Fall 2016 Course Offerings to Satisfy ERC General Education Requirements

FINE ARTS

MUS 1A. Fundamentals of Music A (4)
Primarily intended for students without previous musical experience. It introduces music notation and basic music theory topics such as intervals, scales, keys, and chords, as well as basic rhythm skills. *Prerequisites: none.*

MUS 2A. Basic Musicianship (4)
Primarily intended for music majors. Development of basic skills: perception and notation of pitch and temporal relationships. Introduction to functional harmony. Studies in melodic writing. Drills in sight singing, rhythmic reading, and dictation. *Prerequisites: passing score on placement exam. Must be taken in sequence. Music majors must be concurrently enrolled in Music 2AK (Basic Keyboard)*

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**.** *Prerequisite: none.*

MUS 8. American Music (4)
A course designed to study the development of music in America. The focus will be on both the vernacular traditions including hymn singing, country music, jazz, big band, rock, etc., as well as the cultivated traditions of various composers from William Billings to John Cage. *Prerequisites: none.*

MUS 15. Popular Music (4)
A course on popular music from different time periods, covered through lectures, films, and listening sessions. May be repeated once for credit. *Prerequisite: none.*

MUS 33A. Introduction to Composition I (4)
First course in a sequence for music majors and nonmajors pursuing an emphasis in composition. The course examines "sound" itself and various ways of building sounds into musical structures, and develops skills in music notation. Students compose solo pieces in shorter forms. Students may not receive credit for both Music 33 and 33A. *Prerequisites: Music 2C or consent of instructor.*

TDAC 1. Introduction to Acting (4)
A beginning course in the fundamentals of acting: establishing a working vocabulary and acquiring the basic skills of the acting process. Through exercises, compositions and improvisations, the student actor explores the imagination as the actor's primary resource, and the basic approach to text through action. *Prerequisite: none.*

TDDE 1. Introduction to Design for the Theatre (4)
A survey of contemporary and historical concepts and practices in the visual arts of the theatre; studies in text analysis, studio processes and technical production; elementary work in design criticism, scale model making, and costume design. A course serving as an introduction to theatre design and production. *Prerequisite: none.*

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. *Prerequisite: none.* May be taken three times for credit.

FINE ARTS

TDGE 25. Public Speaking (4)
This course is designed to establish a clear understanding of the fundamentals of effective oral communication. The methodologies explore the integration of relaxation, concentration, organization, and clear voice and diction as applied to various public speaking modes. *Prerequisite: none.*

TDHT 10. Introduction to Play Analysis (4)
An introduction to the fundamental techniques of analyzing dramatic texts. Focus is on the student's ability to describe textual elements and their relationships to each other as well as on strategies for writing critically about drama. *Prerequisites: none*

TDHT 21. Ancient and Medieval Theatre (4)
This course introduces the basic parameters of performance dynamics by exploring varieties of performance space, acting methods, and actor-audience relations, comparing examples drawn from different historical periods and world cultures. *Prerequisite: none.*

TDPW 1. Introduction to Playwriting (4)
Beginning workshop in the fundamentals of playwriting. Students discuss material from a workbook which elucidates the basic principles of playwriting, do exercises designed to help them put those principles into creative practice, and are guided through the various stages of the playwriting process which culminates with in-class readings of the short plays they have completed. *Prerequisite: none.*

TDTR 10. Introduction to Dance (4)
An overview of dance, examining its social and cultural history and its evolution as an art form. Focus is on dance and its many genres as an expressive medium and form of communication. *Prerequisite: none.*

VIS 1. Introduction to Art-Making: Two-Dimensional Practices (4)
An introduction to the concepts and techniques of art making with specific reference to the artists and issues of the twentieth century. Lectures and studio classes will examine the nature of images in relation to various themes. Drawing, painting, found objects, and texts will be employed. *Prerequisite: none.* This course is offered only one time each year.

VIS 20. Introduction to Art History (4)
This course examines history of Western art and architecture through such defining issues as the respective roles of tradition and innovation in the production and appreciation of art; the relation of art to its broader intellectual and historical contexts; and the changing concepts of the monument, the artist, meaning, style, and "art" itself. Representative examples will be selected from different periods, ranging from Antiquity to Modern. Content will vary with the instructor. *Prerequisites: none. Students may not receive credit for VIS21 and VIS 21B.*

VIS 60. Introduction to Digital Photography (4)
An in-depth exploration of the camera, combining darkroom techniques in black and white, and color photography. Emphasis is placed on developing reliable control of the fundamental materials and procedures through lectures, field, and lab experience. Basic discussion of image making included. *Prerequisite: none. Materials fee required.*

FINE ARTS

VIS 70N. Introduction to Media (6)

Operating as both a lecture and production course, this introductory class provides a technical foundation and theoretical context for all subsequent production-oriented film and video studies. In the laboratory, the student will learn the basic skills necessary to initiate video production. Completion of Visual Arts 70N is necessary to obtain a media card. *Prerequisite: none. Materials fee required.*

VIS 84. History of Film (4)

A survey of the history and the art of the cinema. The course will stress the origins of cinema and the contributions of the earliest filmmakers, including those of Europe, Russia, and the United States. *Prerequisite: none. Materials fee required. Only offered once a year.*
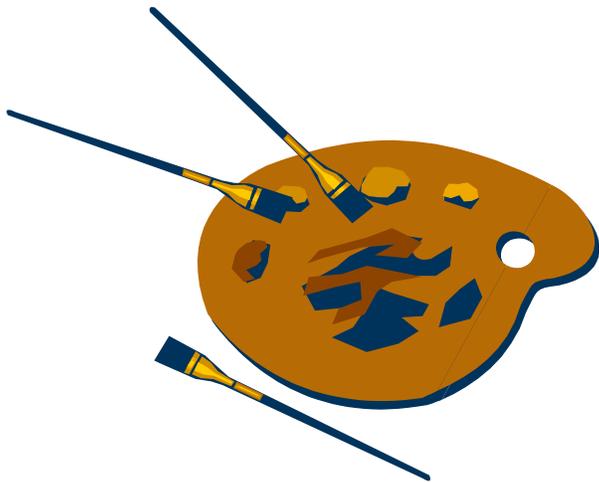
QUANTITATIVE/FORMAL SKILLS
For Non-Science/Math/Engineering Majors

Formal Logic

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. *Prerequisites: none.*

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. *Prerequisites: none.*

Statistics

CSE 3. Fluency in Information Technology (4)

Introduces the concepts and skills necessary to effectively use information technology. Includes basic concepts and some practical skills with computer and networks. *Prerequisite: none.*

MAE 5. Quantitative Computer Skills (4)

Introductory course for nonengineering majors. Use of computers in solving problems; applications from life sciences, physical sciences, and engineering. Students run existing computer programs and complete some programming in BASIC. *Prerequisite: none.*

QUANTITATIVE/ FORMAL SKILLS
For Science/Math/Engineering Majors

Computer Programming

CSE 5A. Introduction to Programming I (4)

(Formerly CSE 62A) Introduction to algorithms and top-down problem solving. Introduction to the C language including functions, arrays, and standard libraries. Basic skills for using a PC graphical user interface operating system environment. File maintenance utilities are covered. (A student may not receive credit for CSE 5A after receiving credit for CSE 10 or CSE 11 or CSE 8B or CSE 9B or CSE 62B or CSE 65.) *Prerequisite: A familiarity with high-school level algebra is expected, but this course assumes no prior programming knowledge.*

CSE 8A. Introduction to Computer Science: JAVA I (4)

Introductory course for students interested in computer science. Fundamental concepts of applied computer science using media computation. Exercises in the theory and practice of computer science. Hands-on experience with designing, editing, compiling, and executing programming constructs and applications. CSE 8A is part of a two-course sequence (CSE 8A and CSE 8B) that is equivalent to CSE 11. Students should take CSE 8B to complete this track. Recommended preparation: No prior programming experience is assumed, but comfort using computers is helpful.
Prerequisite: none

CSE 11. Introduction to Computer Science and Object-Oriented Programming: Java (4)

An accelerated introduction to computer science and programming using the Java language. Basic UNIX. Modularity and abstraction. Documentation, testing and verification techniques. Basic object-oriented programming, including inheritance and dynamic binding. Exception handling. Event-driven programming. Experience with AWT library or other similar library. Students who have completed CSE8B may not take CSE 11. Recommended preparation: high school algebra and familiarity with computing concepts and a course in a compiled language. *Prerequisites: none.*

Computer Programming

ECE 15. Engineering Computation (4)
Students learn the C programming language with an emphasis on high-performance numerical computation. The commonality across programming languages of control structures, data structures, and I/O is also covered. Techniques for using MatLab to graph the results of C computations are developed. *Prerequisites: a familiarity with basic mathematics such as trigonometry functions and graphing is expected but this course assumes no prior programming knowledge.*

Mathematics/ Calculus

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

MATH 4C. Pre-Calculus for Science and Engineering (4)
Review of polynomials. Graphing functions and relations: graphing rational functions, effects of linear changes of coordinates. Circular functions and right triangle trigonometry. Reinforcement of function concept: exponential, logarithmic, and trigonometric functions. Vectors. Conic sections. Polar coordinates. Three lectures, one recitation. (No credit given if taken after Math 10A or 20A. Two units of credit given if taken after Math. 3C.) *Prerequisite: Math Placement Exam qualifying score, or Math 3C with a grade of C or better.*

MATH 10A. Calculus I (4)
Differentiation and integration of algebraic functions. Fundamental theorem of calculus. Applications. (No credit given if taken after or concurrently with Math 20A.) *Prerequisite: Math Placement Exam qualifying score, or AP Calculus AB score of 2, or SAT II Math 2C score of 600 or higher, or Math 3C with a grade of C or better, or Math 4C with a grade of C− or better.*

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 concurrently with Math 20B.) *Prerequisites: AP Calculus score of 3, 4, or 5 (Or equivalent AB subscore on BC exam), or Math 10A, or Math 20A.*

MATH 10C. Calculus III (4)
Vector geometry, velocity, and acceleration vectors. (No credit given if taken after or concurrently with Math 20C) *Prerequisite: AP Calculus BC score of 3, 4, or 5, or Math 10B with a grade of C− or better, or Math 20B with a grade of C− or better.*

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 10A and no credit given if taken after Math 10B or Math 10C) *Prerequisite: Math Placement Exam qualifying score, or AP Calculus AB score of 2 or 3, or SAT II Math 2C score of 650 or higher, or Math 4C with a grade of C− or better, or Math 10A with a grade of C− or better.*

Mathematics/ Calculus

MATH 20B. Calculus for Science and Engineering (4)
Integral calculus of one variable and its applications, with exponential, logarithmic, hyperbolic, and trig-onometric functions. Methods of integration. Polar coordinates in the plane. (Two units of credits given if taken after Math 10B or Math 10C.) *Prerequisite: 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. Prerequisite: AP Calculus BC score of 4, or 5, or Math 20B with a grade of C− or better.*

NATURAL SCIENCES
For Non-Science/Math/Engineering Majors

ANTH 2. Human Origins (4)
An introduction to human evolution from the perspective of physical anthropology, including evolutionary theory and the evolution of the primates, hominids, and modern humans. Emphasis is placed on evidence from fossil remains and behavioral studies of living primates. *Prerequisite: none.*

CHEM 11. The Periodic Table (4)
Introduction to the material world of atoms and small inorganic molecules. Student may not receive credit for both Chem 4 and Chem 11. *Prerequisite: none.*

COGS 11. Minds and Brains (4)
How damaged and normal brains influence the way humans solve problems, remember or forget, pay attention to things; how they affect our emotions; and language in daily life. *Prerequisite: none.*

COGS 17. Neurobiology of Cognition (4)
Introduction to the organization and functions of the nervous system. Topics include molecular, cellular, developmental, systems, and behavioral neurobiology. Specifically, structure and function of neurons, peripheral and central nervous systems, sensory, motor, and control systems, learning and memory mechanisms. Students may not receive credit for both Biology 12 and Cognitive Science 17. *Prerequisite: none.*

ENVR 30. Environmental Issues: Natural Sciences (4)
Examines global and regional environmental issues. The approach is to consider the scientific basis for policy options. Simple principles of chemistry and biology are introduced. The scope of problems include: air and water pollution, climate modification, solid-waste disposal, hazardous-waste treatment, and environmental impact assessment. *Prerequisite: none.*

PHYS 5. Stars and Black Holes (4)
An introduction to the evolution of stars, including their birth and death. Topics include constellations, the atom and light, telescopes, stellar birth, stellar evolution, white dwarfs, neutron stars, black holes, and general relativity. This course uses basic algebra, proportion, radians, logs, and powers. *Prerequisite: none.*

NATURAL SCIENCES
For Non-Science/Math/Engineering Majors

PHYS 11. Survey of Physics (4)
First quarter of a two-quarter survey of physics for non-science majors with strong mathematical background, including calculus. Physics 11A describes the laws of motion, gravity, energy, momentum, and relativity. A laboratory component consists of two experiments with gravity and conservation principles. *Prerequisites: Mathematics 10A or 20A. Corequisites: Math 10B or 20B.*

PHYS 13. Life in the Universe (4)
An exploration of life in the Universe. Topics include defining life; the origin, development, and fundamental characteristics of life on Earth; searches for life elsewhere in the Solar System and other planetary systems; space exploration; and identifying extraterrestrial intelligence. This course uses basic algebra, proportion, radians, logs, and powers. *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 15. Natural Disasters (4)
Introduction to environmental perils and their impact on everyday life. Geological and meteorological processes, including earthquakes, volcanic activity, large storms, global climate change, mass extinctions throughout Earth's history, and human activity that causes and prevents natural disasters. *Prerequisites: none.*

SIO 25. Climate Change and Society (4)
Climate change is one of the most complex and critical issues affecting societies today. This course will present the scientific evidence for climate change and its impacts and consider governmental policy responses and possible adaptation strategies. *Prerequisite: none.*

SIO 30. The Oceans (4)
Presents modern ideas and descriptions of the physical, chemical, biological, and geological aspects of oceanography, and considers the interactions between these aspects. Intended for students interested in the oceans, but who do not necessarily intend to become professional scientists. *Prerequisite: none.*

SIO 40. Life and Climate on Earth (4)
Explores life on Earth and its relationship to the environment—past, present, and future. Topics include origins of life, earth history, elemental cycles, global climate variability and human impacts on our environment. *Prerequisite: none.*

SIO 50. Introduction to Earth and Environmental Sciences (6)
This course is an introduction to how our planet works, focusing on the formation and evolution of the solid earth, and the processes affecting both its surface and interior. Labs and field trips complement and extend the lecture material. Lab fee applies. *Prerequisite: none.*

NATURAL SCIENCES
For Science/Math/Engineering Majors

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. *Prerequisites: CHEM 6A; CHEM 6B may be taken concurrently.*

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. *Prerequisite: none.*

CHEM 4. Basic Chemistry (4)
Chemistry 4 is for science majors with insufficient preparation to start the Chem 6 sequence. Topics include nomenclature, stoichiometry, basic reactions, bonding, and the periodic table. May not receive credit for both Chem 4 and Chem 11. Recommended: concurrent enrollment in Math 3C, 4C or 10A or higher. *Prerequisite: none.*

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, types of reactions, and thermochemistry. May not be taken for credit after Chem 6AH. Recommended: proficiency in high school chemistry and/or physics; concurrent or prior enrollment in Math 10A or 20A. *Prerequisite: none.*

CHEM 6AH. Honors General Chemistry I (4)
First quarter of a three-quarter honors sequence intended for well-prepared science and engineering majors. Topics include quantum mechanics, molecular orbital theory, and bonding. An understanding of nomenclature, stoichiometry, and other fundamentals is assumed. Students completing 6AH may not subsequently take 6A for credit. Recommended: completion of a high school physics course strongly recommended. Concurrent enrollment in Math 20A or higher.

CHEM 6B: General Chemistry II (4)
Second quarter of a three-quarter sequence intended for science and engineering majors. Topics include: covalent bonding, gases, liquids, and solids, colligative properties, physical and chemical equilibria, acids and bases, 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.

CHEM 6C. General Chemistry III (4)
Third quarter of a three-quarter sequence intended for science and engineering majors. Topics include: thermodynamics, kinetics, electrochemistry, coordination chemistry, and introductions to nuclear, main group organic, and biochemistry. May not be taken for credit after Chem 6CH. *Prerequisites: Chem 6B or 6BH.* Recommended: completion of Math 10B or 20B

NATURAL SCIENCES
For Science/Math/Engineering Majors

PHYS 1A. Mechanics (3)
First quarter of a three-quarter introductory physics course, geared towards 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. *Prerequisites: Mathematics 10A or 20A. Corequisites: Physics 1AL and Mathematics 10B or 20B*

PHYS 1AL. Mechanics Laboratory (2)
Physics laboratory course to accompany PHYS 1A. Experiments in mechanics. *Prerequisites: Mathematics 10A or 20A. Corequisites: Physics 1A and Mathematics 10B or 20B*

PHYS 1B. Electricity & Magnetism (3)
Second quarter of a three-quarter introductory physics course geared towards life-science majors. Electric fields, magnetic fields, DC and AC circuitry. *Prerequisites: PHYS 1A or 2A, 1AL, and Math 10B or 20B. Corequisites: Physics 1BL and Math 10C or 20C or 11*

PHYS 1BL. Electricity & Magnetism Laboratory (2)
Physics laboratory course to accompany PHYS 1B. Experiments in electricity and magnetism. Course materials fee may apply. *Prerequisite: Physics 1A or 2A, 1AL and Mathematics 10B or 20B. Corequisites: Physics 1B and Mathematics 10C or 20C or 11*

PHYS 1C. Waves, Optics & Modern Physics (3)
Third quarter of a three-quarter introductory physics course geared towards life-science majors. The physics of oscillations and waves, vibrating strings and sound, the behavior of systems under combined thermal and electric forces, and the interaction of light with matter as illustrated through optics and quantum mechanics. Examples from biology, sports, medicine, and current events. *Prerequisites: PHYS 1B, 1BL, Math 10C or 20C or 11. Corequisite: PHYS 1CL*

PHYS 1CL. Waves, Optics & Modern Physics Laboratory (2)
Physics laboratory course to accompany PHYS 1C. Experiments in waves, optics, and modern physics. Course materials fee may apply. *Prerequisite: Physics 1B, 1BL, and Math 10C or 20C or 11. Corequisites: Physics 1C*

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, conversation of energy, linear momentum, collisions, rotational kinematics, rotational dynamics, equilibrium of rigid bodies, oscillations, gravitation. Students may not receive credit for PHYS 2A and 4A. *Prerequisites: Math 20A Corequisites: Math 20B*

PHYS 2B. Physics—Electricity & 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, Paraday's law, inductance, electromagnetic oscillations, alternating currents and Maxwell's equations. *Prerequisites: PHYS 2A,or 4A and Math 20B Corequisite: Math 20C*

PHYS 2C. Physics—Fluids, Waves, Thermodynamics & 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, geometric optics, interference and diffraction. *Prerequisites: PHYS 2A, 2B and Math 20C Corequisite: Math 20D*