



Summer 2025 General Education Courses

NATURAL SCIENCE

Courses designed for non-science majors are noted with a double asterisk (**)

BIOLOGY GE

BILD 1. The Cell (4)

An introduction to cellular structure and function, to biological molecules, bioenergetics, to the genetics of both prokaryotic and eukaryotic organisms, and to the elements of molecular biology. Recommended preparation: prior completion of high school- or college-level chemistry course.

BILD 2. Multicellular Life (4)

An introduction to the development and the physiological processes of plants and animals. Included are treatments of reproduction, nutrition, respiration, transport systems, regulation of the internal environment, the nervous system, and behavior. Prerequisites: BILD 1.

BILD 3. Organismic and Evolutionary Biology (4)

The first principles of evolutionary theory, classification, ecology, and behavior; a phylogenetic synopsis of the major groups of organisms from viruses to primates.

BILD 42. Our Sustainable Future (4)

This course will provide an overview of existing methods for energy, food, and materials production and utilization, and describe new technologies for their sustainable production and the consequences of this to our society and the planet.

CHEMISTRY GE

CHEM 6A. General Chemistry I (4)

First quarter of a three-quarter sequence intended for science and engineering majors. Topics include atomic theory, bonding, molecular geometry, stoichiometry, and types of reactions. May not be taken for credit after CHEM 6AH. Recommended: concurrent or prior enrollment in MATH 4C, 10A, or 20A. **Prerequisites:** CHEM 4, or AP Chemistry score of 3, or Math Placement Exam qualifying score, or AP Calculus AB score of 2, or MATH 3C or higher.

CHEM 6B. General Chemistry II (4)

Second quarter of a three-quarter sequence intended for science and engineering majors. Topics include gases, liquids, and solids, thermochemistry and thermodynamics, physical and chemical equilibria, solubility. May not be taken for credit after CHEM 6BH. **Prerequisites:** CHEM 6A or 6AH and MATH 10A or 20A. Recommended: concurrent or prior enrollment in MATH 10B or 20B. (F, W, S)

CHEM 6C. General Chemistry III (4)

Third quarter of a three-quarter sequence intended for science and engineering majors. Topics include kinetics, acid-base equilibria, electrochemistry, coordination chemistry, and an introduction to nuclear chemistry. May not be taken for credit after CHEM 6CH. **Prerequisites:** CHEM 6B or 6BH. Recommended: completion of MATH 10B or 20B. (F, W, S)



Summer 2025 General Education Courses

PHYSICS GE

PHYS 1A. Mechanics (3)

First quarter of a three-quarter introductory physics course, geared toward life-science majors. Equilibrium and motion of particles in one and two dimensions in the framework of Newtonian mechanics, force laws (including gravity), energy, momentum, rotational motion, conservation laws, and fluids. Examples will be drawn from astronomy, biology, sports, and current events. PHYS 1A and 1AL are designed to be taken concurrently but may be taken in separate terms; taking the lecture before the lab is the best alternative to enrolling in both. Students continuing to PHYS 1B/1BL will also need MATH 10B or 20B. Prerequisites: MATH 10A or 20A. Recommended preparation: concurrent or prior enrollment in MATH 10B or 20B.

PHYS 1AL. Mechanics Laboratory (2)

Physics laboratory course to accompany PHYS 1A. Experiments in Mechanics. PHYS 1A and 1AL are designed to be taken concurrently but may be taken in separate terms; taking the lecture before the lab is the best alternative to enrolling in both. Students continuing to PHYS 1B/1BL will also need MATH 10B or 20B. Prerequisites: MATH 10A or 20A. Recommended preparation: concurrent or prior enrollment in PHYS 1A and MATH 10B or 20B.

PHYS 1B. Electricity and Magnetism (3)

Second quarter of a three-quarter introductory physics course geared toward life-science majors. Electric fields, magnetic fields, DC and AC circuitry. PHYS 1B and 1BL are designed to be taken concurrently but may be taken in separate terms; taking the lecture before the lab is the best alternative to enrolling in both. Prerequisites: PHYS 1A or 2A, and MATH 10B or 20B.

PHYS 1BL. Electricity and Magnetism Laboratory (2)

Physics laboratory course to accompany PHYS 1B. Experiments in electricity and magnetism. Program or materials fee may apply. PHYS 1B and 1BL are designed to be taken concurrently but may be taken in separate terms; taking the lecture before the lab is the best alternative to enrolling in both. Prerequisites: PHYS 1A or 2A, 1AL or 2BL, and MATH 10B or 20B. Recommended preparation: concurrent or prior enrollment in PHYS 1B.

PHYS 1C. Waves, Optics, and Modern Physics (3)

Third quarter of a three-quarter introductory physics course geared toward life-science majors. The physics of oscillations and waves, vibrating strings and sound, and the interaction of light with matter as illustrated through optics and quantum mechanics. Examples from biology, sports, medicine, and current events. PHYS 1C and 1CL are designed to be taken concurrently but may be taken separately; taking the lecture before the lab is the best alternative to enrolling in both. Prerequisites: PHYS 1B or 2B, and MATH 10B or 20B.

PHYS 1CL. Waves, Optics, and Modern Physics Laboratory (2)

Physics laboratory course to accompany PHYS 1C. Experiments in waves, optics, and modern physics. Program or materials fee may apply. PHYS 1C and 1CL are designed to be taken concurrently but may be taken in separate terms; taking the lecture before the lab is the best alternative to enrolling in both. Prerequisites: PHYS 1B or 2B, 1BL or 2CL, and MATH 10B or 20B. Recommended preparation: concurrent or prior enrollment in PHYS 1C.



Summer 2025 General Education Courses

PHYS 2A. Physics—Mechanics (4)

A calculus-based science-engineering general physics course covering vectors, motion in one and two dimensions, Newton's first and second laws, work and energy, conservation of energy, linear momentum, collisions, rotational kinematics, rotational dynamics, equilibrium of rigid bodies, oscillations, gravitation. Students continuing to PHYS 2B/4B will also need MATH 20B. Prerequisites: MATH 10A-B or 20A or 20B or 20C or 31BH. Recommended preparation: prior or concurrent enrollment in MATH 20B.

PHYS 2B. Physics—Electricity and Magnetism (4)

Continuation of PHYS 2A covering charge and matter, the electric field, Gauss's law, electric potential, capacitors and dielectrics, current and resistance, electromotive force and circuits, the magnetic field, Ampere's law, Faraday's law, inductance, electromagnetic oscillations, alternating currents and Maxwell's equations. Students continuing to PHYS 2C will also need MATH 20C or 31BH. Prerequisites: PHYS 2A or 4A and MATH 20B or 20C or 31BH. Recommended preparation: prior or concurrent enrollment in MATH 20C or 31BH.

PHYS 2C. Physics—Fluids, Waves, Thermodynamics, and Optics (4)

Continuation of PHYS 2B covering fluid mechanics, waves in elastic media, sound waves, temperature, heat and the first law of thermodynamics, kinetic theory of gases, entropy and the second law of thermodynamics, Maxwell's equations, electromagnetic waves, geometric optics, interference and diffraction. Students continuing to PHYS 2D will need MATH 20D. Prerequisites: PHYS 2A or 4A, and MATH 20C or 31BH. Recommended preparation: prior or concurrent enrollment in MATH 20D. Prior completion of PHYS 2B is strongly recommended.

PHYS 4A. Physics for Physics Majors—Mechanics (4)

The first quarter of a five-quarter calculus-based physics sequence for physics majors and students with a serious interest in physics. The topics covered are vectors, particle kinematics and dynamics, work and energy, conservation of energy, conservation of momentum, collisions, rotational kinematics and dynamics, equilibrium of rigid bodies, small oscillations, gravitation, and central force motion. **Prerequisites:** MATH 20A. Recommended preparation: prior or concurrent enrollment in MATH 20B and a knowledge of vectors.

PHYS 4B. Physics for Physics Majors—Fluids, Waves, Statistical and Thermal Physics (4)

Continuation of PHYS 4A covering forced and damped oscillations, fluid statics and dynamics, waves in elastic media, sound waves, heat and the first law of thermodynamics, kinetic theory of gases, Brownian motion, Maxwell-Boltzmann distribution, second law of thermodynamics. Students continuing to PHYS 4C will also need MATH 18 or 20F or 31AH. **Prerequisites:** PHYS 4A and MATH 20A-B. Recommended preparation: prior or concurrent enrollment in MATH 20C or 31BH.

****PHYS 12. Energy and the Environment (4)**

A course covering energy fundamentals, energy use in an industrial society and the impact of large-scale energy consumption. It addresses topics on fossil fuel, heat engines, solar energy, nuclear energy, energy conservation, transportation, air pollution and global effects. Concepts and quantitative analysis.



Summer 2025 General Education Courses

SIO 10. The Earth (4)

An introduction to structure of the Earth and the processes that form and modify it. Emphasizes material that is useful for understanding geological events as reported in the news and for making intelligent decisions regarding the future of our environment. *Prerequisites:* none.

SIO 12. History of the Earth and Evolution (4)

Evolution of the Earth from its origin in the early solar system to formation of continents and ocean basins, and how the planet became habitable. It examines the geologic record of evolution, extinction, plate tectonics, and climate changes through time. *Prerequisites:* none.

SIO 45. Volcanoes (4)

This class will provide students with an introduction to volcanoes, including the mechanisms, products, and hazards associated with various types of volcanic eruptions. A key area of emphasis will be the impact of volcanism on human societies. *Prerequisites:* none.

MATHEMATICS, STATISTICS AND LOGIC

MATHEMATICS, ADVANCED STATISTICS

MATH 3C. Precalculus (4)

Functions and their graphs. Linear and polynomial functions, zeroes, inverse functions, exponential and logarithmic, trigonometric functions and their inverses. Emphasis on understanding algebraic, numerical, and graphical. (No credit given if taken after MATH 4C, 1A/10A, or 2A/20A.) Three or more years of high school mathematics or equivalent recommended. *Prerequisites:* Math Placement Exam qualifying score or MATH 3B.

MATH 10A. Calculus I (4)

Differential calculus of functions of one variable, with applications. Functions, graphs, continuity, limits, derivatives, tangent lines, optimization problems. (No credit given if taken after or concurrent with MATH 20A.) *Prerequisites:* Math Placement Exam qualifying score, or AP Calculus AB score of 2, or SAT II Math Level 2 score of 600 or higher, or MATH 3C, or MATH 4C.

MATH 10B. Calculus II (4)

Integral calculus of functions of one variable, with applications. Antiderivatives, definite integrals, the Fundamental Theorem of Calculus, methods of integration, areas and volumes, separable differential equations. (No credit given if taken after or concurrent with MATH 20B.) *Prerequisites:* AP Calculus AB score of 3, 4, or 5 (or equivalent AB subscore on BC exam), or MATH 10A, or MATH 20A.

MATH 10C. Calculus III (4)

Introduction to functions of more than one variable. Vector geometry, partial derivatives, velocity and acceleration vectors, optimization problems. (No credit given if taken after or concurrent with 20C.) *Prerequisites:* AP Calculus BC score of 3, 4, or 5, or MATH 10B, or MATH 20B.



Summer 2025 General Education Courses

MATH 20A. Calculus for Science and Engineering (4)

Foundations of differential and integral calculus of one variable. Functions, graphs, continuity, limits, derivative, tangent line. Applications with algebraic, exponential, logarithmic, and trigonometric functions. Introduction to the integral. (Two credits given if taken after MATH 1A/10A and no credit given if taken after MATH 1B/10B or MATH 1C/10C. Formerly numbered MATH 2A.) **Prerequisites:** Math Placement Exam qualifying score, or AP Calculus AB score of 3 (or equivalent AB subscore on BC exam), or SAT II MATH 2C score of 650 or higher, or MATH 4C or MATH 10A.

MATH 20B. Calculus for Science and Engineering (4)

Integral calculus of one variable and its applications, with exponential, logarithmic, hyperbolic, and trigonometric functions. Methods of integration. Infinite series. Polar coordinates in the plane and complex exponentials. (Two units of credits given if taken after MATH 1B/10B or MATH 1C/10C.) **Prerequisites:** AP Calculus AB score of 4 or 5, or AP Calculus BC score of 3, or MATH 20A with a grade of C– or better, or MATH 10B with a grade of C– or better, or MATH 10C with a grade of C– or better.

MATH 20C. Calculus and Analytic Geometry for Science and Engineering (4)

Vector geometry, vector functions and their derivatives. Partial differentiation. Maxima and minima. Double integration. (Two units of credit given if taken after MATH 10C. Credit not offered for both MATH 20C and 31BH. Formerly numbered MATH 21C.) **Prerequisites:** AP Calculus BC score of 4 or 5, or MATH 20B with a grade of C– or better.

MATH 180A. Introduction to Probability (4)

Probability spaces, random variables, independence, conditional probability, distribution, expectation, variance, joint distributions, central limit theorem. (Two units of credit offered for MATH 180A if ECON 120A previously, no credit offered if ECON 120A concurrently. Two units of credit offered for MATH 180A if MATH 183 or 186 taken previously or concurrently.) Prior or concurrent enrollment in MATH 109 is highly recommended. **Prerequisites:** Math 20C or MATH 31BH, or consent of instructor.

MATH 181A. Introduction to Mathematical Statistics I (4)

Multivariate distribution, functions of random variables, distributions related to normal. Parameter estimation, method of moments, maximum likelihood. Estimator accuracy and confidence intervals. Hypothesis testing, type I and type II errors, power, one-sample t-test. Prior or concurrent enrollment in MATH 109 is highly recommended. **Prerequisites:** MATH 180A, and MATH 18 or MATH 20F or MATH 31AH, and MATH 20C. Students who have not completed listed prerequisites may enroll with consent of instructor.

INTRODUCTORY STATISTICS

COGS 14A. Introduction to Research Methods (4)

Introduction to the scientific method. Methods of knowledge acquisition, research questions, hypotheses, operational definitions, variables, control. Observation, levels of measurement, reliability, validity. Experimentation and design: between-groups, within-subjects, quasi-experimental, factorial, single-subject. Correlational and observational studies. Ethics in research.



Summer 2025 General Education Courses

HDS 60. Introduction to Statistical Analysis (4)

This course provides an introduction to both descriptive and inferential statistics, core tools in the process of scientific discovery, and the interpretation of research. Emphasis on a conceptual understanding of statistics, numerical results of real data, and techniques of data analysis.

POLI 30. Political Inquiry (4)

Introduction to the logic of inference in social science and to quantitative analysis in political science and public policy including research design, data collection, data description and computer graphics, and the logic of statistical inference (including linear regression). POLI 30 is Lecture only, and POLI 30D is Lecture plus Discussion section. These courses are equivalents of each other in regards to major requirements, and students may not receive credit for both 30 and 30D.

PSYC 60. Introduction to Statistics (4)

This course provides an introduction to both descriptive and inferential statistics, core tools in the process of scientific discovery and the interpretation of research.

SOCI 60. The Practice of Social Research (4)

This course introduces students to the fundamental principles of the design of social research. It examines the key varieties of evidence, sampling methods, logic of comparison, and causal reasoning researchers use in their study of social issues. Will not receive credit for SOCI 60 and SOCL 60

COMPUTER PROGRAMMING AND LOGIC

COGS 18. Introduction to Python (4)

This class will teach fundamental Python programming skills and practices, including the “Zen of Python.” Students will focus on scientific computing and learn to write functions and tests, as well as how to debug code using the Jupyter Notebook programming environment. Students may receive credit for one of the following: BILD 62, COGS 18, CSE 8A, or CSE 6R. Recommended preparation: students with limited computing experience may take COGS 3.

CSE 8A. Introduction to Programming and Computational Problem-Solving I (4)

Introductory course for students interested in computer science and programming. Basics of programming including variables, conditionals, loops, functions/methods. Structured data storage such as arrays/lists and dictionaries, including data mutation. Hands-on experience with designing, writing, hand-tracing, compiling or interpreting, executing, testing, and debugging programs. Students solve relevant computational problems using a high-level programming language. CSE 8A is part of a two-course sequence (CSE 8A-B) that is equivalent to CSE 11. Students should take CSE 8B to complete this track. Students who have taken CSE 8B or CSE 11 may not take or receive credit for CSE 8A. Recommended preparation: No prior programming experience is assumed, but comfort using computers is helpful. Students should consult the CSE Course Placement Advice web page for assistance in choosing which CSE course to take first. Prerequisites: restricted to undergraduates. Graduate students will be allowed as space permits.



Summer 2025 General Education Courses

CSE 11. Introduction to Programming and Computational Problem-Solving: Accelerated Pace (4)

Accelerated introductory programming including an object-oriented approach. Covers basic programming topics from CSE 8A including variables, conditionals, loops, functions/methods, structured data storage, and mutation. Also covers topics from CSE 8B including the Java programming language, class design, interfaces, basic class hierarchies, recursion, event based programming, and file I/O. Basics of command-line navigation for file management and running programs. Zero units of credit offered for CSE 11 if CSE 8B taken previously or concurrently. Recommended preparation: Significant prior programming experience (for example, high school AP CSA). Students should consult the CSE Course Placement Advice web page for assistance in choosing a first CSE course. Prerequisites: restricted to undergraduates. Graduate students will be allowed as space permits.

CSS 1. Introductory Programming for Computational Social Science (4)

This course develops computational thinking practices and skills critical for defining, describing, and analyzing social science problems using a computational approach. Students will learn to program in Python in the context of computational social science problems.

LIGN 17. Making and Breaking Codes (4)

A rigorous analysis of symbolic systems and their interpretations. Students will learn to encode and decode information using progressively more sophisticated methods; topics covered include ancient and modern phonetic writing systems, hieroglyphics, computer languages, and ciphers (secret codes). **Prerequisites:** none.

PHIL 10. Introduction to Logic (4)

Basic concepts and techniques in both informal and formal logic and reasoning, including a discussion of argument, inference, proof, and common fallacies, and an introduction to the syntax, semantics, and proof method in sentential (propositional) logic.

PHIL 12. Scientific Reasoning (4)

Strategies of scientific inquiry: how elementary logic, statistical inference, and experimental design are integrated to evaluate hypotheses in the natural and social sciences. May be used to fulfill general-education requirements for Marshall, Warren, and Eleanor Roosevelt Colleges.

HUMANITIES AND CULTURAL STUDIES

AAS 10. Introduction to African American Studies (4)

This course will cover the experiences of peoples of African descent in the U.S. and broader African Diaspora from the vantage points of cultural production, political practice, socioeconomic conditions, and the overall struggle for social justice along intersecting lines of race, gender, and class. Topics reviewed include slavery (and slave rebellion), Reconstruction, Jim Crow apartheid, the Great Migration and Harlem Renaissance, and the Civil Rights and Black Power Movements.

ETHN 2R. Remote—Introduction to Ethnic Studies: Circulations of Difference (4)

Focusing on historical and contemporary migration and the circulation of commodities, knowledge, bodies, and culture, this online course examines how racial formation is shaped and contested by such movements within national and transnational contexts. Students may not receive credit for both ETHN 2R and ETHN 2.



Summer 2025 General Education Courses

GSS 21-27. History, Culture, and Politics of the Global South (4 units each)

An introduction to the history, culture, and politics of various regions of the Global South through multidisciplinary approaches and readings. Topics will vary each quarter. (F,W,S)

- GSS 22. Latin America and the Caribbean: History, Culture, and Politics

HILD 7B. Race and Ethnicity in the United States (4)

A lecture-discussion course on the comparative ethnic history of the United States. Of central concern will be the Asian American and white ethnic groups, race, oppression, mass migrations, ethnicity, city life in industrial America, and power and protest in modern America.

HILD 7C. Race and Ethnicity in the United States (4)

A lecture-discussion course on the comparative ethnic history of the United States. Of central concern will be the Mexican American, race, oppression, mass migrations, ethnicity, city life in industrial America, and power and protest in modern America.

HILD 10. East Asia: The Great Tradition (4)

The East Asia survey compares and contrasts the development of China, Korea, and Japan from ancient times to the present. This course explores the evolution of civilization from the first writing through classical Hei'an Japan, aristocratic Koryo, and late imperial Song China. Primary and secondary readings on basic ideas, institutions, and practices of the Confucian, Daoist, and Buddhist paths and of the state and family.

HILD 14. Film and History in Latin America (4)

Students watch films on Latin America and compare them to historical research on similar episodes or issues. Films will vary each year but will focus on the social and psychological consequences of colonialism, forced labor, religious beliefs, and "Modernization."

LATI 10. Reading North by South: Latin American Studies and the US Liberation Movements (4)

The purpose of this class is to study the multilayered relations between Latin American studies and the US liberation movements, particularly Third World movements, the Chicano movement, the black liberation movement, the indigenous movement, human rights activism, and trans-border activism. Students may not receive credit for LATI 100 and LATI 10.

LATI 50. Introduction to Latin America (4)

Interdisciplinary overview of society and culture in Latin America—including Mexico, the Caribbean, and South America: legacies of conquest, patterns of economic development, changing roles of women, expressions of popular culture, cycles of political change, and US-Latin American relations.



Summer 2025 General Education Courses

FINE ARTS

MUS 4. Introduction to Western Music (4)

A brief survey of the history of Western music from the Middle Ages to the present. Much attention will be paid to the direct experience of listening to music and attendance of concerts. Class consists of lectures, listening labs, and live performances.

MUS 6. Electronic Music (4)

Lectures and listening sessions devoted to the most significant works of music realized through the use of computers and other electronic devices from the middle of this century through the present. *Prerequisites:* none.

MUS 7. Music, Science, and Computers (4)

Exploration of the interactions among music, science, and technology, including the history and current development of science and technology from the perspective of music. *Prerequisites:* none.

MUS 8. American Music: Jazz Cultures (4)

Jazz is one of the primary foundations for American music in the twentieth and twenty-first centuries. This course highlights the multicultural and international scope of jazz by taking a thematic rather than a chronological approach to the subject, and by highlighting the music and lives of a diverse array of jazz practitioners from around the country and around the world. Students may not receive credit for both MUS 8 and MUS 8GS.

MUS 11. Folk Music (4)

A course on folk music of the world, covered through lectures, films, and listening sessions devoted to detailed discussion of music indigenous to varying countries/areas of the world. Topics vary from year to year. May be taken for credit twice. *Prerequisites:* none.

MUS 13. Worlds of Music (4)

Through surveying selected musical traditions and practices from around the world, this course explores the ways in which music both reflects and affects social, cultural, and ecological relationships. Specific case studies will be covered through lectures, films, and listening sessions. *Prerequisites:* none.

MUS 15. Popular Music (4)

A course on popular music from different time periods, covered through lectures, films, and listening sessions. Topics vary from year to year. May be repeated once for credit.

MUS 20. Exploring the Musical Mind (4)

How do we transform complex sounds into comprehensible and meaningful music? What physiological, neurological, cognitive, and cultural systems are involved? Why do we make music in such diverse ways around the globe? Does music have evolutionary or ecological significance? What is the relationship between music, motion, and emotions? This course explores contemporary understandings of how we hear and how we become musical and invites students to listen to new music in new ways. Students may not receive credit for both MUS 20 and COGS 20. (Cross-listed with COGS 20.) *Prerequisites:* none.



Summer 2025 General Education Courses

MUS 80. Special Topics in Music (1–4) *4 units required to satisfy TMC GE

This course presents selected topics in music and consists of lecture and listening sessions. No prior technical knowledge is necessary. The course will be offered during summer session.

TDGE 1. Introduction to Theatre (4)

An introduction to fundamental concepts in drama and performance. Students will attend performances and learn about how the theatre functions as an art and as an industry in today's world.

TDGE 5. A Glimpse into Acting (4)

An introductory course on acting fundamentals for students without an acting background. Through analysis of acting on film, students will explore the actor's craft and practice these skills in studio exercises to better understand how an actor approaches a text. *Prerequisites:* none.

TDGE 10. Theatre and Film (4)

Theatre and Film analyzes the essential differences between theatrical and cinematic approaches to drama. Through selected play/film combinations, the course looks at how the director uses actors and the visual languages of the stage and screen to guide and stimulate the audience's responses.

TDGE 11. Great Performances on Film (4)

Course examines major accomplishments in screen acting from the work of actors in films or in film genres. May be taken for credit three times. *Prerequisites:* none.

VIS 21B. Introduction to Asian Art (4)

Survey of the major artistic trends of India, China, and Japan, taking a topical approach to important developments in artistic style and subject matter to highlight the art of specific cultures and religions. Students may not receive credit for VIS 21 and VIS 21B. *Prerequisites:* none.

VIS 22. Formations of Modern Art (4)

A wide-ranging survey introducing the key aspects of global art and criticism in the nineteenth and twentieth centuries. The course will comparatively examine formations of modernism and modernity within and across a variety of aesthetic traditions in Africa, Asia, Europe, Latin America, North America, and Oceania. *Prerequisites:* none.