ENVS BA and BS majors Course Descriptions

ENVS 204 - Evolution & Genetics
Requirement: UCSF 137 for students admitted to Loyola University for Fall 2012 or later. No requirement for students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of Anthropology, Department of Biology, Department of Chemistry, Department of Environmental Science, Department of Physics, Bioinformatics, Forensic Science or Neuroscience.

Examines the mechanisms responsible for the diversity of life while focusing on the major scientific discoveries that form the underpinnings of evolutionary theory.

Outcome: Students will develop skill in critical reasoning and methods of inquiry, and demonstrate understanding of genetics, gene expression, mutations, cell reproduction, and biogeography and use this knowledge to assess evidence for, and mechanisms of, evolution.

ENVS 207 - Plants and Civilization
Requirement: UCSF 137 for students admitted to Loyola University for Fall 2012 or later. No requirement for students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of Anthropology, Department of Biology, Department of Chemistry, Department of Environmental Science, Department of Physics, Bioinformatics, Forensic Science or Neuroscience.

Examines the structure, function, ecology, and diversity of plants, their importance to human civilization, and the impact of societal decisions regarding their use and exploitation.

Outcome: Students will demonstrate an understanding of the critical role of plants in the biosphere, their physiological processes, adaptations for specialization, and linkages to humans including agroecology

ENVS 210 - Concepts in Phy Sci: Motion
Examines the development of our understanding of motion, including the laws of motion, orbital motion, sound and musical scales, light and color science, black holes and the laws of relativity.

Outcome: Students will demonstrate an understanding of the methods of physical science, the critical reasoning involved and how this science can be applied.

ENVS 211 - Concepts in Phy Sci: Matter
The concept of matter is traced from antiquity to the theory of quantum mechanics and the uncertainty principle, with an emphasis on chemistry, electricity, and magnetism.

Outcome: Students will become skilled in critical reasoning and methods of scientific inquiry, demonstrate an understanding of fundamental physics concepts related to matter and apply these to various phenomena including lightning, lasers, quarks and superconductivity

ENVS 213 - Earth Sci-The Changing Planet
Requirement: UCSF 137 for students admitted to Loyola University for Fall 2012 or later. No requirement for students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of Anthropology, Department of Biology, Department of Chemistry, Department of Environmental Science, Department of Physics, Bioinformatics, Forensic Science or Neuroscience.

Current knowledge regarding the geological development of Earth - its age, structure and glacial history and how we came to this understanding.

Outcome: Students will demonstrate an understanding of the fundamental knowledge and concepts in geology, the qualitative and quantitative reasoning used, and how this science can be applied.

ENVS 214 - Earth Sci: Weather - Climatology
Requirement: UCSF 137 for students admitted to Loyola University for Fall 2012 or later. No requirement for students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of Anthropology, Department of Biology, Department of Chemistry, Department of Environmental Science, Department of Physics, Bioinformatics, Forensic Science or Neuroscience.

Examines our understanding of the atmosphere and the measures that allow us to monitor its activity.

Outcome: Students will develop critical reasoning skills, both qualitative and quantitative, and apply them to a variety of atmospheric phenomena including cloud and storm formation, weather systems, climate factors and human impact on the atmosphere.
ENVS 273 - Energy and the Environment
Requirement: UCSF 137 for students admitted to Loyola University for Fall 2012 or later. No requirement for students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of Anthropology, Department of Biology, Department of Chemistry, Department of Environmental Science, Department of Physics, Bioinformatics, Forensic Science or Neuroscience.

The concept of energy developed from antiquity through the present day and applied to national and worldwide energy use patterns, the technologies supporting their use, as well as the societal impact and environmental consequences of energy usage.

Outcome: Students will become skilled in critical reasoning and methods of inquiry; demonstrate an understanding of critical concepts and knowledge: heat and energy, the laws of thermodynamics, and current and future technologies and their impact.

ENVS 278 - The Nature of Science
Prerequisite: major in School of Education
This course addresses the nature of scientific endeavor. Topics are aligned with Illinois State Science Learning Standards.

Outcome: introduces the concepts, principles and theories that describe the natural world; process and reasoning skills used by scientists, and historical underpinnings of scientific knowledge.

ENVS 279 - Integrated Science and Math
Requirement: UCSF 137 for students admitted to Loyola University for Fall 2012 or later. No requirement for students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of Anthropology, Department of Biology, Department of Chemistry, Department of Environmental Science, Department of Physics, Bioinformatics, Forensic Science or Neuroscience.

Prerequisite: Major in School of Education

This course is designed for Elementary Education majors who wish to extend their knowledge in math and science connections and concepts.

Outcomes: Students will be introduced to the National Council of Teachers of Mathematics standards for algebra, geometry, measurement, and data analysis and to the principles of equity, curriculum, learning, assessment, and technology.

ENVS 281 - Human Impact on Environment
Requirement: UCSF 137 for students admitted to Loyola University for Fall 2012 or later. No requirement for students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of Anthropology, Department of Biology, Department of Chemistry, Department of Environmental Science, Department of Physics, Bioinformatics, Forensic Science or Neuroscience.

Examines the diversity, complexity, and functioning of natural ecosystems and how human activity alters these attributes.

Outcomes: Students will demonstrate an understanding of foundational knowledge in ecology including species interactions, energy flow and elemental cycles, and use this to assess human impacts such as ozone depletion, elevated atmospheric carbon, invasive species, pesticides/herbicides/hormones, dams and habitat fragmentation.

ENVS 282 - The Human Environment
Examines the impact that current environmental conditions have on the health and well-being of humans, both locally and globally.

Outcome: Students will demonstrate an understanding of core environmental concepts and make reasoned, ethical judgments regarding the impact of a compromised environment on human health, including the impact of world food distribution, pesticides, water resources and pollution, air pollution, climatic changes, and hazardous waste.

ENVS 283 - Environmental Sustainability
Requirement: UCSF 137 for students admitted to Loyola University for Fall 2012 or later. No requirement for students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of Anthropology, Department of Biology, Department of Chemistry, Department of Environmental Science, Department of Physics, Bioinformatics, Forensic Science or Neuroscience.
Examines the impact of humans as consumers on the environment and how these interactions affect the probability of establishing sustainability for human and non-humans on Earth.

**Outcome:** Students will become skilled in critical reasoning and methods of inquiry, and demonstrate an understanding of knowledge critical to the field including current human consumptive practices and their effects on the health and well-being of living organisms.

**ENVS 300 – Seminar**
Lectures and discussions of current topics in the natural and environmental sciences.

**ENVS 350A - Solutions to Environmental Problems: Water**
'STEP: Water’ is an interdisciplinary and hands-on course in which students learn about a relevant and complex environmental problems pertaining to water and then develop and implement projects that address the problem on campus and in the local community.

**Outcomes:** Students will develop understanding of water-related environmental problems, demonstrate skills/knowledge needed to address those problems, and develop skills to recognize/articulate future possibilities for environmental leadership and civic engagement.

**ENVS 350F - Solutions to Environmental Problems: Food Systems**
'STEP: Food Systems’ is an interdisciplinary and hands-on course in which students learn about a relevant and complex environmental problems pertaining to food production, processing and transport and then develop and implement projects that address the problem on campus and in the local community.

**Outcomes:** Students will develop understanding of environmental problems related to food systems, demonstrate skills/knowledge needed to address those problems, and develop skills to recognize/articulate future possibilities for environmental leadership and civic engagement.

**ENVS 390 - Integrative Seminar**
This course requires students to focus on a specific environmental issue or theme, integrating multidisciplinary perspectives, through individual or group presentations, discussion, and analysis of presentations by outside speakers.

**Outcome:** Students will demonstrate an understanding of the multi-faceted and interdisciplinary nature of environmental issues.

**ENVS 391 - Environmental Research**
Students may register for independent research on a topic mutually acceptable to the student and any professor in the department. Usually this research is directed to a particular course or to the research of the professor.

**ENVS 395 - Environmental Internship**
Students seek out and engage in a semester- or summer-long internship with a civic, business, governmental, or academic group providing hands-on experience in work on environmental issues.

**Outcome:** Students will demonstrate, through daily activity logs and a comprehensive final report, a clear understanding of the environmental context and practical applications of their internship experience.

**ENVS 398 - Special Topics**
*Prerequisite: Junior or senior standing.*
Specific titles and contents vary from semester to semester. Variable credit hours

**ENVS 399 - Directed Readings**
Directed by an ESP faculty member, students will read, analyze, and discuss a publications focusing on different aspects of a specific environmental issue or theme.

**Outcome:** Students will demonstrate comprehension of, and the ability to apply information from, scientific literature and be able to synthesize information to produce a cogent, synthetic analysis of their topic based on these readings.
Non ENVS courses required for ENVS BA and BS majors

**ANTH 104 - The Human Ecological Footprint**
This course is an introduction to global human ecology and concentrates on how we as humans affect global ecosystems and how these changes can impact our behavior, health, economics, and politics. **Outcome:** Students will be able to draw connections between basic ecological processes and the global patterns of human population growth, health and disease, inequality and poverty, subsistence strategies, and land use and technology.

**BIOL 101 - General Biology I**
 Fundamental principles of Biology including: introduction to the scientific method, basic biological chemistry; cell structure and function; energy transformations; mechanisms of cell communication; cellular reproduction; and principles of genetics. **Outcome:** Students will be able to demonstrate understanding of the historical foundations, methodologies employed, general architecture and functioning of the cell - the basic unit of life.

**BIOL 111 - General Biology I Lab**
Complements General Biology I lecture material through observation, experimentation, and when appropriate, dissection of representative organisms. Physical and chemical phenomena of life as well as systematics and comparative anatomy and physiology of selected organisms will be examined. **Outcome:** Students will be able to demonstrate an understanding of the diversity of living organisms, including comparisons in cell structure and function, and comparative organismal evolution and ecology.

**BIOL 102 - General Biology II**
Prerequisites: BIOL 101, 111.
A continuation of Biology 101. Fundamental principles of Biology including: evolutionary theory; general principles of ecology; study of plant structure and function; and comparative animal physiology. **Outcome:** Students will be able to demonstrate an understanding of the fundamental principles of ecology and evolution, as well as the anatomy and physiology of representative plant and animal phyla.

**BIOL 112 - General Biology II Lab**
Prerequisites: BIOL 101, 111.
Complements General Biology II lecture material through observation, experimentation, and when appropriate, dissection of representative organisms. Physical and chemical phenomena of life as well as systematics and comparative anatomy and physiology of selected organisms will be examined. **Outcome:** Students will be able to demonstrate an understanding of the diversity of living organisms, including comparisons in cell structure and function, and comparative organismal evolution and ecology.

**BIOL 265 - Ecology**
Pre-requisites: BIOL 102, 112; CHEM 102 or 106. Restricted to Biology and Environmental Science/Studies students.
Relationships of organisms to their environment and to each other at the organism, population, community, and ecosystem levels. **Outcome:** Students will understand the fundamental principles governing the interactions of organisms and their environment at the population, community, and ecosystem levels.

**CHEM 101 - General Chemistry A Lecture/Discussion**
Prerequisite: MATH 117 or equivalent. A year of high school chemistry is recommended. Co-requisite: CHEM 111 and MATH 118.
A lecture and discussion course including topics on atomic and molecular structures, states of matter, energetics, and stoichiometry of reactions. **Outcome:** Students will learn basic chemical principles in these areas.

**CHEM 111 - General Chemistry Lab A**
Pre or co-requisite: CHEM 101.
Laboratory course designed to illustrate fundamental models and theories in chemistry with an emphasis on significant digits, calculations, and analysis and discussion questions. **Outcome:** Students will be able to use equipment properly and demonstrate correct laboratory technique.
CHEM 102 - General Chemistry B
*Prerequisites: CHEM 101 or CHEM 105; MATH 118.*
This lecture and discussion course is a continuation of 101 and includes topics on equilibrium systems, chemical thermodynamics, electrochemistry, and descriptive chemistry.
Outcome: Students will learn basic chemical principles in these areas.

CHEM 112 - General Chemistry Lab B
*Pre or co-requisite: CHEM 102. Prerequisite: CHEM 111.*
The second semester of general chemistry laboratory exposes students to qualitative analysis and continues the process of experimenting and collecting data to test the validity of theories and models presented in lecture.
Outcome: Students will demonstrate success in lab by making perceptive qualitative observations and accurate quantitative measurements.

CHEM 105 - Chemical Principles
*Prerequisites: MATH 117 or equivalent, and successful completion of a year of high school chemistry. Chemistry Majors only.*
Lecture, discussion and laboratory course for majors covering stoichiometry, reactions in aqueous solution, states of matter, electronic structure, thermodynamics, chemical bonding, molecular geometry and intermolecular forces. Emphasis given to writing electron configurations and Lewis diagrams, predicting molecular geometry and properties, mass/mole conversions and solving thermodynamic and gas law problems.
Outcome: Students will learn basic chemical principles in these areas.

CHEM 106 - Basic Inorganic Chemistry
*Prerequisite: CHEM 105 or 101 & 111; MATH 118. Chemistry majors only.*
Lecture, discussion and laboratory course for majors that is a continuation of 105 with particular emphasis on acid/base chemistry and other ionic equilibria, gas phase equilibria, electrochemistry, transition metal chemistry, and chemical thermodynamics.
Outcome: Students will learn basic chemical principles in these areas.

CHEM 151 - Elem Physiological Chemistry A
*Prerequisite: high school chemistry or permission of chairperson.*
Lecture, quiz and laboratory course primarily for nursing students emphasizing basic chemical properties, electron configuration, states of matter, gas laws, stoichiometry and energetics of reactions, aqueous equilibria, use of radioisotopes in medicine, environmental considerations, and nomenclature and structure in organic chemistry.
Outcome: Students will learn basic chemical principles in these areas.

ECON 328 - Environmental Economics
*Prerequisites: Sophomore standing, minimum grade of "C-" in ECON 201.*
This course applies economic theory to environmental and natural resource problems and policies, investigates the role economic incentives play, and discusses externalities, property rights, common property problems, pollution and pollution control, and renewable and non-renewable resource management.
Outcome: Students will understand that environmental problems are fundamentally economic problems that come about because there is a market failure (e.g., an externality or public good) and that environmental problems have economic solutions.

ECON 201 - Principles of Microeconomics
*Requirement: ANTH 100, PLSC 102, PSYC 100 or SOCL 101 for students admitted to Loyola University for Fall 2012 or later. No requirement for students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of Anthropology, Department of Criminal Justice, Department of Economics, Department of Psychology, Department of Political Science, the Department of Sociology, Human Services or the School of Nursing.*
This course is an introduction to demand and supply, consumer choice, price analysis in alternative industrial organizations, and the distribution of income.
Outcome: Students will be able to think critically about price formation in different market
structures, and how prices, household incomes and income distribution in a diverse society are
determined with interpretations based on the concepts of opportunity costs and decision making
under uncertainty.

**MATH 131 - Applied Calculus I**
*Prerequisite: Math 118 or Math Placement test.*
An introduction to differential and integral calculus, with an emphasis on applications. This course is
intended for students in the life and social sciences, computer science, and business. Topics include:
modeling change using functions including exponential and trigonometric functions, the concept of the
derivative, computing the derivative, applications of the derivative to business and life, social and
computer sciences, and an introduction to integration.
**Outcome:** Students will obtain an understanding of calculus and methods for applying calculus
(especially differential calculus), including modeling/analyzing processes (such as population growth and
cooling), interpreting the derivative (numerical, graphical, and algebraic), and optimization (such as
finding the time and level for a peak drug concentration).

**MATH 132 - Applied Calculus II**
*Prerequisite: MATH 131*
This course is a continuation of Mathematics 131. Topics include: definition and interpretations of the
integral (numerically, graphically, and algebraically), basic techniques for computing anti-derivatives,
applications to probability, an introduction to multi-variable calculus and optimization for functions of
several variables, and mathematical modeling using differential equations.
**Outcome:** Students will obtain an understanding of integral and multi-variable calculus, including
modeling/analyzing processes with the integral, optimization of functions of several variables, and
modeling with differential equations.

**PHIL 187 - Environmental Ethics**
*Requirement: PHIL 130 for students admitted to Loyola University for Fall 2012 or later. No requirement for
students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of
Philosophy or Department of Political Science.*
This course introduces students to ethical reasoning and to various topics in environmental ethics. Topics
may include: pollution, animal rights, and natural resources.
**Outcomes:** Students will demonstrate an understanding of diverse ethical theories and an ability to use
philosophical reasoning to defend positions in topics covered.

**PHYS 101 - Liberal Arts Physics**
*Requirement: UCSF 137 for students admitted to Loyola University for Fall 2012 or later. No requirement for
students admitted to Loyola prior to Fall 2012 or those with a declared major or minor in the Department of
Anthropology, Department of Biology, Department of Chemistry, Department of Environmental Science,
Department of Physics, Bioinformatics, Forensic Science or Neuroscience.*
For non-science majors. Selected topics from classical and modern physics emphasizing beauty,
symmetry, and simplicity. Contemporary issues of physics and society.
**Outcome:** Understanding of interaction between theory and experiment, role of physics in society,
science vs. non-science; solve problems using algebra, geometry, vectors, and graphs; synthesize
disparate physics topics.

**PLSC 392 - Environmental Politics**
The issues, significant actors, and public policies relating to the environment.
**Outcome:** Students will be able to analyze and assess the role of various actors in the formulation,
adoption and implementation of environmental public policies, and their impact on the everyday lives of
citizens.

**SOCL 272 - Environmental Sociology**
This course examines the distinctively social aspect of the relationship of people to their environments,
both built and natural.
**Outcome:** Students will recognize the role that both social and physical factors play in the environmental
problems facing the world. Students will also develop critical thinking skills needed to evaluate
statements and policy proposal to improve environmental quality.
STAT 103 - Fundamentals of Statistics
This course provides an introduction to statistical reasoning and techniques in descriptive and inferential statistics and their applications in economics, education, genetics, medicine, physics, political science, and psychology. Not open to students who have completed ISOM 241.
Outcome: Students will obtain a background in the fundamentals of descriptive and inferential statistics along with an understanding of their uses and misuses. This course satisfies the quantitative literacy requirement of the core curriculum

THEO 184 - Moral Problems: Ecology Crisis
Christian Life & practice-Ethics: This course considers traditional religious and ethical assumptions about humanity and our relationship to the non-human world.
Outcome: Students will examine a number of religious and philosophical traditions and learn how they describe nature, how they evaluate non-human nature's relationship to humanity, how they define "community" to include or exclude the non-human world, and how they relate or do not relate the sacred to the natural world.