ENVIRONMENTAL SCIENCES MINOR

Contact: Dr. Dawn Holliday
Email: dawn.holliday@wcmo.edu

Note: Students must receive a C- or better for all minor courses. At least 33% of all the hours used to satisfy the minor (7-9) must be Westminster courses.

You can find the course descriptions for all courses required for this minor by clicking on the following links:

- Biology Course Descriptions
- Environmental Science Course Descriptions
- Geology Course Descriptions
- Philosophy Course Descriptions
- Political Science Course Descriptions

ACADEMIC REQUIREMENTS SUMMARY SHEET ACADEMIC YEAR 2022-2023

Minor: ENVIRONMENTAL SCIENCES

Student's Last Name First Name Middle Initial

Advisor Date Minor Declared

Course #	Title of Course	Hours Required	Semester Completed	Grade
Required Course				
ENV 105	Environmental Science with lab	4		
Social Sciences/Humanities: Choose two of the following (6 hrs)				
ECN/ENV 377	Environmental & Resource Economics	3		
PHL 246	Environmental Ethics	3		
POL 326	Environmental Politics & Policy	3		
Physical Science/Geology: Choose two of the following (6-8 hrs)				
GEO 108	Intro to Physical Geology	4		
GEO 116	Environmental Geology	4		
GEO 317	Surficial Geology	4		
GEO 305	Hydrogeology	3		
GEO 327	Weather and Climate	3		
GEO 330	Applications of Geographic Info. Sys.	4		
Ecology & Resource Management: Choose two of the following (6-8 hrs)				
BIO 205	Ecology and Field Biology	4		
BIO/ENV 210	Biogeography	3		
BIO 310	Environmental Toxicology	3		
ENV 350	Conservation Biology	3		
GEO 340	Earth Materials	4		
BIO/GEO/ENV 320/321	Travel Course	4		
	TOTAL HOURS FOR MINOR	**21-23 hrs**		

If any substitutions or waivers of requirements are allowed, please list below and initial.

_____

_____

BIO – Biology

BIO 114 Biological Processes (3 hrs.). An introduction for the beginning student to fundamental organism and cellular processes such as molecular and Mendelian genetics and photosynthesis. Students must take this course in conjunction with BIO 115. This course is typically offered once per academic year in the fall semester. BIO 114/115 will satisfy the Scientific Inquiry (lab) Context in Tier II of New Foundations and the Natural Science Inquiry Theme of Breakthrough general education programs.

BIO 115 Biological Processes Laboratory (1 hrs.). Students conduct laboratory exercises selected to reinforce and augment lecture topics in BIO 114. Students are involved in setting up and management of experiments and in analysis of collected data. Students must take this course in conjunction with BIO 114. This course is typically offered once per academic year in the fall semester. BIO 114/115 will satisfy the Scientific Inquiry (lab) Context in Tier II of New Foundations and the Natural Science Inquiry Theme of Breakthrough general education programs.

BIO 124 Biodiversity (3 hrs.). This course acquaints students with the major subdivisions of the living world. Anatomical, morphological and life cycle characteristics of representatives of the various phyla and classes are introduced and phyletic and functional interrelationships are stressed wherever feasible. Students must take this course in conjunction with BIO 125. This course is typically offered once per academic year in the spring semester. BIO 124/125 will satisfy the Scientific Inquiry (lab) Context in Tier II of New Foundations and the Natural Science Inquiry Theme of Breakthrough general education programs.

BIO 125 Biodiversity Laboratory (1 hr.) This is a survey laboratory and is intended to demonstrate the changes in complexity of form and structure in both plants and animals as evolutionary processes have shaped organisms through geological time. Students must take this course in conjunction with BIO 124. This course is typically offered once per academic year in the spring semester. BIO 124/125 will satisfy the Scientific Inquiry (lab) Context in Tier II of New Foundations and the Natural Science Inquiry Theme of Breakthrough general education programs.

BIO 204 Animal Behavior (4 hrs.) This course will introduce students to the field of animal behavior focusing on an evolutionary approach. We will examine both proximate and ultimate causes for why animals behave as they do. Topics range from how neural mechanisms control behavior to why

different types of mating systems have developed. This course focuses on how scientists study these areas. Students design and conduct experiments in animal behavior as part of the learning process. This course is typically offered every other academic year. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 205 Ecology and Field Biology (4 hrs.) This course is designed to familiarize the student with the concepts and principles of ecology as a science. A wide variety of organisms and groups of organisms are studied in relation to various environmental conditions. Short local field trips are used to acquaint students with collecting, census, and ecological measurement techniques and devices. This course is typically offered every academic year in the fall semester. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 206 Laboratory Instruction Techniques (1 hr.) This course is open to students who are qualified to serve as laboratory assistants in various biology courses. Students assist instructor in the laboratory and serve as mentors for students in course. This course is typically offered every semester during the academic year. Prerequisites: open by invitation to students who have earned an A or B average in NSC 108, BIO 124/125 (or BIO 100 General Biology I), or BIO 114/115.

BIO 208 Functional Plant Morphology (4 hrs.) This course is designed as an integrated study of the gross morphology, internal anatomy and physiology of vascular plants. Laboratory studies emphasize the interrelationships between plant form and function. This course is typically offered every other academic year in the spring semester. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 210 Biogeography (3 hrs.) Biogeography is the study of the distribution of biodiversity over space and time. It aims to reveal where organisms live and at what abundance. It addresses the questions of which species, where and why (or why not). Biodiversity is viewed in light of historical factors, such as speciation and extinction, plate tectonics and glaciations, as well as in the light of current and future threats, including but not limited to climate change. This course is typically offered every other academic year. Prerequisites: BIO 124/125 and 114/115 for Biology and Environmental Science majors; NSC 108 and ENV 105 for non-majors.

BIO 212 Research Methods in Biology and Environmental Sciences (3 hrs.) Research methods will introduce you to tools and techniques used in the scientific research laboratory by offering a hands-on research experience allowing data collection, storage, and analysis. Topics include an examination of research types, design, and methodology, scientific communication, and data analysis. Prerequisites: BIO 114/115 and BIO 124/125 or CHM 114/115 and CHM 124/125. MAT 114 is recommended.

BIO 301 Genetics (4 hrs.) This course will be an introduction to and a survey of the science of genetics. Topics covered will include classical "Mendelian" genetics, population genetics, and modern molecular genetics. The laboratory will augment these approaches with traditional studies in fly genetics and current practices in molecular genetics. This course is typically offered once per academic year. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 302 Human Anatomy (4 hrs.) This class is designed for students who are preparing for careers in health-related clinical or research professions or have a deep interest in understanding how the human body works. You will learn about the human form at the gross anatomical level delivered as a regional approach typical of professional schools. In the laboratory, we will be using anatomical models, skeletons, radiographs, and dissection to enhance your understanding of anatomy. This course will challenge you to apply this information to real world clinical and pathological problems. This course is typically offered every academic year in the fall semester. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 303 Microbiology (4 hrs.) This course serves as an introduction to the structure, physiology, pathogenicity and ecology of microorganisms, particularly the bacteria and viruses. Laboratory work involves effective use of the microscope, staining procedures, handling of pure cultures, analysis of bacterial physiology and identification of unknown bacteria. This course is typically offered once each academic year in the fall semester. Prerequisites: BIO 124/125 (or BIO 100 General Biology I), BIO 114/115.

BIO 310 Environmental Toxicology (3 hrs.) In this course, you will be introduced to the field of environmental toxicology from a biological perspective. We will discuss uptake of chemicals from the environment, biotransformation, and toxicity. We will examine a wide array of endpoints from cellular biomarkers to population-level effects in invertebrates and vertebrates, including humans.
Prerequisites: BIO 124/125 and BIO 114/115

BIO 314 Vertebrate Histology (2-4 hrs.) The aim of this course is to introduce students to the microscopic anatomy and histophysiology of vertebrates. Particular emphasis will be placed on the interrelation between structure and function. In addition, this course will teach students to become proficient in using the microscope to interpret fine structure. This course is typically offered as independent study. Prerequisite: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 315 Entomology (4 hrs.) This course focuses on the biology of insects with the following three objectives: (1) An introduction to common methods used in the field of entomology. (2) The ability to identify many common insect orders and families, since it is impossible to understand something if you do not know what it is. Finally, (3) an introduction to the evolution, behavior, and ecology of this fascinating group. This course is typically offered every other academic year in the fall semester. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 318 Ornithology (4 hrs.) Ornithology is the study of avian biology (birds). The broad goals of this course will be to (1) introduce you to the evolution, behavior, and ecology of birds; and (2) provide you with the ability to identify many common bird species in the wild by sight, sound, behavior, and habitat. This course meets twice a week in a lecture/laboratory class setting. Several trips will be taken into the field to identify birds. Please note that on rare occasions, the class period may run 10-20 minutes longer to accommodate longer trips afield. This course typically is offered every other academic year in the spring semester. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 320 & 321: Biology in Belize (4 hrs.) This course serves as an introduction to the natural history, geography, pre- and post-Columbian history, land-use patterns, and current political climate of Belize, Central America. Following a preparatory spring semester seminar (BIO 320), a three-week Summer Session course (BIO 321) will be taught in Belize where students will study the biota of the offshore caves, coral reefs, grassland savannas and neo-tropical jungles. Special attention will be paid to local land use and conservation issues and the effects of ecotourism on the local economy and relevant ecosystems. Prerequisites: Completion of at least two courses in biology or permission of the instructor.

BIO 322 Vertebrate Biology (4 hrs.) Vertebrate Biology takes a comparative approach to the study of the diversity of vertebrate life both extinct and extant. Anatomy, ecology, behavior, and evolutionary history will all be discussed as part of a broad introduction to the vertebrates. The dissection of representative species of the major vertebrate groups is the focus of the weekly laboratory. This course is typically offered every other academic year. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 325 Molecular Cell Biology (4 hrs.) This course is a study of eukaryotic cells at the molecular level. Topics include protein biosynthesis and trafficking, membrane structure and function, cellular, subcellular, and extracellular structure, and the cell cycle. The course correlates the cellular structures to their function within the cell. The laboratory is designed to complement these topics, with an emphasis on student self-design. This course is typically offered once every one-two academic years. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115. BIO 301 Recommended.

BIO 328 Insects and Human Affairs (3 hrs.) This course provides an introduction to insects and their interactions with humans. Human beings and insects will be compared with respect to both form and function, and students will learn to distinguish the major groups of insects. The course will examine the effects of insects on agriculture (both harmful and helpful), the impact of insects on the course of human history, and their representation in art, music, and literature. This course is typically offered every other academic year in the spring semester. BIO 328 will satisfy the Scientific Inquiry (non-lab) Context in Tier II of the General Education Program and the STEM and Society Explorative Cluster of Breakthrough general education program.

BIO 330 Virology (3 hrs.) This course will introduce students to the basic biology of viruses and then look at some contemporary issues that involve viruses. Topics covered will include the cellular and molecular mechanisms of virus reproduction including virus structure, virus-cell interactions, virus infection, oncogenes, and viral transformation of cells to cancer. We will also consider the evolution and ecology of viruses and the epidemiology of viral infections. Examples will be taken from bacterial, plant, and animal viruses, including newly emerging viruses. Contemporary topics will include the AIDS epidemic, emerging pathogens such as West Nile virus, bird flu, or Ebola virus, the renewed threat of smallpox, etc. Portions of the course will include student-led discussions of specialized topics of their choice. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115. BIO 301 recommended.

BIO 335 Medical Terminology (1 hr.) The course is designed to help students develop a vocabulary for accurately describing the human body and associated components, conditions, processes. This systematic approach to word building and term comprehension is based on the concept of: (1) word roots, (2) prefixes, and (3) suffixes primarily derived from Latin and Greeks origins. This course is typically offered every academic year. Prerequisites: BIO 124/125 (or BIO 100 General Biology I), BIO 114/115, and permission of instructor required.

BIO 372 Developmental Biology (4 hrs.) How does the fertilized egg transform into an organism? What changes over time lead to the specialized tissues and organs of animals? Developmental Biology is a survey of animal development, from sperm and unfertilized egg through embryonic development. Molecular, cellular, genetic, and organismal topics will be included. This course will complement your studies of genetics, cellular, animal, and human biology as we discuss how genotype becomes phenotype. The laboratory will include descriptive and experimental approaches. Typically offered every other year. Prerequisites: BIO 124/125 (or BIO 100 General Biology I), BIO 114/115 and BIO 301 (Or with permission).

BIO 398 Independent Research Projects (1-4 hrs.) Students interested in independent reading or developing individual research projects may enroll in BIO 398 for variable credit. The faculty in the department strongly encourages students majoring in biology to develop and pursue at least one research project. This course is typically offered every semester during the academic year. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115, as well as permission of the department chair.

BIO 404 Biochemistry (4 hrs.) This course is an advanced survey course for students who expect to continue graduate study in biology or continue on to a professional career in a health-related field. Topics include a detailed study of the structure of biological molecules and the function of enzymes, followed by a survey of basic intermediary metabolism. The laboratory is a project-based laboratory incorporating many of the principles covered in lecture. This course is typically offered once each academic year in the spring semester. Prerequisites: CHM 314, 315, 324, and 325 (CHM 324 & 325 can be taken concurrently with BIO 404), BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115.

BIO 415 Human Gross Anatomy (4 hrs.) Students will complete a human dissection, as a team, with a minimum of 6 hours of contact per week. The dissection will be completed as it would in a medical school gross anatomy course, to include a complete regional dissection. Additionally, an assessment of the health of the donor will be completed. The students will be required to share their findings with the community and in other courses as appropriate. This course is typically offered once each academic year in the fall semester. Prerequisites: BIO 124/125 (or BIO 100 General Biology I), BIO 114/115, and BIO 302 (Must have been taken at Westminster). The course is by application and consideration of faculty in the department, and requires instructor permission.

BIO 420 Physiology (4 hrs.) This class is designed for students who have a deep interest in understanding how the human body works. Physiological principles and examples will be geared towards humans, but in many instances are also applicable to other vertebrates. You will learn about how the human body functions at molecular, cellular and systems levels. This course will challenge you to apply this information to real world clinical and pathological problems. You will be expected to critically evaluate current scientific literature and discuss recent scientific findings with your fellow classmates. You will learn how to use physiological lab equipment and then conduct an independent research project. This course is typically offered once each academic year in the spring semester. Prerequisites: BIO 114/115, BIO 124/125 (or BIO 100 General Biology I) and BIO 302 or BIO 322 with a grade of C- or better.

BIO 450 Evolution (3 hrs.) Evolution is the unifying theory of biology. This course will examine Charles Darwin's theory of evolution by means of natural selection looking at the development of this theory and its modern applications. Topics will include the fundamental mechanisms for evolution, including those that are both adaptive and neutral with respect to the process of adaptation; human evolution; the origin and definition of a species; molecular evolution; the relationship between evolution and religion; and modern challenges, modifications, and support for this far-reaching theory. This course is typically offered every academic year in the fall semester. Prerequisites: BIO 124/125 (or BIO 100 General Biology I) and BIO 114/115, junior or senior status.

ENV – Environmental Science

ENV 105 Introduction to Environmental Sciences (4 hrs.) This course investigates global, national, regional, and local environmental issues by critically analyzing available data and examining alternative to current situations. Emphasis is placed on the use of scientific methods to investigate and solve environmental problems. Off-campus field trips are required. Class projects seek to extend the implications of the course material to the campus and local communities. Offered most semesters.

ENV 210 Biogeography (3 hrs.) Biogeography is the study of the distribution of biodiversity over space and time. It aims to reveal where organisms live and at what abundance. It addresses the questions of which species, where and why (or why not). Biodiversity is viewed in light of historical factors, such as speciation and extinction, plate tectonics and glaciations, as well as in the light of current and future threats, including but not limited to climate change. This course is typically offered every other academic year in the spring semester. Prerequisites: BIO 124/125 and 114/115 for Biology and Environmental Science majors; NSC 108 and ENV 105 for non-majors.

ENV 350 Conservation Biology (3 hrs.) Conservation biology is the scientific study of the nature and status of Earth's biodiversity with the aim of protecting species, their habitats, and ecosystems from excessive rates of extinction. It is an interdisciplinary subject drawing on sciences, economics, and

the practice of natural resource management. A variety of topics and issues will be explored, including but not limited to: factors contributing to the decline of populations, the problems of habitat loss, isolation and fragmentation, ecosystem management, restoration ecology and sustainable development. This course is typically offered every other academic year in the spring semester. Prerequisites: BIO 124/125 and 114/115 or ENV 105.

ENV/ECN 377 Environmental and Resource Economics (3 hrs.) This course will introduce students to the theories and methods used to understand and evaluate environmental problems and policies. The class will provide students the much-needed exposure to the non-competitive markets, the methods to analyze such markets, and the effects of these markets on economic institutions. The objective of this course is to introduce students to theories and methods used to understand and evaluate the environmental problems and policies. We will start with concepts of externalities, public goods, property rights and why markets could fail in these cases. Policies to correct market failure in domestic and international situations will be examined. Students will explore the common property problem in case of renewable resources and the public policies used to correct the problem. This course is offered every other spring semester. Prerequisites: MAT 122 or MAT 124, and ECN 212.

ENV 405 Environmental Assessment (3 hrs.) Tools, methods, and techniques employed in the study of environmental impact assessment and resource management. Research fundamentals and related environmental legislation will be studied and applied to environmental problems and resource evaluation. The major product is the development of a project requiring an EIS, researching the alternatives, gathering information, writing, and presenting the report. Offered every other fall semester. Prerequisites: ENV 105, GEO 108 or GEO 110 and Junior or Senior standing.

GEO – Geology

GEO 108 Introduction to Physical Geology (4 hrs.) Introduces the major concepts in the field of geology. Topics to be covered include rock and mineral identification, map reading, theory of plate tectonics, surface and subsurface hydrology, landform, geologic hazards, and environmental issues. Satisfies natural science lab requirement. The lab portion of the course provides "hands-on" experiences laboratory work, as well as off-campus field trips. GEO 108 will satisfy the Scientific Inquiry (lab).

GEO 110 Earth Systems (4 hrs.) This course evaluates basic geographical and earth science principles and processes in the lithosphere (soils and landforms), hydrosphere (hydrologic cycle), atmosphere (weather and climate), and biosphere (biogeography). Study of the relationships between the natural environment and human habitation on the Earth. Lab and field exercises and data evaluation will give students an appreciation of the tools of study and more detailed look at the entire system of the Planet Earth in which there is human interaction. Offered every other spring semester.

GEO 116 Environmental Geology (4 hrs.) Geology of natural hazards in the environment, such as volcanoes, landslides, earthquakes, mass wasting and landslides, subsidence, weather, and tsunami. The course provides "hands on" experiences. In addition to laboratory work, off-campus field trips will be required. Offered every other year in the spring semester.

GEO 203 Historical Geology (4 hrs.) A physical history of Earth that examines the processes responsible for creating a dynamic planet. This course evaluates the origins of Earth, changes in continents/ocean basins as it relates to plate tectonics and how these changes influenced climates, environments, and ultimately life. Students will apply concepts from GEO 108 and focus on specific examples of prehistoric organisms and their interaction within the surrounding environment in which they lived. Based on information recorded from the rock and fossil record, a better comprehension of the delicate relationship between organisms and their surrounding environment will be gained. Course content will be complemented with field and laboratory components. Prerequisite: GEO 108

GEO 302 Geoscience: Perspectives & Creative Design (3 hrs.) This interdisciplinary course will challenge students to expand on geological content and concepts presented in GEO 108, as well as new material, by engaging in projects that promote and explore new perspectives and creativity. Students will utilize a variety of artistic mediums to express the comprehension and appreciation of various subjects related to the geosciences in more meaningful ways. Prerequisite: ART 230, ART 231, or GEO 108

GEO 305 Hydrogeology (3 hrs.) Natural water systems both on and beneath the surface will be investigated. Issues receiving particular attention will include behavior and characteristics of natural systems, human impacts on the systems (including contamination and flooding), and water quality and public health. Offered every other fall semester. Prerequisites: GEO 108 or 110 and MAT 111, 121 or 124 and CHM 105/106 or CHM 114/115.

GEO 310 Introductory Soil Science (4 hrs.) Nature, properties and distribution of soils and their relationship to the influence of vegetation, climate, landforms, and human activity. Understanding how soils form and how and why they vary horizontally across the landscape and vertically with depth. Emphasis upon North American patterns. Required field trips and labs. Offered every other fall semester. Prerequisites: CHM 114/115 and GEO 108 or 110.

GEO 315 Anthropocene Geology (3 hrs.) This course will expand on important environmental issues during the most recent portion of geologic time, known as the Anthropocene. Primary focus will be on the hydrosphere and atmosphere, and how human activity affects various parts of these systems. Therefore, content will include topics associated with the relationship between human activity and climate change, as well as environmental contamination. In addition, students will also become familiar with a variety of natural hazards and disasters and learn how to prepare and respond to such events. Prerequisite: ENV 105 & GEO 108

GEO 317 Surficial Geology (4 hrs.) This course focuses on the physical, chemical, hydrological, and biological processes responsible for shaping and creating various geological surface features and environments. Content includes an in-depth look at weathering, erosion, transporting agents, sedimentation and deposition, soil formation, classification and distribution of soils, soil processes, and landscape evolution. Course content is designed to illustrate the dynamics of Earth's past and future surface environmental changes. A primary focus of the course discusses the relationship between process and surface form, as well as consequences of land scape alteration due to human activities. Lecture material will be complemented with field and laboratory components. Prerequisite: GEO 108

GEO 320 & 321 Geology and Environment of the National Parks Seminar & Trip (4 hrs.) Hands-on opportunity to learn geology field techniques, do a cooperative planning effort, and to study on-site the geology and environment of the national parks of the United States and/or Canada. Following a preparatory spring seminar (GEO 320), the one to three-week Summer Session course (GEO 321) will be taught on an off-campus field trip in the United States and/or Canada. Some of the study will be led by federal and state personnel. The geology and environment will be studied at individual national parks, as well as regionally. May be taken more than once for credit.

GEO 325 Geomorphology (3 hrs.) Landforms of the continents and marine basins and the physical processes that create and fashion them. In addition to external agents, such as running water, glacial ice, gravity, and waves, the internal forces that create landforms are evaluated. Emphasis upon North American geomorphic patterns. Offered every other spring semester.

GEO 327 Weather and Climate (3 hrs.) This course examines the processes and patterns found in the Earth's atmospheric system on a daily basis (weather) as well as a statistical average (climate). The course also examines the effect weather and climate have on the environment in which we live. The course will have a focus on short-term energy input, atmospheric motion and moisture considerations, weather forecasting, climate change, microclimates, and energy balance. Offered every other fall semester.

GEO 330 Application of Geographic Information Systems (4 hrs.) Basic study of Geographic Information Systems, particularly ARCGIS software and applications to a variety of disciplines. Course will involve extensive hands-on use of ARCGIS and the development of maps and projects in several disciplines. Offered every other spring semester. Prerequisites: Junior standing and a Tier I math course.

GEO 335 Paleontology (4 hrs.) This course will cover invertebrate and vertebrate fossils throughout geologic time and discuss phylogenetic relationships and evolutionary history of important taxonomic groups. Unique morphological characteristics and adaptations will be highlighted and discussed. Furthermore, there will be a focus on the relationship between form and function. Students will learn how to make environmental interpretations based on morphological characteristics. Course content will be complemented with field and laboratory components. Prerequisite: GEO 108 & GEO 203

GEO 340 Earth Materials (4 hrs.) This course focuses on mineral and rock resources in both hand sample and thin section. It addresses the natural processes responsible for formation, distribution, and abundances of these resources. Students will be introduced to the basics of crystallization and physical properties based on elemental chemistry, as well as petrographic techniques. This course will also concentrate on common mineral and rock resources that are important to human society and future progress by clarifying how these resources are mined, extracted, utilized, and become cause for environmental concern. Lecture material will be complemented with field and laboratory components. Prerequisite: GEO 108

PHL – Philosophy

PHL 101 Introduction to Philosophy Through Film (3 hrs.) This course utilizes films and media to help explore the major areas of philosophy relating to who and what we are and how we should live our lives. More specifically, it explores questions relating to the belief in God; knowledge of the world; the relationship between minds, bodies, and persons; freedom and responsibility; and ethics and morality. Offered each semester

PHL/REL 102 World Religions (3 hrs.) One of the most pressing problems of the 21st century is religious pluralism: We live in a world, in a nation, and in an academic community that is religiously diverse. How will we relate to persons who are different from one another and from us in terms of religious orientation? Will we choose to relate in ways that are healthy or ways that are harmful? For unless we know what persons of faith believe and value and do, we cannot relate in positive ways to them. This course will strive to understand a number of the varied religious traditions of the world in a way that is fair, open-minded, objective, and kind. "Agreeing" with the various religions we will be studying is not required; however, "understanding" them is. Typically offered every semester.

PHL 120 History of Philosophy (3 hrs.) This course explores the history of western philosophy with an emphasis on the ancient, medieval and modern philosophical eras. Pursued chronologically, most attention is given to central figures such as Socrates, Plato, Aristotle, Aquinas, Descartes, Locke, Hume and Kant though a broader range will be investigated with an emphasis on their views relating to ethics, political theory, and metaphysics/epistemology (relating to the nature of reality and how we come to know such). The course also focuses on applying historical philosophical thought to our contemporary world.

PHL 212 Introduction to Ethics (3 hrs.) An introductory survey that begins with a brief introduction of ethical theory before moving on to explore specific applied ethical issues such as the following: abortion, euthanasia, sexual morality, human cloning, animal rights, war and terrorism, and distributive justice. The focus of the course is developing critical ethical reasoning that enables deeper normative insights in to how we should live our lives. Offered each spring.

PHL 218 Introduction to Logic (3 hrs.) Drawing from a broad spectrum of controversial issues, this course is a systematic introduction to techniques for constructing, analyzing, and evaluating arguments using ordinary language instead of formal systems of inference. Offered every other spring.

PHL 242 Biomedical Ethics (3 hrs.) The course begins with a brief introduction to ethical theories and to major moral principles used in analyzing problems in biomedical ethics. Theories and principles are then applied to a sampling of biomedical cases such as the following: severely impaired newborns and their parents' right to refuse treatment for them; the justification for genetic manipulation and screening; physician-assisted suicide; doctor-patient confidentiality and informed consent; the use of fetal-cell tissues; living wills and their relationship to personal identity. The readings include analyses by physicians, jurists, and philosophers of the ethical and philosophical questions raised by the cases and issues considered.

PHL 244 Business Ethics (3 hrs.) A study of moral problems arising in business and industry: consumer rights, property rights and employee rights; the obligations of employees, owners and managers, governmental regulation and economic justice.

PHL 246 Environmental Ethics (3 hrs.) An examination of ethical issues arising from our use of natural resources, animate and inanimate, and different ethical perspectives regarding our relationship to the rest of the natural world (both now and in context of future generations). Most of the course is devoted to examining contemporary environmental issues (pollution, global warming, preservation of species, etc.) using traditional ethical theories, biocentric and ecocentric ethics, deep ecology, and concepts from economics and policy analysis. Offered every other spring semester.

PHL 302 The Meaning of Life (3 hrs.) What is the meaning of life? Most of us have asked this question of ourselves and perhaps of other people we respected. For, in addition to understanding the world in which we live, we want to make sense of how to make our own lives as meaningful as possible to know not only why we're living, but that we're living our lives with intention, purpose, and commitment. Through interesting and pertinent books, writing selections, films, and a community service/experiential learning project, this course will address this profound, abstract, and personal question. Prerequisite: One PHL or REL course, or permission of the instructors.

PHL 320 Philosophy & Literature (3 hrs.) This course examines philosophy, and particularly existentialist philosophy, through literature. We will focus on existentialist themes involving life's meaning, authenticity, freedom/responsibility, and identity as exemplified by the works of Dostoevsky, Kierkegaard, Nietzsche, Ortega, Heidegger, Sartre, de Beauvoir, and Camus. We will pursue these topics both through primary and secondary philosophical essays, and also through the literary works of such writers as Camus, Kundera, Barth, Crumey, and Hesse. Prerequisites: Any one of the following PHL 101, 212, 221, 222, 242, 244, 246; ENG 204, 205, 206, 238, 239, 248, 249; CLA 215; FRE 280; GER 204; LAT 204.

PHL 324 Genetic Manipulation (3 hrs.) This seminar provides an interdisciplinary examination of practices and policies relating to actual or imagined genetic manipulation of human beings and other life forms. We will discuss the history and practice of eugenics, the attempt to create "better" offspring, and its relationship to potential genetic technology. In part drawing from a Rawlsian framework we will discuss issues such as human cloning, genetic screening, and genetic manipulations of humans in light of principles such as justice, fairness, discrimination and other values such as the sanctity of life. We will also consider broader genetic manipulation of plants and animals and resulting ethical controversies from broadly scientific, ecological, philosophical and religious perspectives. Prerequisite: Any ONE of the following: Bio 114/115, BIO 328 BIO 124/125, BIO 100 General Biology I, PHL 101, 212, 221, 222, 242, 244, 246, or REL 101, 102.

PHL 333 Asian Philosophy and Religion (3 hrs.) The purpose of this course is to provide a detailed overview of the key thinkers and issues of the four major traditions of Eastern Philosophy: Indian, Chinese, Japanese, and Islamic. A variety of primary and secondary source readings are used to elucidate issues in metaphysics (including philosophy of religion), epistemology, ethics, political philosophy, and aesthetics. Prerequisite: Any ASN, PHL or REL course.

PHL/REL 342 Philosophy, Religion, and Science (3 hrs.) The common perception today is that, for centuries, science and religion have stood in conflict with each other –e.g. as demonstrated by conflicting perspectives between Charles Darwin and the Bible concerning the theory of evolution. Philosophy itself was foundational to scientific inquiry, though its approach differs from both science and religion and can also be seen by some as adversarial to each. This course explores three themes--cosmology and creation, evolution and providence, and genetics and human nature—from the vantage points of philosophy, religion, and science with the goal of presenting a fresh conversation between these fields which does not reduce to adversarial positions. Prerequisite: One course in philosophy or religious studies or one course in the natural sciences, or permission of the instructor.

PHL 398 Independent Study (1-4 hrs.) This course permits advanced study of topics not covered in regularly offered courses on a research-tutorial basis. The topic is defined by the student in conference with the instructor. Prerequisite: two previous courses in philosophy, a major or minor in philosophy, and permission of instructor.

PHL 410 Major Areas of Philosophy (3 hrs.) An intensive study of a major area of philosophy such as philosophy of religion, Eastern philosophy, ethics, metaphysics, epistemology, or philosophy of mind. May be repeated for credit with change of topic. Prerequisite varies depending on course.

PHL 420 Major Philosophers (3 hrs.) An intensive study of the thought of a single major philosopher such as Plato, Aristotle, Hume, or Kant. May be repeated for credit with change of topic. Prerequisite varies depending on course.

PHL 430 Philosophical Problems (3 hrs.) An intensive study of a relatively specific philosophical problem such as evolution vs. Intelligent Designer Theory, genetic manipulation (relating to human cloning/ eugenics), the mind-body problem, animal rights, philosophy of death and dying. May be repeated for credit with change of topic. Prerequisite varies depending on course.

POL – Political Science

POL 112 Introduction to Political Science (3 hrs.) An introductory study of political action, institutions and argument. Some current controversies in American politics will be considered, together with the experience of other countries where comparison is helpful.

POL 211 American Government and Politics (3 hrs.) An introduction to American government and politics through an examination of interactions between citizens and political institutions in the formation and the execution of public policies.

POL 212 Introduction to International Relations (3 hrs.) This course explores key issues in the international system including war, terrorism, human rights, and international law, international institutions like the United Nations, and theories of international relations.

POL 301 The American Presidency (3 hrs.) A study of the modern American presidency in terms of its concepts and controversies. Prerequisites: POL 211.

POL 304 American Political Theory (3 hrs.) Focuses on the political philosophies expressed in the Declaration of Independence and the U.S. Constitution. Considers the viability of these philosophies in the context of contemporary American society and politics. Prerequisites: POL 112 or 205, or permission of the instructor.

POL 305 International Law and Organizations (3 hrs.) An analysis of the nature, sources, function and development of international law and organizations with special reference to the role and function of the United Nations' system for resolving international disputes. Prerequisites: POL 212 or permission of the instructor.

POL 306 West European Government and Politics (3 hrs.) A study of the foundations, structures and functions of the governments of selected major European countries. Offered every other spring semester. Prerequisites: GTS 201 or HIS 106 or POL 112 or POL 212 or SEC 201 or permission of the instructor.

POL 308 Post-Soviet Politics (3 hrs.) An examination of the history of the Soviet political system since 1917; the influence of ideology; the role played by the Communist Party, the bureaucracy, interest groups and other actors; political culture, socialization and participation; current economic and social policy issues; and the future evolution of the system. Prerequisites: GTS 201 or HIST 106 or POL 112 or POL 212 or SEC 201 or permission of the instructor.

POL 311 Political Parties, Voting and Campaign Strategies (3 hrs.) Reviews the evolution and role of political parties and elections in the American political system. Examines the decline-of-parties thesis and recent developments in campaign strategy. This course is offered in the Fall semester of even-numbered years and students are required to participate in political campaigns of their choice. Prerequisites: POL 112 or 211.

POL 314 American Constitutional Law and Politics (3 hrs.) This course, (1) explores how the decisions of the U.S. Supreme Court have influenced the country's understanding of the Constitution, (2) considers the political forces that shaped the decisions, as well as the political effects of those decisions and (3) details the contours of the significant rights articulated in the decisions. Prerequisites: POL 211.

POL 316 American Jurisprudence (3 hrs.) This course, (1) introduces and critiques the major philosophies of law, (2) applies these philosophies to various issues and cases and (3) orients the student to legal reasoning and other legal methods of analysis and inquiry. This course should help prepare students for the study of law, or law-related topics. Prerequisites: POL 211.

POL 324 Central Europe (3 hrs.) This course will examine the unique problems of this region from an interdisciplinary perspective. Since the demise of the Cold War in 1989, and with it the collapse of the wall between eastern and western Europe, this region has become a crucible for a changing world order and a changing Europe. Analysis of a series of current themes from a political science and a historical perspective will form the backbone of the course. We will also look at the issues from both a regional and a national point of view. These topics will include: the reunification of Germany; the ethnic/nationality question; the legacy of communism; the rise of neo-fascism; diplomatic integration into NATO or the European Union; tensions over Ukraine. Prerequisites: HIS 110, GTS 201, or POL 212.

POL 325 Middle East and North African Politics (3 hrs.) An examination of political issues within and between the countries in the Middle East and North Africa. In this course, students will examine the role of religion in politics, the causes and consequences of military conflicts in the region, efforts to promote (and diminish) the rights of marginalized groups, and the wide diversity of political institutions that exist in the area. Prerequisites: GTS 201, SEC 201, POL 212, or permission of the instructor.

POL 326 Environmental Politics and Policy (3 hrs.) This course seeks to explore and understand four broad, interrelated topics: (1) the major political processes, actors, conditions and controversies involved in the formulation and implementation of environmental policies at the local, national and international levels; (2) some of the major pieces of legislation that constitute environmental policy in the United States and the world community; (3) some of the techniques and approaches that policy analysts employ to assess the effectiveness and costs of environmental policies and (4) issues that will shape environmental politics and policies in the immediate future, such as population growth, global warming, habitat destruction and resource depletion. Offered every other fall semester. Prerequisites: POL 112 or POL 211 or ENV 105.

POL 328 National Security Agencies (3 hrs.) To understand the politics and processes of national security, we must have an understanding of the national security labyrinth at the national level. The purpose of this course is to ensure the students' knowledge about the institutional design, oversight mechanisms and shortcomings, missions, and relationship of the varied institutions of the national security bureaucracy. Prerequisites: POL 211, SEC 201, or permission of the instructor.

POL 332 National Security Law I (3 hrs.) The purpose of this class is to provide an understanding of the sources, impact and limitations of laws that impact the national security of the United States. We will look at the three branches of government and the roles that each plays in the legal environment related to national security. Additionally, there will be discussion of international laws and their effect on the security of the United States. Prerequisites: Any of the following: POL 211; POL 301; POL 305; POL 314; POL 362; any Security Studies course (SEC designation); OR permission of the instructor.

POL 333 National Security Law II (3 hrs.) This class delves deeply into legal issues facing national security, including traditional legal frameworks, and legal questions in emerging areas of national security law. Prerequisite: POL 211, POL 301, POL 305, POL 314, POL 362, or any Security Studies Course.

POL 335 Politics and Security of Developing Nations (3 hrs.) In this course, students will undertake a comparative investigation of the political dynamics of the developing world. Looking across Latin America, Asia, and Africa, students will identify and contrast patterns of political behavior across regions and analyze models of economic development, governance, and security challenges that occur in the developing world. By taking a policy-making perspective, students will assess problems and analyze solutions to current issues in developing nations. Prerequisites: POL 112, 212, SEC 201 or permission of the instructor.

POL 337 Human Rights and Security (3 hrs.) This course examines the evolution of the international system of human rights. It will consider fundamental legal, moral, and political debates related to human rights and look for avenues to make progress in human rights protection. It will also examine the relationship between human rights and human security and the challenges associated with the provision of human security in the 21st century, with special attention paid to human trafficking and economic development. Prerequisites: POL 112, 212, SEC 201, GTS 201, or permission of the instructor.

POL 342 U.S. Supreme Court (3 hrs.) This course is intended to provide insight into the United States Supreme Court. It will cover subjects that include, but are not limited to: understanding Supreme Court opinions; how justices are chosen to sit upon the Court; the reasons why the Supreme Court makes the decisions it does; and the impact of the Supreme Court on the political and legal landscape in the United States. Prerequisite: POL 211 or permission of the instructor.

POL 343 Congress (3 hrs.) This course will broadly examine the legislative branch of the United States government. Topics include: elections, committees, inter-branch relations, and spatial models of voting. The roles of Congress in our political system are two-fold: 1) to represent issues and concerns of the citizenry; and 2) to make policy for the nation – "to govern." How does the structure of Congress impact the behavior of its members? What makes for "quality" representation? These questions, and more, will be discussed in this course. Prerequisites: POL 112, POL 211 or permission of the instructor.

POL 345 Politics and Film (3 hrs.) Film and visual images can help us understand contemporary politics. Films often shape and illustrate the public's perception of politics. This course will examine the portrayal of politics in movies. The course will have different themes each semester it is taught, including, but not limited to, the American presidency, race and gender, legislative politics, war, terrorism, and elections. Prerequisites: Any of the following: FAR 215, HIS 104, POL 112, or POL 211.

POL 351 Women and Politics (3 hrs.) This course explores the connection between gender and politics in America and in international contexts. Topics under investigation include political participation and the exercise of political leadership by women, the evolution of social movements in support of women's rights, critical social and political issues of concern to women such as health, employment, security, and education, and debates over relevant public policies. Prerequisites: POL 112, 211, 212, WGS 210, or permission of the instructor.

POL 362 American Foreign Policy (3 hrs.) A study of the diplomatic process designed to provide a realistic insight into the stresses and demands upon modern policy-making, including the roles of the president and Department of State. The course includes an analysis of postwar American programs, policies and difficulties in foreign affairs. Prerequisites: POL 211 or 212.

POL 370 Drugs, Politics and Public Policy (3 hrs.) Examines the response of the American political system to the use of psychoactive drugs. Class will consider questions pertaining to the explanation of human behavior, the structure and dynamics of American society and politics, the formation of public policy and fundamental issues of moral and political philosophy to encourage critical and sophisticated thought regarding the actual and desired relationship of American citizens with psychoactive drugs and possible political strategies for responding to perceived issues. Prerequisites: POL 112, or 212.