, effective problem solving techniques and study strategies.

**106 Preparation for Science and Engineering**

Fall. 1(1-0) Interdepartmental with Engineering. Administered by Engineering. R: Open to freshmen. Approval of college.

Academic and environmental aspects to college success. Review of math and science fundamentals and development of writing skills. Introduction to Science, Technology, Engineering, and Mathematics (STEM) careers.

**118 Calculus I**

Fall, Spring. 4(4-0) P: (MTH 114 or MTH 116) or designated score on Mathematics Placement test RB: College Algebra and Trigonometry R: Open to students in the Lyman Briggs College. SA: LBS 118 Not open to students with credit in MTH 152H or MTH 132 or MTH 153H.

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

**119 Calculus II**

Fall, Spring. 4(4-0) P: LB 118 or MTH 132 or MTH 152H R: Open to students in the Lyman Briggs College. SA: LBS 119 Not open to students with credit in MTH 133 or MTH 153H.

Continuation of LB 118. Integration techniques, elementary differential equations, parametric curves, polar coordinates, sequences and series, vectors, and vector operations.

**133 Introduction to History, Philosophy, and Sociology of Science**

Fall, Spring. 4(4-0) P: Designated score on English Placement test R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 133 Not open to students with credit in RCAH 111 or WRA 101 or WRA 195H.

Introduction to the history, philosophy, and sociology of science, technology, the environment, and medicine. Instruction and practice in formal writing.

**144 Biology I: Organismal Biology**

Fall, Spring. 4(3-3) R: Open to students in the Lyman Briggs College. SA: LBS 144 Not open to students with credit in BS 162 or BS 172 or BS 182H or BS 192H.

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: (LB 144 or (BS 162 and BS 172) or (BS 182H and BS 192H)) and (LB 171 or CEM 141 or CEM 181H or CEM 151) R: Open to students in the Lyman Briggs College. SA: LBS 145 Not open to students with credit in BS 161 or BS 171 or BS 181H or BS 191H.

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

**155 Introduction to Quantitative Science and Research**

Fall. 3(2-3) P: (MTH 1825 or concurrently) or (MTH 103 or concurrently) R: Open to freshmen in the Lyman Briggs College.

Exploration of fundamental chemistry, biology, physics, mathematics and statistics. Quantitative analysis and research.

**171 Principles of Chemistry I**

Fall. 4(4-0) P: MTH 114 or (MTH 116 or concurrently) or (MTH 132 or concurrently) or (MTH 133 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently) or (LB 119 or concurrently) R: Open to students in the Lyman Briggs College. SA: LBS 165, LBS 171 Not open to students with credit in CEM 141 or CEM 151 or CEM 181H. C: LB 171L concurrently.

Stoichiometry, quantum mechanics and interactions of light with matter, periodic trends, Lewis dot structures, molecular structure, polarity and intermolecular forces, valence bond theory, introduction to organic chemistry, enthalpy and heat transfer.

**171L Introductory Chemistry Laboratory I**

Fall. 1(0-3) R: Open to students in the Lyman Briggs College. C: LB 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**

Spring. 3(4-0) P: LB 171 or CEM 141 or CEM 151 or CEM 181H R: Open to students in the Lyman Briggs College. C: LB 172L concurrently.

Gases, properties of solutions, introduction to solid state chemistry, molecular orbital theory, chemical equilibria, chemical kinetics, acid/base equilibria, solubility equilibria, entropy, free energy, electrochemistry, redox reactions, nuclear chemistry.

**172L Principles of Chemistry II - Reactivity Laboratory**

Spring. 1(0-3) P: (LB 171 or CEM 141 or CEM 152 or CEM 182H) and (LB 171L or CEM 161 or CEM 185H) R: Open to students in the Lyman Briggs College. C: LB 172 concurrently.

Synthesis and characterization of chemical systems.

**181 Introduction to Science, Technology, the Environment and Public Policy**

Fall. 3(3-0) Interdepartmental with Fisheries and Wildlife and James Madison College. Administered by Fisheries and Wildlife.

Relation of science and technology to ethics and public policy. Environmental law and public policy. Managing fish, water and wildlife resources at state, national, and international levels. Science and technology in developing countries. Impacts of military technology on environmental policy.

**181H Honors Cell and Molecular Biology**

Spring. 3(3-0) Interdepartmental with Biochemistry and Molecular Biology and Biological Science and Microbiology and Molecular Genetics. Administered by Biological Science. P: (CEM 141 or concurrently) or (CEM 151 or concurrently) or (CEM 181H or concurrently) or (LB 171 or concurrently) SA: BS 149H, BS 111 Not open to students with credit in BS 161 or LB 145.

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

**182H Honors Organismal and Population Biology**

Fall. 3(3-0) Interdepartmental with Biological Science and Integrative Biology and Plant Biology. Administered by Biological Science. SA: BS 148H, BS 110 Not open to students with credit in LB 144.

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

**191H Honors Cell and Molecular Biology Laboratory**

Spring. 2(1-3) Interdepartmental with Biochemistry and Molecular Biology and Biological Science and Microbiology and Molecular Genetics. Administered by Biological Science. P: BS 181H or concurrently SA: BS 159H Not open to students with credit in LB 145.

Basic techniques of cellular and molecular biology including experimental design and hypothesis formulation; biochemistry, molecular biology and genetics.

**192H Honors Organismal and Population Biology Laboratory**

Fall. 2(1-3) Interdepartmental with Biological Science and Integrative Biology and Plant Biology. Administered by Biological Science. P: BS 182H or concurrently SA: BS 158H, BS 110 Not open to students with credit in LB 144.

Nature and process of organismal biology, including experimental design and statistical methods, hypothesis testing, genetics, ecology, and evolution.

**220 Calculus III**

Fall, Spring. 4(4-0) P: LB 119 or MTH 133 or MTH 153H R: Open to students in the Lyman Briggs College. SA: LBS 220

Continuation of LB 119. Differential calculus of functions of two or three variables. Double and triple integrals. Line and surface integrals.

## Lyman Briggs—LB

- 240 Bioethics: Theories and Methods**  
Fall, Summer. 2(2-0) RB: Completion of Tier I Writing Requirement  
Interdisciplinary survey of key theories and methods in bioethics. Topics include aging, cultural diversity, and health care policy.
- 268 Introduction to Health Care Policy and Organization**  
Summer. 3(3-0) P: Completion of Tier I Writing Requirement  
Introductory theories, concepts, and processes for policy, organization, and administration in health care.
- 270 Medical Terminology**  
Summer. 2(2-0) RB: (PSL 250 or PSL 310 or PSL 431) and junior or senior status.  
Medical terminology, focusing on human systems, anatomy and physiology, fundamental word building principles, and phonetic pronunciations.
- 273 Physics I**  
Fall. 4(3-3) P: LB 118 or MTH 132 or MTH 152H R: Open to students in the Lyman Briggs College. SA: LBS 271, LBS 271L, LBS 164 Not open to students with credit in PHY 183 or PHY 231 or PHY 193h or PHY 191 or PHY 251.  
Basic physics principles and problem solving techniques. Mechanical systems (Newton's laws, momentum and energy conservation, rotational motion, gravity), elementary thermodynamics, oscillations and waves, and atomic nuclei. Laboratory techniques, instrumentation, and selected experiments in classical and modern physics.
- 274 Physics II**  
Spring. 4(3-3) P: LB 273 or PHY 183 or PHY 183B or PHY 193H or PHY 233B RB: LB 119 or MTH 133 or MTH 153H R: Open to students in the Lyman Briggs College. SA: LBS 267, LBS 272, LBS 272L Not open to students with credit in PHY 184 or PHY 232 or PHY 294h or PHY 192 or PHY 252.  
Basic physics principles and problem solving techniques. Principles of electromagnetic theory, circuits, special relativity, quantum physics, optics, atomic and subatomic physics. Laboratory error analysis and 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 students in the Lyman Briggs College. SA: LBS 290A  
Directed studies involving at least two Lyman Briggs College 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 to students in the Lyman Briggs College. SA: LBS 290B  
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 to students in the Lyman Briggs College. SA: LBS 290C  
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 to students in the Lyman Briggs College. SA: LBS 290D  
Directed studies in mathematics.
- 290E Directed Study--History, Philosophy, and Sociology of Science**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open to students in the Lyman Briggs College. SA: LBS 290E  
Directed study in history, philosophy, and sociology of science.
- 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 to students in the Lyman Briggs College. SA: LBS 290F  
Directed studies in computing.
- 304 Lesbian, Gay, Bisexual, Transgender, Queer (LGBTQ) and Sexuality Studies**  
Spring. 3(3-0) Interdepartmental with Residential College in the Arts and Humanities and Women's Studies. Administered by Women's Studies. R: Not open to freshmen. SA: WS 204  
Interdisciplinary study of the history, politics, theories, science, cultures, and communities of lesbian, gay, transgender, queer, and intersex people including a global perspective.
- 321A Science and the Public - Arts and Humanities (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of the relationship between science and society, public engagement with science and technology, public expressions of scientific knowledge, and science in culture. Emphasis on scholarship in the arts and humanities.
- 321B Science and the Public - Social Sciences (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of the relationship between science and society, public engagement with science and technology, public expressions of scientific knowledge, and science in culture. Emphasis on scholarship in the social sciences.
- 322A Advances in Science and Technology - Arts and Humanities (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of technology and innovation. Emphasis on methodologies, scholarship, and theoretical approaches from the arts and humanities.
- 322B Advances in Science and Technology - Social Sciences (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of technology and innovation in relation to science and/or medicine. Emphasis on scholarship and methodologies from the social sciences.
- 323A Science in a Global Context - Arts and Humanities (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Explores scientific practice and relevance in a global context. Emphasis on scholarship from the arts and humanities.
- 323B Science in a Global Context - Social Sciences (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Explores scientific practice and relevance in a global context. Emphasis on scholarship from the social sciences.
- 324A Science and Sex, Gender, Sexuality - Arts and Humanities (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of sex, gender, and sexuality in relation to science and/or medicine. Emphasis on scholarship and methodologies from the arts and humanities.
- 324B Science and Sex, Gender, Sexuality - Social Sciences (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of sex, gender, and sexuality in relation to science and/or medicine. Emphasis on scholarship and methodologies from the social sciences.
- 325A Science and the Environment - Arts and Humanities (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of how and why humans have transformed their environments, as well as changes in people's attitudes about nature and wilderness over time. Emphasis on scholarship and methodologies from the arts and humanities.

- 325B Science and the Environment - Social Sciences (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of the interrelationship between human systems and natural systems, including human drivers of environmental impact and solutions to environmental problems. Emphasis on scholarship and methodologies from the social sciences.
- 326A Medicine and Health - Arts and Humanities (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of health and medicine. Emphasis on scholarship and methodologies from the arts and humanities.
- 326B Medicine and Health - Social Sciences (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Interdisciplinary study of health and medicine. Emphasis on scholarship and methodologies from the social sciences.
- 327A Scientific Practice - Arts and Humanities (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Motivations and methodologies of the scientific endeavor, as well as the institutions that support it. Historical perspectives on the development of scientific practice, ethical implications of scientific work, and the impact of cultural practices, norms, and identities on scientific innovation. Emphasis on scholarship and methodologies from the arts and humanities.
- 327B Scientific Practice - Social Sciences (W)**  
On Demand. 4(4-0) P: Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Minor.  
Explores the motivations and methodologies of scientific endeavors and the relationships between science and other major human institutions such as religion, politics, government, and the economy. Emphasis on scholarship and methodologies from the social sciences.
- 330 Topics in History, Philosophy, and Sociology of Science (W)**  
Fall, Spring, Summer of odd years. 4(4-0) P: (LB 133) or completion of Tier I writing requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 330  
Topics in history, philosophy, and sociology of science, technology, the environment, and medicine.
- 331 Literature and Science (W)**  
Fall, Spring. 4(4-0) P: (LB 133) or completion of Tier I writing requirement R: Open to students in the Lyman Briggs College. SA: LBS 331  
Representations of science, technology, the environment, and medicine in texts drawn from science fiction, Gothic, and utopian literature, or mainstream writings.
- 332 Technology and Culture (W)**  
Fall, Spring. 4(4-0) Interdepartmental with American Studies. Administered by Lyman Briggs. P: (LB 133) or completion of Tier I writing requirement R: Open to students in the Lyman Briggs College or in the American Studies major or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 332  
History of technology with special emphasis on the interaction of technical innovation and other elements of culture.
- 333 Topics in History of Science (W)**  
Fall, Spring. 4(4-0) P: (LB 133) or completion of Tier I writing requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 333  
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 (W)**  
Fall of odd years, Spring. 4(4-0) P: (LB 133) or completion of Tier I writing requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 334  
Formation, implementation, and evaluation of public policy related to science, technology, the environment, and medicine.
- 335 The Natural Environment: Perceptions and Practices (W)**  
Fall of even years, Spring. 4(4-0) Interdepartmental with American Studies. Administered by Lyman Briggs. P: (LB 133) or completion of Tier I writing requirement R: Open to students in the Lyman Briggs College or in the American Studies major or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 335  
American attitudes toward the natural environment and related public and private institutions.
- 336 Gender, Sexuality, Science, Technology (W)**  
Spring. 4(4-0) P: (LB 133) or completion of Tier I writing requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 336  
Significance of gender in relation to science, technology, the environment, and medicine.
- 347 Advances in Applied Biology**  
Fall. 3(1-4) P: (LB 145 or (BS 161 and BS 171) or (BS 181H and BS 191H)) and Completion of Tier I Writing Requirement R: Open to students in the Lyman Briggs College. SA: LBS 347  
Advances in cell and molecular biology and application: plant and animal breeding, environment, and therapeutics.
- 348 Research Experiences in Biology**  
Fall, Spring. 3(1-4) A student may earn a maximum of 6 credits in all enrollments for this course. P: ((LB 144 and LB 145) or (BS 161 and BS 162 and BS 171 and BS 172) or (BS 181H and BS 182H and BS 191H and BS 192H)) and ((LB 119 or STT 231) and completion of Tier I writing requirement) R: Open to undergraduate students in the Lyman Briggs College.  
Laboratory, data science, or field research in basic or applied molecular, cellular, or organismal biology. Field trips required.
- 355 Philosophy of Technology (W)**  
Spring. 4(4-0) Interdepartmental with Philosophy. Administered by Lyman Briggs. P: (LB 133) or completion of Tier I writing requirement RB: PHL 200 R: Open to students in the Department of Philosophy or in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 355  
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. 4(4-0) Interdepartmental with Sociology. Administered by Sociology. RB: (LB 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.
- 425 American and European Health Care since 1800**  
Spring. 4(4-0) Interdepartmental with History. Administered by History. P: 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.
- 440 Bioethics Capstone**  
Fall, Spring. 1(1-0) P: LB 240 RB: Completion of 9 credits in the bioethics minor. R: Open to juniors or seniors in the Bioethics, Humanities, and Society Minor.  
Selective topics in bioethics. Analysis of key issues and problems. Case studies.

## Lyman Briggs—LB

**459 Science, Technology, Environment and Public Policy Capstone**  
Fall, Spring. 3(3-0) Interdepartmental with James Madison College. Administered by James Madison College. P: (FW 181 or approval of college) and completion of Tier I writing requirement

Selected topics in science, technology, environment and public policy (STEPPS). Analysis of key issues and problems. Case studies.

**473A Literature and Medicine**  
Spring. 3(3-0) Interdepartmental with English. Administered by English. P: Completion of Tier I Writing Requirement R: Not open to freshmen or sophomores. SA: ENG 483

Human dimensions of medicine as seen in literature. Health, illness, mortality. Medical dilemmas. Physical and psychological self. Psychological theories used in interpreting literature. Cultural history of the body. Theories of embodiment.

**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 students in the Lyman Briggs College. SA: LBS 490A

Directed advanced studies involving at least two Lyman Briggs College 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 to students in the Lyman Briggs College. SA: LBS 490B

Directed advanced studies in biology.

**490E Advanced Directed Study--History, Philosophy, Sociology of Science (W)**

Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. P: (LB 133) or completion of Tier I writing requirement R: Open to students in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 490E

Directed advanced studies in history, philosophy, sociology of science, technology, the environment, or medicine.

**492 Senior Seminar (W)**

Fall, Spring. 4(4-0) P: ((LB 330 or LB 331 or LB 332 or LB 333 or LB 334 or LB 335 or LB 336 or LB 355 or LB 490E) or approval of college) and completion of Tier I writing requirement R: Open to juniors or seniors in the Lyman Briggs College or in the Science, Technology, Environment and Public Policy Specialization. SA: LBS 492

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, Summer. 1 to 10 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open to students in the Lyman Briggs College. SA: LBS 493

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

**494 Undergraduate Research**

Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of college; application required. SA: LBS 494

Faculty-guided undergraduate research.