

2009

Earth and Environmental Studies (EAES)

Montclair State University

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Earth and Environmental Studies

	Course Description	This online course will provide students with core knowledge of bones, joints, and muscles; body orientation terminology; biomechanics; and an anatomical basis for lifelong learning within the discipline. This course will include information on teaching from an anatomically safe viewpoint, emphasizing injury risk evaluation, exercise/combo selection, and skill progression that supports execution of the desired aesthetic while minimizing injury risk.
DNCE540	Title	Thesis Project.
	Course Description	In this capstone course, students will create a significant work that can manifest in the format most in keeping with the background, goals, and future objectives of the student. Examples of acceptable formats are: choreographic work with supporting documentation, dance on film, or written thesis.
EAES100	Title	Principles of Geography.
EAES100	Number and type of credits	3 hours lecture.
	Course Description	The course studies the major elements of the natural environment and their interrelation. The principles and processes essential to the understanding of the natural environmental system and their significance are stressed. The elements studied include: atmosphere, weather and climate, continents, landforms, river systems, ocean currents and tides, soils, vegetation, animal and marine life. Previous course EUGS 100 effective through Spring 2012.
EAES101	Title	Planet Earth.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	An introduction to the physical characteristics of planet earth. The focus is on processes and interactions of the four components of the earth system: atmosphere, hydrosphere, lithosphere and biosphere. An understanding of the human impact on earth systems is also developed and maintained in perspective. Satellite information, aerial photography, maps, charts and other Geographic Information Systems technologies are used to study planet earth in this course. Meets Gen Ed 2002 - Natural/Physical Science Laboratory. Previous course GEOS 107 effective through Spring 2012.
EAES102	Title	Principles of Geology.
	Number and type of credits	3 hours lecture.

	Course Description	Geologic materials and processes. Origin and development of the earth throughout geologic time. Evolution of life as interpreted through the study of fossils. Previous course GEOS 108 effective through Spring 2012.
EAES103	Title	Earth in Space and Time.
	Number and type of credits	3 hours lecture.
	Course Description	The earth, its interactions with the sun, moon and planets; its origin; its major ecologic features and the geologic events of its past, present, and possible future. Previous course GEOS 109 effective through Spring 2012.
EAES104	Title	Natural Disasters.
	Number and type of credits	3 hours lecture.
	Course Description	The study of natural disasters such as volcanic activity, earthquakes and hurricanes: the causes, effects and means of predicting, preventing and minimizing the effects of disasters will be discussed. The relationships between man and his sometimes hostile habitat will be included. Previous course GEOS 110 effective through Spring 2012.
EAES105	Title	Physical Geology.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Materials of the earth; landforms and structures; the processes and agents responsible for their formation and modification. Modern tectonic concepts. Topographic and geologic maps. Required field trips. Not open to students who have had Principles of Geology. Meets Gen Ed 2002 - Natural/Physical Science Laboratory. Previous course GEOS 112 effective through Spring 2012.
EAES106	Title	The National Parks and their Geology.
	Number and type of credits	3 hours lecture.
	Course Description	The National Parks and Monuments as regions of relatively undisturbed natural history. The minerals, fossils and rock formations which occur as well as the story of their formation. Specific parks and monuments will be studied in detail. Previous course GEOS 119 effective through Spring 2012.
EAES107	Title	Earth and the Environment.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	The study of the natural processes of the earth and the effects of human activities on the environment. Earth materials, processes and systems, and

the engineering properties of natural materials will be discussed, as well as

EAES107	Course Description	pollution of soil, water and air. Meets Gen Ed 2002 - Natural/Physical Science Laboratory. Previous course GEOS 125 effective through Spring 2012.
EAES109	Title	Freshman Seminar in Geoscience and Geography.
	Number and type of credits	1 hour seminar.
	Course Description	This course introduces entering freshmen or transfer students to the University, the departments of the College of Science and Mathematics, the culture of higher education, and the field of geoscience and geography. Students learn about campus resources and activities, majors/careers in geoscience and geography, and techniques that foster the development of good study skills and academic success. Open to all MSU students. Previous course ENVR 199 effective through Spring 2012.
EAES120	Title	The Study of Gems.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	Mineralogy of gem materials through lectures, demonstrations and laboratory experience. Sources of gem materials; the cutting and polishing of gem materials. Not for major credit.
EAES140	Title	Dinosaurs, Their Life and Times.
	Number and type of credits	3 hours lecture.
	Course Description	The origin, evolution, paleoecology and extinction of the dinosaurs as reflected in the history of the Mesozoic era. Previous course GEOS 135 effective through Spring 2012.
EAES150	Title	General Oceanography.
	Number and type of credits	3 hours lecture.
	Course Description	A general study of the oceans and methods of modern oceanography including the physical, chemical, geological, and biological aspects of the oceans and their interrelationships. This course is designed for non-science majors. Previous course GEOS 162 effective through Spring 2012.
EAES160	Title	The Human Environment.
	Number and type of credits	3 hours lecture.
	Course Description	An interdisciplinary course which explains the human impact, as social groups and individuals, on the natural environment. It explores the relationships

		and interconnectedness between natural processes and social, economic, cultural, technological, and political culture. Critical environmental issues are discussed. Meets Gen Ed 2002 - Social Science, Social Science. Previous course ENVR 109 effective through Spring 2012.
EAES161	Title Number and type of credits Course Description	Human Geography. 3 hours lecture. Human Geography presents the interaction of culture and environment. Variations in environment and culture result in great differences how culture is imprinted upon the environment. The role of politics, language, religion, economics, urban systems, and technology reveal the relative intensity with which culture roots in nature. Emphasis is upon culture as a force that shapes the human use of the earth. Meets Gen Ed 2002 - Social Science, Social Science. Previous course EUGS 101 effective through Spring 2012.
EAES170	Title Number and type of credits Course Description	World Geography. 3 hours lecture. World geography aims to present essential facts and concepts about the natural and human environment of major regions and countries. The course presents a picture of regions as developed through the interactions of natural, cultural, economic and political forces. Geopolitical, social and economic relationships between and among countries are studied. Meets Gen Ed 2002 - Social Science, Social Science. Previous course EUGS 102 effective through Spring 2012.
EAES200	Title Prerequisites	Geomorphology. EAES 100, EAES 101, EAES 105 or EAES 107.
EAES200	Special Fee Number and type of credits Course Description	Special fee. 3 hours lecture. Major controls of climate and the landforms of North America are analyzed in order to gain an understanding of how the continent compares and is related to the rest of the world. The basis and distinct characteristics of the subdivisions of North America are examined in order to bring out contrasts and unique features within the continent. Previous course GEOS 254 effective through Spring 2012.

EAES201	<p>Title</p> <p>Prerequisites</p> <p>Special Fee</p> <p>Number and type of credits</p> <p>Course Description</p>	<p>Understanding Weather and Climate.</p> <p>GNED 199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.</p> <p>Special fee.</p> <p>3 hours lecture, 2 hours lab.</p> <p>Presents a basic understanding of the dynamic atmosphere and explores the impacts that weather and climate have on humans and the biosphere. Basic physical laws of energy and motion are employed to explain temperature, precipitation, atmospheric circulation, storms, and how climates vary regionally. Connections are made toward management of weather hazards, air pollution, impacts on agriculture and economy, and environmental and social implications of climate change. Lectures are supplemented by current events discussions and hands-on exercises in lab sections. Meets Gen Ed 2002 - Natural/Physical Science Laboratory. Previous course GEOS 257 effective through Spring 2012.</p>
EAES202	<p>Title</p> <p>Prerequisites</p> <p>Number and type of credits</p> <p>Course Description</p>	<p>Introduction to Sustainability Science.</p> <p>EAES 160 and EAES 101.</p> <p>3 hours lecture.</p> <p>Introduction to sustainability science and the challenges confronting society's transition to global sustainability; an investigation into the systems and processes basic to sustainability science; and the relationship of sustainability science to business, public policy, and the sciences. Previous course ENVR 233 effective through Spring 2012. Satisfies the Graduation Writing Requirement for all BS Sustainability Science majors.</p>
EAES204	<p>Title</p> <p>Prerequisites</p> <p>Course Description</p>	<p>Geology Field Trip.</p> <p>EAES 100, EAES 101, EAES 105, EAES 107 or departmental approval.</p> <p>A five-day to one-week trip through areas of geologic significance. A geoscience major is expected to participate in at least two of the trips. Field trip report and collection required. Expenses shared by the participants. Previous course GEOS 484 effective through Spring 2012.</p>
EAES210	<p>Title</p> <p>Prerequisites</p> <p>Special Fee</p> <p>Number and type of credits</p>	<p>Introduction to GIS and Remote Sensing.</p> <p>CSIT 111, EAES 100, EAES 101, EAES 105, EAES 107, EAES 160, EAES 161 or EAES 170.</p> <p>Special fee.</p> <p>2 hours lecture, 2 hours lab.</p>

	Course Description	Introduces the basic principles of Geographic Information Systems (GIS) and remote sensing. Focus on digital cartographic science, graphic design, spatial data and image portrayal and inquiry, map overlays, and applications. Previous course EUGS 270 effective through Spring 2012.
EAES211	Title	Aerial Photograph Interpretation.
	Prerequisites	EAES 100, EAES 101, EAES 105, EAES 107, EAES 160, EAES 161 or EAES 170.
	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	Principles of photogrammetry and the use of aerial photographs as a significant research method to recognize and evaluate earth environments and resources. Previous course GEOS 251 effective through Spring 2012.
EAES212	Title	Map Reading and Cartography.
	Prerequisites	EAES 100, EAES 101, EAES 105, EAES 107, EAES 160, EAES 161 or EAES 170.
EAES212	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	This course is designed to acquaint students with the characteristics of map computation, design and construction. Historical development of mapping and map reading will be important areas of emphasis. Remote sensing, computer mapping will provide up-to-date procedures. Each student will work toward a map suitable for commercial publication. Previous course GEOS 250 effective through Spring 2012.
EAES220	Title	Mineralogy.
	Prerequisites	EAES 101, EAES 105 or EAES 107; and CHEM 120 may be taken as a prerequisite or corequisite.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Crystallography, internal structure, origin, occurrence, and properties of minerals, laboratory study of common minerals. Required field trips. Previous course GEOS 443 effective through Spring 2012.
EAES230	Title	Hydrology.
	Prerequisites	EAES 100, EAES 101, EAES 105 or EAES 107.
	Special Fee	Special fee.

	Number and type of credits	3 hours lecture.
	Course Description	Water, its availability, distribution and usefulness. Hydrologic cycle examined in detail. Interaction with man and his usage. Applications to models and systematic processes. Previous courses ENVR 252 and GEOS 252 effective through Spring 2012.
EAES240	Title	Historical Geology.
	Prerequisites	EAES 101, EAES 105, EAES 107 or EAES 250.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Geological history of the earth; the evolution of North America in terms of the changing geography, climate, and plant and animal life as interpreted from the rock and fossil record. Required field trips. Previous course GEOS 114 effective through Spring 2012.
EAES250	Title	Introduction to Marine Sciences.
	Prerequisites	GNER 199, ENWR 105 or HONP 100 may be taken as a prerequisite or corequisite.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	A general study of the marine sciences, including origin and evolution of the oceans, physical and chemical properties of seawater, marine life, oceanic circulation, atmospheric-ocean exchange and other processes that take place in the oceans. This course also deals with marine resources and human interaction with the marine environment. Field trips required. May be taught off-campus at the NJ Marine Sciences Consortium in the summer. Meets Gen Ed 2002 - Natural/Physical Science Laboratory. Cross listed with Earth and Environmental Studies, PHMS 250. Previous course PHMS 210 effective through Spring 2012.
EAES260	Title	Energy, Environment and Society.
	Prerequisites	ENWR 105 or HONP 100; and MATH 106 or MATH 109; and EAES 101 or EAES 105 or BIOL 100 or CHEM 100.
	Number and type of credits	3 hours lecture.
	Course Description	An introductory survey of present-day energy sources, the impact of their extraction and utilization on Earth's environment, and future options to meet the energy needs of society. Topics include basic principles of energy, carbon cycle, greenhouse effect, origin and production of fossil fuels,

hydraulic fracturing ("fracking"), consequences of fossil fuel combustion, nuclear energy, renewable energy sources, energy efficiency, and conservation.

EAES260	Course Description	Also considered are the impacts of the energy economy on international relations and the uneven distribution of the benefits and negative consequences of resource utilization. Previous course EAES 162 effective through Spring 2015.
EAES261	Title	Conservation of Natural Resources.
	Prerequisites	GNE 199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.
	Number and type of credits	3 hours lecture.
	Course Description	The emphasis of this course is on the imbalance of world population growth and distribution in comparison with the availability of natural resources.
EAES262	Title	Our Finite Earth: Population and Resources.
	Prerequisites	GNE 199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.
	Number and type of credits	3 hours lecture.
	Course Description	Implications of the population explosion and the rising rate of resource consumption. Focuses on the alternative ways various societies can achieve equilibrium between population and economic development within the framework of limited world resources. Previous course EUGS 203 effective through Spring 2012.
EAES263	Title	Noise Pollution: Contemporary Problems and Issues.
	Prerequisites	GNE 199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.
	Number and type of credits	3 hours lecture.
	Course Description	Noise, noise pollution, the psycho-physical effects of noise, noise control, and hearing conservation is studied. Previous course GEOS 205 effective through Spring 2012.
EAES264	Title	The Geography of Life and Death.
	Prerequisites	GNE 199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.
	Number and type of credits	3 hours lecture.
	Course Description	Study of medical geography of diseases of man and their relationship to physical setting. Factors such as climate, soils, water nutrition and sanitation in relation to diseases will be analyzed world-wide. Human diseases also examined; national, regional, and local geographic conditions.

EAES270	Title Prerequisites Number and type of credits Course Description	<p>Previous course EUGS 222 effective through Spring 2012.</p> <p>Geography of North America.</p> <p>GNE199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.</p> <p>3 hours lecture.</p> <p>Provides an understanding of the development of cultural, physical and economic landscape of the United States and Canada. Emphasizes elements of rapid change: urbanization, industrial growth, transportation, trade patterns, distribution of population and modern agriculture. Previous course EUGS 202 effective through Spring 2012.</p>
EAES271	Title Prerequisites Number and type of credits Course Description	<p>Geography of East and Southeast Asia.</p> <p>GNE199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.</p> <p>3 hours lecture.</p> <p>Regional analysis of East Asia (China and Japan) and Southeast Asia (Indonesia): (1) physical environments; (2) human landscape and their cultural heritages; (3) contemporary issues including economic development, political configurations, and environmental problems. Meets Gen Ed 2002 - Social Science, Non-Western Cultural Perspectives. Previous course EUGS 207 effective through Spring 2012.</p>
EAES272	Title Prerequisites Number and type of credits Course Description	<p>Land and Life in Latin America.</p> <p>GNE199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.</p> <p>3 hours lecture.</p> <p>"Land and Life in Latin America" is a regional survey course that explores and explains the physical-human interface and the constantly changing environmental societal needs. The course focuses on the functional processes that mold contemporary states and regional realignments. Emphasis is upon</p>
EAES272	Course Description	<p>environmental conservation, demographic transitions, the role of culture and politics to foster a viable ecumene. Meets Gen Ed 2002 - Social Science, Social Science. Meets World Cultures Requirement. Previous course EUGS 208 effective through Spring 2012.</p>
EAES273	Title Prerequisites Number and type of credits	<p>New Jersey Environment: Problems and Issues.</p> <p>GNE199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.</p> <p>3 hours lecture.</p>

	Course Description	Designed to focus attention on the physical characteristics of New Jersey in order to appreciate and understand the problems encountered in issues involved in management and protection of the natural environment. The significance of location, characteristics of landforms, climate weather patterns, soil and vegetation, will be examined together with the human impact on the landscape. Previous course GEOS 222 effective through Spring 2012.
EAES280	Title	Principles of Land Use.
	Prerequisites	GNEC 199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.
	Number and type of credits	3 hours lecture.
	Course Description	Geographical analysis of rural and urban land use patterns in the United States. Field work stresses mapping techniques and socio-economic aspects of urban land use in the New York-New Jersey metropolitan area. Previous course EUGS 204 effective through Spring 2012.
EAES281	Title	Introduction to American Urban Studies.
	Prerequisites	GNEC 199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.
	Number and type of credits	3 hours lecture.
	Course Description	An interdisciplinary introduction to the development of American cities and their suburbs, with an emphasis on current patterns of urbanism and urbanization. The growth and evolution of metropolitan systems, urban-suburban ecology, and planning responses to critical metropolitan issues. Meets Gen Ed 2002 - Social Science, Social Science. Meets World Cultures Requirement. Previous course EUGS 206 effective through Spring 2012.
EAES282	Title	Urban Design and Architecture: American Cityscape.
	Prerequisites	GNEC 199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.
	Number and type of credits	3 hours lecture.
	Course Description	The evolution of American urban form and architecture from the colonial town to the contemporary metropolitan region; city plans and the emergence of professional planning; the architect and the urban environment cultural values and changing urban forms and new town design. Previous course EUGS 209 effective through Spring 2012.
EAES283	Title	Urban Geography.
	Prerequisites	GNEC 199, ENWR 105 or HONP 100 may be taken as prerequisite or corequisite.
	Number and type of credits	3 hours lecture.
	Course Description	Principles of location, interaction in the socioeconomic spheres, and the

		<p>increasing importance of sustainable environmental management are dominant themes. Close attention to socio-spatial conditions, especially the housing sector, are addressed, as well as the suburbanization process and the urban sprawl challenge to a viable long-term urban system. Assignments are structured to introduce students to professional presentations, both maps and graphics, and written analysis. Meets Gen Ed 2002 - Social Science, Social Science. Meets World Cultures Requirement. Previous course EUGS 213 effective through Spring 2012.</p>
EAES300	Title	Energy Transitions: A Global Dependence.
	Prerequisites	ECON 207, ECON 208, EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	This course assesses the interactions of shifting energy dependence and adaptive technologies to add energy sources to the current national energy
EAES300	Course Description	matrices. Included in this analysis will be a discussion of the growing roster of accessible energy sources by type and environmental source and environmental limitations. History, economy, politics, and culture will be addressed to provide the social context to gauge the growing impact of energy dependence in the contemporary global system. Previous course ENVR 315 effective through Spring 2012.
EAES301	Title	Climatology.
	Prerequisites	EAES 201.
	Number and type of credits	3 hours lecture.
	Course Description	Basic climate elements examined in terms of their influence on habitats and various aspects of human activities. The energy flux between atmosphere and biosphere affords a fundamental understanding of limitations in ecosystems development. Knowledge and climatic influences on health, clothing, human comfort, architecture, commerce and industry encourages the student to investigate new ways of living rationally within a climatic environment. Previous course GEOS 201 effective through Spring 2012.
EAES302	Title	Structural Geology.
	Prerequisites	EAES 200, EAES 220 or EAES 240.

	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	Recognition and interpretation of primary and tectonic rock structures laboratory work emphasizes the analysis of faults, joints, folds and foliation. Required field trips. Previous course GEOS 472 effective through Spring 2012.
EAES303	Title	Field Geography.
	Prerequisites	EAES 200, EAES 202, EAES 210, EAES 230, EAES 281 or EAES 283.
	Special Fee	Special fee.
	Course Description	Geographic analysis of local region. Uses of reconnaissance and survey, interviews, maps and ground and aerial photographs in information gathering. Requires individual area study. Previous course EUGS 303 effective through Spring 2012.
EAES310	Title	Geographic Information Systems (GIS).
	Prerequisites	EAES 210.
	Special Fee	Special fee.
	Number and type of credits	3 hours lab.
	Course Description	This course deals with fundamental principles and applications of GIS. Various ways in which GIS can be used in planning and management analysis and research will be discussed. Students will learn the issues which need to be considered when planning and implementing GIS. One or two widely used software packages will be employed as a tool to study GIS applications. Previous courses GEOS 470 and EUGS 470 effective through Spring 2012.
EAES311	Title	Fundamentals of Remote Sensing of Environment.
	Prerequisites	EAES 210.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Systematic study of multiband spectral reconnaissance of the environment; multifrequency radar systems and their uses. Previous courses GEOS 455 and ENVR 455 effective through Spring 2012.
EAES320	Title	Igneous & Metamorphic Petrology.
	Prerequisites	EAES 220.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.

	Course Description	Description, identification, classification, origin and occurrence of sedimentary, igneous and metamorphic rocks. Laboratory study of the common rocks. Required field trips. Meets the University Writing Requirement for
EAES320	Course Description	majors in Geoscience. Previous course GEOS 444 effective through Spring 2012.
EAES321	Title	Economic Geology.
	Prerequisites	EAES 220.
	Number and type of credits	3 hours lecture.
	Course Description	Geology and geography of non-metallic and metallic mineral resources and fuels. Problems associated with their occurrence and exploitation. Required field trips. (Not given every year.) Previous course GEOS 310 effective through Spring 2012.
EAES322	Title	Environmental Geochemistry.
	Prerequisites	EAES 220 or CHEM 230.
	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	Chemical principles and methods applied to the study of interactions among lithosphere, hydrosphere and atmosphere. Topics such as water pollution, waste disposal and human impact on global geochemical cycles will be discussed. Laboratory will stress the measurement of chemical properties related to water and soil quality as well as computer modeling of chemical transport in porous media. Previous course GEOS 454 effective through Spring 2012.
EAES330	Title	Fluvial Geography.
	Prerequisites	EAES 200 or EAES 230 or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Detailed study of streams and rivers emphasizing processes causing variations of size and shape; the morphology of streams and stream channels; processes, quantitative techniques. Previous courses GEOS 352 and EUGS 352 effective through Spring 2012.
EAES331	Title	Geohydrology.
	Prerequisites	EAES 200, EAES 230 or EAES 240.

	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	The study of ground water with particular emphasis given to its mode of migration, chemistry and relation to the geographic environment. Particular attention is given to Darcy's law, soil porosity, soil permeability and the ability to withdraw water for human consumption. Water pollutants and salt water incursions are investigated. Spatial distributions are analyzed and the processes examined. Previous course GEOS 452 and ENVR 452 effective through Spring 2012.
EAES332	Title	Hydroclimatology.
	Prerequisites	EAES 201, EAES 230 or EAES 301.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Climatology emphasizing moisture as one of the fundamental factors in climatic analysis; processes and problems of classification and variability. Examines energy and water balance. Previous course ENVR 456 effective through Spring 2012.
EAES340	Title	Sedimentology.
	Prerequisites	EAES 200, EAES 220, EAES 230, EAES 240 and EAES 250.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Geological processes and agents which form, transport, deposit, consolidate and alter sediments. Interpretation of the resultant sedimentary rocks. Laboratory work on the texture, mineralogy and mass properties of sedimentary particles. Required field trips. (Not offered every year.) Previous course GEOS 437 effective through Spring 2012.
EAES341	Title	Principles of Soil Science.
	Prerequisites	ANTH 270, ANTH 360, ANTH 370, BIOL 213, CHEM 230, EAES 200, EAES 220, EAES 230 or EAES 240.
	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	Origin, composition, properties and classification of soils. Additional

		<p>topics include water in soils and human impact on soil resources. Laboratory covers the measurement of soil properties and principles of soil mapping and soil resource assessment. Field trips are required. Previous course GEOS 450 effective through Spring 2012.</p>
EAES342	Title	Invertebrate Paleobiology.
	Prerequisites	EAES 240, BIOL 213 or BIMS 220.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Invertebrate fossils-their classification, morphology, evolution, stratigraphic distribution and paleoecology. Required field trips. Previous course GEOS 431 effective through Spring 2012.
EAES343	Title	Geoarchaeology.
	Prerequisites	ANTH 103 or GNHU 181 or EAES 100 or EAES 101 or EAES 105 or EAES 107, plus one of any of the following: EAES 200, EAES 220, EAES 240, EAES 340, EAES 341, ANTH 270, ANTH 370, GNHU 351, GNHU 361, GNHU 362, or departmental approval.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	This course explores the use of geological concepts and methods toward the solution of archaeological problems. Discusses earth materials and processes relevant to archaeology; evidence and timing of environmental change; human environmental impacts; field, lab, and spatial analytical techniques. Field trips expected.
EAES350	Title	Oceanography.
	Prerequisites	EAES 240, EAES 250, PHMS 250 or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Study of the physical and chemical properties of sea water, oceanic circulation, waves and tides, and estuarine and shoreline processes. May be taught off-campus at the NJ Marine Sciences Consortium in the summer. Cross listed with Earth and Environmental Studies, PHMS 350. Previous course GEOS 360 effective through Spring 2012.
EAES360	Title	Contemporary Problems in Conservation of Natural Resources.
	Prerequisites	EAES 202, EAES 261, EAES 262 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Designed to focus attention on specific environmental problem areas or

		utilization of resources through assigned readings which provide background for open class discussion. Previous course GEOS 320 effective through Spring 2012.
EAES361	Title	Environmental Policy.
	Prerequisites	EAES202, EAES281, EAES283, JUST209, LAWS200, JURI210, POLS201 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	The course studies U.S. environmental policy in air, water, land use, agriculture, energy, and waste disposal and other areas. It examines the major ideas that shape environmental policy, the institutional processes by which these ideas are turned into policy, and how these policies affect both U.S. and global environments. Issues of international environmental policy will also be discussed. Previous course ENVR 313 effective through Spring 2012.
EAES362	Title	Environmental Gerontology.
EAES362	Prerequisites	EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	This course examines the social, political, economic and spatial impacts of the older adult on the environment. Topics discussed are: demographic characteristics and environmental design of senior leisure and housing environments; migration patterns; mobility, and location of older adults; and the planning, site location, design, and financing of independent and assisted adult living environments. Previous course EUGS 360 effective through Spring 2012.
EAES363	Title	Geopolitics.
	Prerequisites	EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Main theories of the field and their application to selected political entities, current problem zones and the spatial interaction of nations. Previous course EUGS 408 effective through Spring 2012.
EAES370	Title	World Resources and Industries.
	Prerequisites	ECON 207, ECON 208, EAES 202, EAES 210, EAES 281 or EAES 283 or departmental

	Number and type of credits	approval.
	Course Description	3 hours lecture. Distribution, flow and consumption of mineral resources. Political, economic and social implications of the geography of resources. Basic studies in industrial location, agricultural land use, problems of economic development and population-resource ratios. Examines world trend in production controls and market allocations. Previous course EUGS 300 effective through Spring 2012.
EAES371	Title	Geography of Europe.
	Prerequisites	EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	The modern European landscape created by the activities, over many centuries, by a variety of peoples of differing cultural backgrounds, economic systems and ideologies. Previous course EUGS 304 effective through Spring 2012.
EAES372	Title	Geography of South Asia.
	Prerequisites	EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Political, cultural and economic study of India, Pakistan and Bangladesh; interrelationship between cultural and physical aspects of the regional landscape. Previous course EUGS 306 effective through Spring 2012.
EAES373	Title	Historical Geography of the United States.
	Prerequisites	EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	The slow pace of settlement of the Eastern Seaboard and the development of distinctive culture hearths prior to 1800; the rapid settlement and diffusion of culture traits in the area beyond the Appalachians since 1800. Previous course EUGS 312 effective through Spring 2012.
EAES374	Title	Latin American Environments and Economies in a Global Framework.
	Prerequisites	ECON 101 and ECON 102 and EAES 202, EAES 210, EAES 281, or EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	This course is structured to focus on the interactions of the physical world with economical, financial, and commercial activities in a global perspective. Environment and economics serve as thematic threads to develop dynamic models

		that are representative of regional--and increasingly--global linkages. Previous course EUGS 320 effective through Spring 2012.
EAES375	Title Prerequisites	Culture in Transition in India: An Anthro-Geographical Approach. EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
EAES375	Number and type of credits Course Description	3 hours lecture. India in its geographical and socio-anthropological setting. The course focuses on the nature and processes bringing about transition in traditional values and social institutions. Previous course EUGS 330 effective through Spring 2012.
EAES376	Title Prerequisites Number and type of credits Course Description	Geography of New Jersey. EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval. 3 hours lecture. Demographic and economic organization of the State. Spatial contrasts in population density; suburban-central city interactions; the influence of New York and Philadelphia on landscape organization. Philosophical concepts of regionalism and investigation of micro-regionalism in New Jersey. Previous course EUGS 424 effective through Spring 2012.
EAES377	Title Prerequisites Number and type of credits Course Description	Geography of Sub-Sahara Africa. EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval. 3 hours lecture. Topical and regional study of African soils, vegetation, climate, physiography, mineral resources and other aspects of the physical environment in the light of man's habitation of the continent. Previous course EUGS 412 effective through Spring 2012.
EAES378	Title Prerequisites Number and type of credits Course Description	Geography of the Middle East. EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval. 3 hours lecture. Topical study of area extending from Morocco to Iran: arid land agriculture, nomadism, land tenure systems, settlement patterns, problems of industrial development, and socio-economic and military implications of region's oil wealth. Includes Arab culture and Islamic influences on urban and rural landscapes. Previous course EUGS 413 effective through Spring 2012.

EAES379	Title Prerequisites Number and type of credits Course Description	Geography: The Former Soviet Union. EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval. 3 hours lecture. Topical and regional analysis. Emphasizes demographic-ethnic composition of Soviet people, physical resource base, interregional relationships, and spatial effects of state planning programs. Previous course EUGS 419 effective through Spring 2012.
EAES380	Title Prerequisites Number and type of credits Course Description	Transportation. EAES 202, EAES 210, EAES 281 or EAES 283 or departmental approval. 3 hours lecture. Transportation is the study of spatial interaction of economic factors and societal functioning. Transportation flows are analyzed in the context of technological change, degree of accessibility, different transport cost surfaces, and transportation as it relates to land use planning. Previous course EUGS 234 effective through Spring 2012.
EAES381	Title Prerequisites Course Description	Urban Field Studies. EAES 281 or EAES 283. Off-campus study of urban conditions in New York-New Jersey metropolitan area: housing, mass transportation, social pathologies, inner city economics and the role of planning. On-campus discussion sessions alternate with field trips. Meets World Cultures Requirement. Previous course EUGS 301 effective through Spring 2012.
EAES382	Title Prerequisites Number and type of credits Course Description	Geography of Manufacturing. ECON 207, ECON 208, EAES 202, EAES 210, EAES 281 or EAES 283 or departmental approval. 3 hours lecture. The world's manufacturing activities; measurement techniques; analysis of the
EAES382	Course Description	economic, cultural and geographic bases in industrialization; plant location problems and the special situation of underdeveloped nations. Previous course EUGS 311 effective through Spring 2012.
EAES383	Title Prerequisites	Location of Economic Activity. ECON 101 and EAES 202, EAES 210, EAES 281 or EAES 283 or departmental

	Number and type of credits	approval.
	Course Description	3 hours lecture. Organization of economic activity past and present refined with changes of more complex economic systems. Location factors such as physical & human resources, accessibility, routing, services, industrial sites and market advantages analyzed under varied conditions in different economic systems. Previous course EUGS 314 effective through Spring 2012.
EAES384	Title	Managing the Urban Environment.
	Prerequisites	EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	An advanced interdisciplinary investigation of the modern city and its suburbs, emphasizing the impact of selected social, political and economic issues. Previous course EUGS 317 effective through Spring 2012.
EAES385	Title	Urbanization and Environment.
	Prerequisites	EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Examines interaction between man and the physical urban environment. Studies dynamic and physical processes as related to air, water and noise pollution, and hydrologic and geologic hazards. Previous course EUGS 331 effective through Spring 2012.
EAES386	Title	People and Cities: Comparative Urban Studies.
	Prerequisites	ANTH 210, EAES 202, EAES 210, EAES 281, EAES 283 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Introduction and cross-cultural investigation of the processes of urbanism and urbanization: formation, structure and functioning of cities throughout the world. Previous course EUGS 462 effective through Spring 2012.
EAES390	Title	Research Methods.
	Prerequisites	MATH 109 and EAES 210.
	Number and type of credits	3 hours lecture.
	Course Description	The course introduces a widely used statistical package to analyze data. The application and interpretation of results of frequently used statistical techniques remains the primary focus. Survey research techniques are stressed. All the steps in the completion of a research project are emphasized. Meets the University Writing Requirement for majors in Geography.

EAES391	Title Prerequisites Number and type of credits Course Description	<p>Previous course EUGS 309 effective through Spring 2012.</p> <p>Quantitative Methods in Geography and Urban Studies.</p> <p>MATH 109 and EAES 210.</p> <p>3 hours lecture.</p> <p>Treatment of measurements and design in geography; definition of problems, hypotheses formulation and tests of hypotheses by alternative methods of measurement. Geographic applications of computer methods, multi-variate analysis, systems analysis, data bank maintenance and evaluation. Meets the University Writing Requirement for majors in Geography. Previous course EUGS 310 effective through Spring 2012.</p>
EAES401	Title Prerequisites Number and type of credits Course Description	<p>Geo-Ecology.</p> <p>EAES 322, EAES 332, EAES 341, BIOL 370 or departmental approval.</p> <p>3 hours lecture.</p> <p>Spatial relations of the living environment. A systems approach to functional processes, characteristics and relationships of the ecological elements, i.e. soil, water, air, vegetation, etc. Both natural succession and human-induced</p>
EAES401	Course Description	<p>changes including pollution, within the ecosystem. Previous course GEOS 404 effective through Spring 2012.</p>
EAES402	Title Prerequisites Number and type of credits Course Description	<p>Sustainability Science Seminar.</p> <p>EAES 202, BIOL 213 and EAES 370.</p> <p>3 hours lecture.</p> <p>The course consists of a literature search and application of research tools and methodologies appropriate for completion of a project, paper, or internship in sustainability science. Previous course ENVR 465 effective through Spring 2012.</p>
EAES403	Title Prerequisites Special Fee Number and type of credits Course Description	<p>Meteorology.</p> <p>EAES 301 or departmental approval.</p> <p>Special fee.</p> <p>3 hours lecture, 2 hours lab.</p> <p>The characteristics of the earth's atmosphere. Meteorological instruments, principles of atmospheric physics, weather patterns and measurements of changes within the atmosphere. Meets the University Writing Requirement for</p>

		majors in Geoscience. Previous course GEOS 457 effective through Spring 2012.
EAES404	Title	Field Geology.
	Prerequisites	EAES 302, EAES 320 and EAES 441; or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	4 hours lecture, 6 hours lab.
	Course Description	Application of geologic principles to field mapping and interpretation in the North Central Appalachians, Rocky Mountains, and/or regional geology of another designated area. Map production and writing field reports will be emphasized. This is an intensive summer field course. Previous course GEOS 480 effective through Spring 2012.
EAES410	Title	Advanced Topics in GIScience.
	Prerequisites	EAES 310 or EAES 311.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	This course will allow students with demonstrated knowledge and skills in the geographic information sciences (GIS and/or Spatial Analysis) to expand on those skills by applying them to a particular geological or geographical issue. Students will work closely with faculty to select appropriate project(s) based on the student's interest and the professor's expertise. Depending on the project's scope and scale, the course will use current software such as ESRI's ArcGIS or ERDAS Imagine. Previous courses EUGS 475 and GEOS 475 effective through Spring 2012.
EAES412	Title	Computer Mapping.
	Prerequisites	EAES 310.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	The course introduces a widely used computer mapping software to make thematic customized maps. Presentation of data in the form of a graph and a chart is also stressed. General cartographic principles are emphasized. Previous courses GEOS 405 and EUGS 405 effective through Spring 2012.
EAES419	Title	Senior Seminar in Geographic Information Science.
	Prerequisites	EAES 310, EAES 311, EAES 410 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Provides students with the tools and experience to develop and complete a

		research or problem-solving project in geographic information science. Students will produce a senior thesis or digital presentation portfolio. Previous course EUGS 467 effective through Spring 2012.
EAES427	Title	Organic Geochemistry.
	Prerequisites	AQUA 351 or BIOL 350 or BIOL 370 or CHEM 310 or CHEM 320 or CHEM 370 or EAES
EAES427	Prerequisites	320 or EAES 322 or EAES 340 or EAES 341 or EAES 342.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	This is a basic course in organic geochemistry, covering the occurrence of natural and anthropogenic organic matter in sediments and sedimentary rocks, emphasizing fossil fuels and environmental contaminants. Previous course GEOS 453 effective through Spring 2012.
EAES441	Title	Stratigraphy.
	Prerequisites	EAES 220 and EAES 302 or EAES 340.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Stratigraphic principles and their application. Case studies of selected regions. Local stratigraphy interpreted through field studies. Meets the University Writing Requirement for majors in Geoscience. Previous course GEOS 434 effective through Spring 2012.
EAES443	Title	Geology of the Vertebrates.
	Prerequisites	EAES 342.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	The origin, development, biogeography, paleoecology, survival or extinction, stratigraphy, and morphology of selected fossil vertebrate groups. Bio-stratigraphic and paleogeographic significance of particular fossil vertebrate faunules. Required field trips. Previous course GEOS 435 effective through Spring 2012.
EAES451	Title	Coastal Marine Geology.
	Prerequisites	EAES 340, EAES 350, PHMS 350, AQUA 351, EAES 441 or departmental approval.
	Number and type of credits	4 hours lecture.

	Course Description	A study of the geologic processes concerned with the supra-, inter-, and sub-tidal areas of the near shore environment. Field studies will emphasize the dynamics of erosion and deposition as well as general sedimentation associated with modification of barrier beaches and other land forms of the New Jersey shoreline. Offered at the New Jersey Marine Sciences Consortium. Cross listed with Earth and Environmental Studies, PHMS 451. Previous course PHMS 481 effective through Spring 2012.
EAES452	Title	Dynamic Beach Processes.
	Prerequisites	EAES 340, EAES 350, PHMS 350, AQUA 351, EAES 441 or departmental approval.
	Number and type of credits	1 hour lecture, 3 hours lab.
	Course Description	Study of the processes and forces involved in material transport within the beach zone. Offered at the New Jersey Marine Sciences Consortium. Cross listed with Earth and Environmental Studies, PHMS 452. Previous course PHMS 483 effective through Spring 2012.
EAES453	Title	Tidal Marsh Sedimentations.
	Prerequisites	EAES 340, EAES 350, PHMS 350, AQUA 351, EAES 441 or departmental approval.
	Number and type of credits	1 hour lecture, 3 hours lab.
	Course Description	Processes involved in sediment transport and deposition within the marsh system. Geologic history of tidal marshes. Offered at the New Jersey Marine Sciences Consortium. Cross listed with Earth and Environmental Studies, PHMS 453. Previous course PHMS 484 effective through Spring 2012.
EAES454	Title	Human Impact on the Coastal Zone.
	Prerequisites	EAES 350, PHMS 350, AQUA 351, EAES 451, EAES 452 or departmental approval.
	Special Fee	Special fee.
	Course Description	A study of man's economic, political, legal and social impacts on the physical and biological aspects of the coastal zone, primarily a field course with supporting lectures and discussion. Previous course GEOS 403 effective through Spring 2012.
EAES455	Title	Field Methods in Oceanography.
	Prerequisites	EAES 350, PHMS 350, AQUA 351, EAES 451, EAES 452 or departmental approval.
	Course Description	This course is intended to familiarize the student with the applications and techniques of marine samplings. The nature and role of equipment will be

EAES456	<p>Title</p> <p>Prerequisites</p> <p>Number and type of credits</p> <p>Course Description</p>	<p>stressed. Field experience at the New Jersey Marine Sciences Consortium field station. Previous course GEOS 466 effective through Spring 2012.</p> <p>Physical Oceanography.</p> <p>EAES 350, PHMS 350, AQUA 351 or departmental approval.</p> <p>3 hours lecture, 3 hours lab.</p> <p>A survey of modern oceanography and its methods including characteristics of sea water, theories of ocean currents and, in general, applications of biological, geological, physical, meteorological and engineering sciences to the study of the oceans. Offered at the site of the New Jersey Marine Sciences Consortium. Cross listed with Earth and Environmental Studies, PHMS 456. Previous course PHMS 411 effective through Spring 2012.</p>
EAES458	<p>Title</p> <p>Prerequisites</p> <p>Number and type of credits</p> <p>Course Description</p>	<p>Marine Science Education.</p> <p>EAES 350, PHMS 350, AQUA 351 or departmental approval.</p> <p>1 hour lecture, 1 hour lab.</p> <p>Selected field experiences and laboratory methods utilized to develop resources from the marine environment to be used in teaching the various disciplines. Offered at the site of the New Jersey Marine Sciences Consortium. Cross listed with Earth and Environmental Studies, PHMS 458. Previous course PHMS 460 effective through Spring 2012.</p>
EAES459	<p>Title</p> <p>Prerequisites</p> <p>Course Description</p>	<p>Independent Study in the Marine Sciences.</p> <p>Departmental approval.</p> <p>Individual research projects will be selected under the guidance of a professor associated with the consortium. Open only to those advanced undergraduate students who have indicated a potential for original thinking. Offered at the New Jersey Marine Sciences Consortium. May be repeated three times for a maximum of 10.0 credits as long as the topic is different. Cross listed with Earth and Environmental Studies, PHMS 459. Previous course PHMS 498 effective through Spring 2012.</p>
EAES460	<p>Title</p> <p>Prerequisites</p> <p>Number and type of credits</p> <p>Course Description</p>	<p>Environmental Law.</p> <p>ANTH 360, EAES 300, EAES 302, EAES 310, EAES 320, EAES 322, EAES 341, EAES 361, EAES 370, EAES 390, JUST 314, JUST 330, LAWS 302, JURI 300, POLS 365 or departmental approval.</p> <p>3 hours lecture.</p> <p>The study of the National Environmental Policy Act; the Environmental Impact</p>

		Statement; the Clean Air Act; the Clean Water Act; Toxic Substances Control Act; Solid and Hazardous Waste; related environmental laws, i.e. OS&H act; and litigation are analyzed. Aspects of environmental law, within which institutions and corporations must operate, are discussed. Previous courses ENVR 410 and EUGS 410 effective through Spring 2012.
EAES462	Title	Population Problems of the World.
	Prerequisites	EAES 363, EAES 370, EAES 380, EAES 390 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Identification, description and analysis of the present-day distributional patterns of the world's people; demographic trends, man-land ratios. Mobility, migration and socio-economics and geographic forces affecting world population. Techniques for measurement and analysis. Previous course EUGS 421 effective through Spring 2012.
EAES463	Title	Culture and Resource Utilization.
	Prerequisites	EAES 300, EAES 363, EAES 370, EAES 390 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Evaluation and utilization of resources. Examines changes of characteristics
EAES463	Course Description	of physical resources in relation to technological and cultural change, population increases, resource depletion and accelerated redundancy of man. Previous course EUGS 423 effective through Spring 2012.
EAES470	Title	The Geology of New Jersey.
	Prerequisites	EAES 302, EAES 320 or EAES 441.
	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	The physical features of New Jersey and their origin, geologic history, stratigraphy, paleobiology, mineralogy, structural geology, economic geology. Required field trips. Previous course GEOS 410 effective through Spring 2012.
EAES471	Title	Urban Studies: London and the British New Towns Movement.
	Prerequisites	EAES 380, EAES 385, EAES 386 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	An "in-the-field" study of London and the new towns movement in the greater London metropolitan region. Students will meet with officials and planners in

		such agencies as the department at environment, new towns association, and borough government and study: planning and design of new towns and greenbelts; contrasting social, political, economic, cultural and life styles of central city London and surrounding new towns; and urban re-development in central London. Previous course EUGS 428 effective through Spring 2012.
EAES475	Title	Environmental Economics.
	Prerequisites	BIOL 213 or BSLW 235 or ECON 207 or ANTH 360 or EAES 300 or EAES 363 or EAES 370 or EAES 390 or JUST 314 or SOCI 314 or JUST 330 or POLS 365 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	This course explores the economic foundations of environmental problems such as natural resource depletion, conservation, pollution control, climate change, energy and other contemporary problems. In particular, the course develops students' understanding of why resource and environmental problems have occurred from the economic point of view and what kind of economic tools can be used for informed decision-making and tackling of environmental problems.
EAES476	Title	Seminar in International Economic Geography.
	Prerequisites	ECON101 and ECON102 and EAES300, EAES363, EAES370, EAES390, or departmental approval.
	Number and type of credits	3 hours seminar.
	Course Description	An interdisciplinary seminar focusing the techniques of economics and geography on a common theme to achieve a synergistic conclusion. Previous course EUGS 461 effective through Spring 2012.
EAES480	Title	Urbanization in World Perspective.
	Prerequisites	EAES 363, EAES 380, EAES 385, EAES 386, EAES 390 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Analysis of characteristics and patterns of urbanism and urbanization in world perspective. Studies multi-faceted problems created by rapid urbanization. Examines role of cities in regional development and modernization of rural sector in Third World. Previous course EUGS 409 effective through Spring 2012.
EAES481	Title	Problems in Urban Geography.
	Prerequisites	EAES 363, EAES 380, EAES 385, EAES 386, EAES 390 or departmental approval.

	Number and type of credits	3 hours lecture.
	Course Description	Seminar on the application of geographic concepts and theories to the analysis of urban problems. Field or library research projects by students on specific urban problems. Previous course EUGS 411 effective through Spring 2012.
EAES482	Title	Real Estate Principles.
	Prerequisites	EAES 363, EAES 373, EAES 380, EAES 385, EAES 386, EAES 390 or departmental approval.
EAES482	Prerequisites	approval.
	Number and type of credits	3 hours lecture.
	Course Description	In this course the student is introduced to the principles of real estate from a historical, social, economic, legal, and spatial perspective. The topics explored are: urban-suburban development and the real estate product; the changing nature of real estate through planning, zoning, environmental and social considerations; real estate economics and demographics from a national, local and individual parcel level; and a detailed study of the legal instruments and concepts involved in residential, commercial and industrial real estate transactions. Previous course EUGS 417 effective through Spring 2012.
EAES483	Title	Advanced Real Estate.
	Prerequisites	EAES 482.
	Number and type of credits	3 hours lecture.
	Course Description	This course builds on the fundamental principles introduced in EAES 482 and explores the following new topics: mortgage finance; market demand analysis for residential, retail commercial, office and industrial land use; location and site planning theory and analysis; real estate investment analysis and appraisal techniques; real estate research sources and methods; and public policy impacts on real estate. Previous course EUGS 418 effective through Spring 2012.
EAES484	Title	Urban Planning.
	Prerequisites	EAES 373, EAES 380, EAES 385, EAES 386 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	The course focuses on the principles, processes, and practices of urban planning. The formulation of policies and the management roles of the

		planning agencies are emphasized. Previous course EUGS 460 effective through Spring 2012.
EAES486	Title	Village to Metropolis: Urbanization in Latin America.
	Prerequisites	EAES 363, EAES 380, EAES 385, EAES 386 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Examines urbanization in Latin America from Columbian times to the present. Portuguese and Spanish town planning practices and their evolution into modern times, including their impacts upon evolving urban morphology and subsequent metropolitanization. Previous course EUGS 444 effective through Spring 2012.
EAES487	Title	Senior Seminar in Urban Study (Urban Studies Internship).
	Prerequisites	EAES 390 or departmental approval.
	Number and type of credits	3 hours semester.
	Course Description	A seminar to be taken in conjunction with the urban studies semester internship, and designed as a synthesis of the various approaches in urban studies which the student has acquired in previous urban-related courses. Each semester the seminar focuses upon a specific in-the-field research project, and an analysis and evaluation of the student's internship experience. Previous course EUGS 464 effective through Spring 2012.
EAES490	Title	Independent Study in Geography.
	Prerequisites	Departmental approval.
	Number and type of credits	Independent Study.
	Course Description	Preparation of a research paper or project to be presented to members of the staff. May be repeated three times for a maximum of 10.0 credits as long as the topic is different. Previous course EUGS 490 effective through Spring 2012.
EAES491	Title	Internship.
	Prerequisites	EAES 390 or departmental approval.
	Course Description	A full semester internship in an urban or environmental agency. Students will be expected to carry out agency assignments, observe and participate in
EAES491	Course Description	decision making processes and engage in middle management activities. Previous course EUGS 463 effective through Spring 2012.
EAES492	Title	Honors Research.

EAES494	Prerequisites	EAES 390 or departmental approval.
	Course Description	Provides original research experience to superior undergraduates.
	Title	Independent Study in Geoscience.
	Prerequisites	Departmental approval.
EAES495	Course Description	An opportunity for the qualified student to do library and/or laboratory investigation in a field of science of his/her choice under the guidance of a faculty member. The course is conducted exclusively by scheduled individual conferences and reports. (Offered on demand.) May be repeated three times for a maximum of 10.0 credits. Previous course GEOS 495 effective through Spring 2012.
	Title	Readings in Earth & Environmental Studies.
	Prerequisites	Departmental approval.
	Number and type of credits	3 hours lecture.
EAES496	Course Description	Open only to Geography honor students. Students will be expected to read a number of the more definitive works in modern geography. Examination will be both oral and written. Previous course EUGS 425 effective through Spring 2012.
	Title	Pro-Seminar in Earth and Environmental Studies.
	Prerequisites	Departmental approval.
	Special Fee	Special fee.
EAES497	Number and type of credits	Independent Study.
	Course Description	Problem-oriented seminar. Specific topics in urban, environmental studies or geography. Content changes according to the needs of the instructor. May be taken three times for a total of nine credits. Previous course EUGS 427 effective through Spring 2012.
	Title	Senior Seminar Geography.
	Prerequisites	EAES 390 or departmental approval.
EAES498	Number and type of credits	3 hours seminar.
	Course Description	The course provides students with the tools and experience to develop and complete a geographic research project from start to finish. Students will be introduced to issues associated with becoming a professional geographer. Students will produce a senior thesis. Previous course EUGS 466 effective through Spring 2012.
	Title	Seminar in Geoscience.

	Prerequisites	Departmental approval.
	Number and type of credits	2 hours seminar.
	Course Description	Student field, laboratory and library investigation of a problem in the area of his/her interest in geoscience; results presented in oral and written form. Class discussion of the individual papers and of other pertinent topics of current interest in geoscience. (Not offered every year.) Previous course GEOS 490 effective through Spring 2012.
EAES499	Title	Selected Topics in Earth & Environmental Studies.
	Prerequisites	Departmental approval.
	Special Fee	Special fee.
	Course Description	An in-depth study of a particular topic in geoscience, the specific subject matter of which is not offered regularly in an existing course. May be repeated three times for a maximum of 10.0 credits as long as the topic is different. Previous course GEOS 494 effective through Spring 2012.
EAES500	Title	Energy Transitions: A Global Dependence.
	Prerequisites	Matriculation in a graduate program or departmental approval. Not open to students who have taken EAES300.
	Number and type of credits	3 hours lecture.
EAES500	Course Description	This course assesses the interactions of shifting energy dependence and adaptive technologies to add energy sources to the current national energy matrices. Included in this analysis will be a discussion of the growing roster of accessible energy sources by type and environmental source and environmental limitations. History, economy, politics, and culture will be addressed to provide the social context to gauge the growing impact of energy dependence in the contemporary global system. Previous course ENVR 515 effective through Spring 2012.
EAES501	Title	Environmental Studies Physical.
	Number and type of credits	3 hours lecture.
	Course Description	A systems concept utilizing physical science. Provides some understanding of the abiotic environment to life. The atmosphere, hydrosphere, and lithosphere are examined as natural, man-modified, and human environments. Previous course ENVR 501 effective through Spring 2012.

EAES502	Title Special Fee Number and type of credits Course Description	The Dynamic Earth. Special fee. 3 hours lecture, 2 hours lab. Origin, evolution and history of the earth. Internal and external processes by which minerals and rocks form and are modified. Interpretation of rock features and structures and significance of the fossil record. Plate tectonics, geomorphology, oceanography, and meteorology. The course is conducted at a more rigorous level than introductory, undergraduate courses. Research project and field trips are required. Previous course GEOS 502 effective through Spring 2012.
EAES503	Title Number and type of credits Course Description	Advanced Physical Geology. 3 hours lecture, 2 hours lab. In-depth study of the major problems of physical geology processes of erosion, rock formation, continent and ocean-basin origin and relationships, earthquakes, interior of the earth, volcanism, island arcs, mountain building, paleomagnetism, continental drift, and sea-floor spreading. Field trips. Previous course GEOS 503 effective through Spring 2012.
EAES504	Title Number and type of credits Course Description	Landscapes in Transition. 3 hours lecture. The field in historical perspective, with emphasis upon contemporary trends; philosophical roots and quest for theory. Analyzes theory and methods of application and their relationships in order to understand the role of applied in contrast to theoretical geography. Previous course GEOS 520 effective through Spring 2012.
EAES505	Title Prerequisites Special Fee Number and type of credits Course Description	Environmental Geoscience. Matriculation in a CSAM graduate program or departmental approval. Special fee. 3 hours lecture. In-depth study of the relationships between man and the physical environment of atmosphere, hydrosphere and lithosphere. Particular attention to problems of mineral resource and fossil-fuel depletion; pollution of air, water and soils and waste disposal and recycling, simple computer modeling of environmental situations. Previous course GEOS 525 effective through Spring 2012.

EAES507	Title	Tectonics.
	Prerequisites	Matriculation in MS Geoscience program or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	The study of the major structures of the earth, the principle of isostasy, mountain-building, continental drift, sea-floor spreading, and possible causes of tectonism in the earth. Discussion will include the methods of study,
EAES507	Course Description	results obtained, interpretation of the data, and the latest theories of tectonism. Previous course GEOS 572 effective through Spring 2012.
EAES508	Title	Field Geology.
	Prerequisites	Matriculation in MS Geoscience; and equivalent of EAES 302; and EAES 320 or EAES 441 or departmental approval. Not open to students who have taken EAES 404.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	The principles and techniques of geologic field work. Independent and team mapping of local areas of geologic interest using modern field methods and instruments. Previous course GEOS 580 effective through Spring 2012.
EAES509	Title	Current Issues in Sustainability Science.
	Prerequisites	Matriculation in a graduate program or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Overview of current issues in sustainability science and the challenges confronting society's transition to global sustainability: sustainable use of natural resources; social learning; engaging scientists at the science-policy interface; and the application of systems science to better predict the consequences of human actions and forecast outcomes of the multiple interacting stresses on the life support systems around us. Previous course ENVR 533 effective through Spring 2012.
EAES510	Title	Geographic Information Systems.
	Prerequisites	Matriculation in an Earth and Environmental Studies (EAES) graduate program and equivalent of EAES 210 or departmental approval. Not open to students who have taken EAES 310.

	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Provides graduate students who have finished any introductory GIS courses or equivalents an opportunity to advance both the practical skills and theoretical understanding of GIS. The course will focus on application of GIS to urban planning, locational analysis, public health, crime analysis, resource and land use management, transportation planning, environmental management etc. In the meantime, specific topics such as geovisualization, geographic database design, GIS modeling and management will be treated as an integrated part during the applications. Previous course EUGS 570 effective through Spring 2012.
EAES511	Title	Fundamentals of Remote Sensing of the Environment.
	Prerequisites	Matriculation in an Earth and Environmental Studies (EAES) graduate program and equivalent of EAES210 or departmental approval. Not open to students who have taken EAES311.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	This course affords graduate students who have completed introductory courses or equivalents the opportunity to advance both practical skills in and theoretical understanding of remote sensing. The course covers a wide range of applications and promotes facility in image processing and visualization, integration with Geographic Information Systems, and spatial modeling techniques. Industry-standard software is used for demonstration and laboratory exercises. A semester project must be completed that demonstrates an application of remote sensing to a real-world environmental problem. Students are required to submit a term paper, an oral presentation, and a poster related to this project. Previous courses ENVR 555 and GEOS 555 effective through Spring 2012.
EAES520	Title	Advanced Mineralogy.
	Prerequisites	Matriculation in MS Geoscience and equivalent of EAES 220 Mineralogy.
EAES520	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 2 hours lab.

	Course Description	Chemical and physical principles as applied to minerals. Detailed study of representative minerals from the various families. Advanced techniques will be performed by the student. Field trips. Previous course GEOS 543 effective through Spring 2012.
EAES521	Title	Optical Mineralogy.
	Prerequisites	Matriculation in MS Geoscience and equivalent of EAES 220 Mineralogy.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Theory and practice of using the polarizing microscope to study and identify minerals; theory of light transmission in minerals; the practical effect. Required field trips. Previous course GEOS 545 effective through Spring 2012.
EAES522	Title	Petrography.
	Prerequisites	Matriculation in MS Geoscience and equivalent of EAES 220 Mineralogy.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Rock textures, structures and mineralogy using the polarizing microscope. Identification and classification of rocks and the origin and history of the rock as determined by microscopic study of thin sections. Required field trips. Previous course GEOS 546 effective through Spring 2012.
EAES523	Title	Sedimentary Petrography.
	Prerequisites	Matriculation in MS Geoscience; and EAES 220 Mineralogy, EAES 337 Sedimentology or EAES 441 Stratigraphy or equivalent.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	The interpretative study of the structures, textures, composition and genesis of sedimentary rocks. Laboratory analyses of sediments and sedimentary rocks by optical, mechanical and chemical methods and the graphical representation of the resultant data. Previous course GEOS 538 effective through Spring 2012.
EAES524	Title	Igneous and Metamorphic Geology.
	Prerequisites	Matriculation in MS Geoscience (GEOS) and equivalent of EAES 220 Mineralogy and EAES 320 Igneous and Metamorphic Petrology or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.

	Course Description	The interpretive study of igneous and metamorphic rocks in detail with the aim of properly identifying and naming the rocks and interpreting their history: rock suites from classical areas. Required field trips. Previous course GEOS 578 effective through Spring 2012.
EAES525	Title	X-ray Microanalysis.
	Prerequisites	Matriculation in a CSAM graduate program and equivalent of one of the following: EAES 220, CHEM 410, PHYS 470 or BIOL 504 or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Students will learn energy dispersive spectroscopy, qualitative and quantitative chemical analysis, and x-ray mapping. Previous course GEOS 547 effective through Spring 2012.
EAES526	Title	Geochemistry.
	Prerequisites	Matriculation in a CSAM graduate program or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Chemical laws and principles applied to the earth, chemical composition of the earth, distribution and relative abundance of the elements. Radioactive materials, atmospheric precipitation of geochemicals, the geochemistry of
EAES526	Course Description	polluted water (including solid and liquid wastes) study of meteorites. Required field trips. Previous course GEOS 575 effective through Spring 2012.
EAES527	Title	Organic Geoghemistry.
	Prerequisites	Matriculation in a CSAM graduate program and equivalent of one of the following: CHEM 230, EAES 322, EAES 441 or departmental approval. Not open to students who have taken EAES 427.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	This is an introductory graduate course in organic geochemistry, covering the occurrence of natural and anthropogenic organic matter in sediments and sedimentary rocks, emphasizing fossil fuels and environmental contaminants. Previous course GEOS 576 effective through Spring 2012.
EAES528	Title	Environmental Forensics.

	Prerequisites	Matriculation in a CSAM graduate program and equivalent of EAES 427 or EAES 527 or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Environmental Forensics seeks to answer the questions: "How did environmental contamination occur?" and "Who/what caused it?" It involves the use of analytical (geo)chemistry, field geology and biology, remote sensing, integrated with law and policy. This course will focus primarily on the methods and applications of chemical fingerprinting, using petroleum biomarkers, polycyclic aromatic compounds, isotopes, and heavy metals. Previous course GEOS 577 effective through Spring 2012.
EAES529	Title	Instrumental Environmental Analysis.
	Prerequisites	Matriculation in a CSAM graduate program and equivalent of one of the following: EAES 322, CHEM 410, EAES 526, EAES 527 or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	A survey of instrumentation and methods for quantitative environmental analysis of inorganic earth materials (e.g., waters, soils, sediments). Hands-on analytical techniques will typically include, but are not limited to, pH and conductivity measurements, ion chromatography, UV-Vis and optical ICP spectrometry, ICP mass spectrometry, and SEM-EDS depending on expertise of the instructor(s). Previous course GEOS 579 effective through Spring 2012.
EAES531	Title	Hydroclimatology.
	Prerequisites	Matriculation in a EAES graduate program and equivalent of EAES201, EAES230, or EAES301 or departmental approval. Not open to students who have taken EAES332.
	Number and type of credits	3 hours lecture.
	Course Description	Climatology emphasizing moisture as one of the fundamental factors in climatic analysis: processes and problems of classification and variability. Examines energy and water balance.
EAES532	Title	Applied Groundwater Modeling.
	Prerequisites	Matriculation in a College of Science and Mathematics (CSAM) graduate program and equivalent of EAES 331; and MATH 116 or MATH 122 or departmental approval.
	Special Fee	Special fee.

	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Introduction to groundwater flow and contaminant transport modeling, using a variety of current software packages. Saturated and unsaturated media will be considered. Emphasis is on application of models to the solution of common problems encountered in hydrology industry and research. Previous course GEOS 552 effective through Spring 2012.
EAES533	Title	Water Resource Management.
	Prerequisites	Matriculation in a CSAM graduate program or departmental approval.
EAES533	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	The spatial patterns of the water resource both as surface water and ground-water. Processes affecting availability and techniques of estimation are stressed. Previous course GEOS 509 effective through Spring 2012.
EAES535	Title	Geophysics.
	Prerequisites	Matriculation in MS Geoscience program.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Theory and application of conventional geophysical methods: seismology, magnetism, electricity and gravity. Laboratory includes the collection and interpretation of geophysical data. Field trips. Previous course GEOS 571 effective through Spring 2012.
EAES540	Title	Advanced Historical Geology.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	In-depth analysis of major problems in geologic history, stratigraphy and paleoenvironments as interpreted through lithologic and paleontologic evidence. Required field trips. Previous course GEOS 504 effective through Spring 2012.
EAES541	Title	Stratigraphy.
	Prerequisites	Matriculation in MS Geoscience program or departmental approval.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Stratigraphic principles and their application. Case studies of selected regions. Local stratigraphy interpreted through field studies. Previous

EAES542	Title	course GEOS 534 effective through Spring 2012. Advanced Invertebrate Paleobiology.
	Prerequisites	Matriculation in MS Geoscience or MS Biology programs.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Fossil invertebrates with emphasis on their evolutionary, paleoecologic and stratigraphic significance. Laboratory and field work stress collecting, preparation, identification, curatorial and faunal analysis techniques. Required field trips. Previous course GEOS 533 effective through Spring 2012.
EAES543	Title	Vertebrate Paleobiology.
	Prerequisites	Matriculation in MS Geoscience or MS Biology programs.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	The geologic history, morphology, taxonomy, paleogeography and evolution of fossil vertebrates. Required field trips. Previous course GEOS 535 effective through Spring 2012.
EAES545	Title	Paleoecology.
	Prerequisites	Matriculation in a CSAM graduate program or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	Distribution and association of fossils as interpreted from the evidence presented in the geologic record. Detailed paleoecological field study made of selected faunal assemblages. Previous course GEOS 530 effective through Spring 2012.
EAES546	Title	Micropaleobiology.
	Prerequisites	Matriculation in MS Geoscience or MS Biology programs.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Taxonomic, morphologic, paleoecologic and stratigraphic consideration of microfossils with special emphasis on those from the marine environment. Previous course GEOS 532 effective through Spring 2012.
EAES547	Title	Paleobotany.
	Prerequisites	Matriculation in MS Geoscience or MS Biology programs.
	Number and type of credits	2 hours lecture, 2 hours lab.
EAES547	Course Description	The taxonomy, morphology, evolution, paleoecology and stratigraphic

		significance of fossil plants. Required field trips. Previous course GEOS 536 effective through Spring 2012.
EAES548	Title	Biostratigraphy of New Jersey.
	Prerequisites	Matriculation in MS Geoscience or MS Biology programs.
	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	The geologic history, paleontology, stratigraphy and paleogeography of New Jersey. Required field trips. Previous course GEOS 537 effective through Spring 2012.
EAES550	Title	Advanced Marine Geology.
	Prerequisites	Matriculation in a EAES graduate program or department approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Development and evolution of the ocean basins; marine sedimentation; shoreline development and classification; submarine topography; mineral resources of the sea. Laboratory analysis of marine sediments and fossil assemblages. Required field trips. Previous course GEOS 560 effective through Spring 2012.
EAES551	Title	Coastal Geomorphology.
	Prerequisites	Matriculation in an EAES or MS Biology graduate program and equivalent of EAES 200 or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Coastlines and their evolution; processes and materials of the coastal zone; shore zone hydrodynamics and sedimentation: beach and barrier systems with special emphasis on the New Jersey shoreline. Offered at the site of the New Jersey Marine Sciences Consortium. Cross listed with Earth and Environmental Studies, PHMS 551. Previous course PHMS 581 effective through Spring 2012.
EAES559	Title	Special Problems in the Marine Sciences.
	Prerequisites	Departmental approval.
	Course Description	An opportunity for the qualified graduate student to do research in a field of marine science selected under the guidance of a professor. Open only to graduate students who have indicated a potential for original thinking. Also offered at the site of the New Jersey Marine Sciences Consortium. May be repeated three times for a maximum of 10.0 credits as long as the topic is

EAES560	Title Number and type of credits Course Description	different. Cross listed with Earth and Environmental Studies, PHMS 559. Previous course PHMS 598 effective through Spring 2012. Environmental Law. 3 hours lecture. The course focuses on The National Environmental Policy Act; The preparation of an environmental impact statement; The Clean Air Act; The Clean Water Act; The Endangered Species Act; Toxic Substance Control Act; Solid and Hazardous Waste and other Environmental laws. The role of environmental professionals in the formulation and implementation of environmental law and policy are discussed. Previous course ENVR 510 effective through Spring 2012.
EAES561	Title Number and type of credits Course Description	Environmental Law and Policy. 3 hours lecture. The goal of this course is to provide students with the theoretical foundations and practical applications of Environmental Law. The course will utilize a model and method approach, which will present theory and procedure in a case problem context. The course will acquaint students with various traditional legal theories and compare and contrast them with law as it has evolved to meet the changes in society. Previous course ENVR 590 effective through Spring 2012.
EAES562	Title	Waste Management.
EAES562	Prerequisites Number and type of credits Course Description	Matriculation in a CSAM graduate program or departmental approval. 3 hours lecture. This course examines liquid waste management (sewage, sewerage, septic, and acid mine drainage) and solid waste management (composting, incineration, dumps, sanitary landfills, ocean dumping, and resource recovery). Management of radioactive wastes is included. Previous course GEOS 513 effective through Spring 2012.
EAES563	Title Number and type of credits Course Description	Natural Resource Management. 3 hours lecture. Provide background in natural resource management; wildlife, fisheries, forests, water and related components. Includes field trips. Previous course ENVR 551 effective through Spring 2012.

EAES564	Title Number and type of credits Course Description	Environmental Education. 3 hours lecture. Foundations of environmental education-historical, theoretical, and conceptual. Includes models, gaming encounters, and teaching strategies. Previous course ENVR 550 effective through Spring 2012.
EAES565	Title Number and type of credits Course Description	Environmental Change and Communication. 3 hours lecture. Prepare students as professional environmentalists: Communication and journalism strategies, theory of persuasion, and roles as catalyst, solution giver, process helpers, and resource person. Previous course ENVR 509 effective through Spring 2012.
EAES566	Title Number and type of credits Course Description	Environmental Problem Solving. 3 hours lecture. The purpose of this course is to train students to define environmental problems, develop their skills in solving these problems, as well as commitment to work toward their solution. Each lesson consists of student preparation of reading selected articles, classroom orientation, field trips, and the student-instructor follow-up. Field trip topics include pedestrian/vehicle conflict, school site development, plants as a city resource, urban/rural recreation, sign ordinances, transportation and similar topics. Offered as ENVR 508 through Spring 2012. To become EAES 566 effective Summer 2012.
EAES567	Title Number and type of credits Course Description	Human Environment. 3 hours lecture. Discussion of population in relation to the physical environment; objectives and skills of numerous culture groups will be examined to clarify existing regional variations in the man-land relationship. Previous course ENVR 505 effective through Spring 2012.
EAES568	Title Number and type of credits Course Description	Environmental Studies-Social/Behavior. 3 hours lecture. A systems concept utilizing social and behavioral sciences. Provides some understanding of the relationships of the cultural environment to life. The social and behavioral conditions upon the grouping of individuals are examined in natural and man-modified environments. Previous course ENVR 502 effective

		through Spring 2012.
EAES569	Title	Air Resource Management.
	Prerequisites	Matriculation in a CSAM graduate program or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Spatial distribution of energy in the atmosphere treated in terms of natural factors and man's induced changes (atmospheric pollution). Incoming sun energy as modified by man is traced through the atmosphere, vegetation, soil and water. Previous course GEOS 501 effective through Spring 2012.
EAES570	Title	Culture Regions.
EAES570	Number and type of credits	3 hours lecture.
	Course Description	Seminar investigation of man's role in changing the face of the earth. Emphasis on spatial perception and cultural attitudes towards space as well as the diffusion process. Previous course EUGS 503 effective through Spring 2012.
EAES575	Title	Environmental Economics.
	Number and type of credits	3 hours lecture.
	Course Description	This course explores the economic foundations of environmental problems such as natural resource depletion, conservation, pollution control, climate change, energy and other contemporary problems. In particular, the course develops students' understanding of why resource and environmental problems have occurred from the economic point of view and what kind of economic tools can be used for informed decision-making and tackling environmental problems.
EAES580	Title	Problems in Economic Geography.
	Number and type of credits	3 hours lecture.
	Course Description	Research course examines spatial patterns of economic activities. Stress on current methodology and research interests. Previous course EUGS 502 effective through Spring 2012.
EAES581	Title	Urban Systems Analysis.
	Number and type of credits	3 hours lecture.
	Course Description	The complexity of the city and its modification by means of planning, the systems approach to urban study, the ecological base, different models of urban systems, the impact of technological change, the hierarchy of urban

EAES582	Title Number and type of credits Course Description	regions, planning in the existing systems, and creating new ones. Previous course EUGS 510 effective through Spring 2012. Urban and Regional Planning. 3 hours lecture. Urban and regional planning analyzes planning goals at an integral level. Urban and regional planning are rooted in the need to anticipate social and economic change in space and how it needs to be organized to enhance the functions of the physical plant and conserve the habitat twenty and more years into the future. Data gathering and analysis, graphic presentation and model building are an integral part of the course. Previous course EUGS 511 effective through Spring 2012.
EAES583	Title Number and type of credits Course Description	Transportation Analysis and Planning. 3 hours lecture. Transportation analysis addresses such diverse subject matter as technological change in the transportation media, transportation and energy, degree of accessibility, passenger trip generation by kind, commodity flows, transportation and spatial order, and transportation planning as part of urban and regional planning. Previous course EUGS 512 effective through Spring 2012.
EAES584	Title Number and type of credits Course Description	Urban Studies and Policy Analysis. 3 hours lecture. Interdisciplinary study of urbanization, the processes that produce and shape urban agglomerations. From this holistic perspective the interaction of different social, cultural economic, political and planning forces examined for their impact upon the resulting system. Previous course EUGS 550 effective through Spring 2012.
EAES585	Title Number and type of credits Course Description	The Metropolitan Economy. 3 hours lecture. The spacing, location and size of cities, the role of transportation in city rhythms and intra and inner city relationships. Urban design planning juxtaposed with multi-faceted decision making processes for an examination of their relative position in the management of urban systems. Previous course

EAES585	Course Description	EUGS 551 effective through Spring 2012.
EAES586	Title	Urban Contamination.
	Number and type of credits	3 hours lecture.
	Course Description	This course uses examples from the published peer-reviewed literature to introduce the basic concepts of environmental contamination and the fundamental principles of environmental assessment. This is an introductory course at the graduate level and suitable for the students who are pursuing their graduate degree study and career in environmental education, science and management. The course will focus on environmental topics that are of current public concern and interest.
EAES590	Title	Independent Study in Environmental Studies.
	Prerequisites	Departmental approval.
	Course Description	Student must develop statement of goals and phasing for completion, prior to consultation with instructor. May be repeated three times for a maximum of 10.0 credits as long as the topic is different. Previous course ENVR 531 effective through Spring 2012.
EAES591	Title	Methods in Environmental Research.
	Number and type of credits	3 hours lecture.
	Course Description	Formulation of the research problem, use of bibliographical sources and reference material organizing the research tests and measurements, analysis of data, and report writing. Previous course ENVR 503 effective through Spring 2012.
EAES592	Title	Pro Seminar.
	Prerequisites	Departmental approval.
	Special Fee	Special fee.
	Number and type of credits	1-4 hours seminar.
	Course Description	Research on selected problems which will vary according to instructor. May be repeated once for a maximum of eight semester hours as long as the topic is different each time. Previous course EUGS 504 effective through Spring 2012.
EAES593	Title	Research Seminar.
	Prerequisites	Matriculation in an EAES graduate program or departmental approval.
	Number and type of credits	3 hours seminar.
	Course Description	Student field, laboratory, and library investigation of a problem in the area of his or her interest in geoscience, the results of which will be presented

EAES594	Title	in oral and written form. Class discussion of the individual papers and of other pertinent topics of current interest in geoscience. Previous course GEOS 590 effective through Spring 2012.
	Prerequisites	Research in Geoscience Literature.
	Number and type of credits	Matriculation in an EAES graduate program or departmental approval.
	Course Description	1 hour lecture.
		Investigation and evaluation of a topic in geoscience under the supervision of a faculty member by: (1) preparing a bibliography from standard sources, including an on-line computer search; and, (2) preparing a report written in standard professional format. Previous course GEOS 594 effective through Spring 2012
EAES599	Title	Special Problems in Earth and Environmental Studies.
	Prerequisites	Matriculation in an EAES graduate program or departmental approval.
	Course Description	Independent research project to be performed by the student under the guidance of the faculty. May be repeated three times for a maximum of 10.0 credits as long as the topic is different. Previous course GEOS 592 effective through Spring 2012.
EAES610	Title	Spatial Analysis.
	Prerequisites	Matriculation in an Earth and Environmental Studies (EAES) program and equivalent of EAES 510 or departmental approval.
	Special Fee	Special fee.
EAES610	Number and type of credits	3 hours lecture.
	Course Description	This course will introduce students to techniques for the analysis of spatial data. The course will heavily utilize GIS and Remote Sensing data with particular attention to applications and manipulation techniques. Topics include characterizing spatial data, data sampling, visualization, data modeling, point pattern analysis, and spatial data interaction. Previous course EUGS 680 effective through Spring 2012.
EAES611	Title	Advanced Environmental Remote Sensing and Image Processing.
	Prerequisites	Matriculation in a EAES graduate program and equivalent of EAES311 or EAES511 or departmental approval.
	Special Fee	Special fee.

	Number and type of credits	3 hours lecture.
	Course Description	This course provides a forum to explore cutting edge advances in remote sensing of the environment afforded by new satellite and aircraft based imaging platforms and to provide facility with image processing (IP) and geographic information systems (GIS) software. Topics covered include multispectral, hyperspectral and multiangular reflectance data, very high resolution panchromatic imagery, active radar and lidar systems, microwave imagery, advanced spatial and statistical raster analysis, and interfaces to GIS. Previous course ENVR 655 effective through Spring 2012.
EAES612	Title	Seminar in Environmental Graphics.
	Prerequisites	Matriculation in a CSAM graduate program.
	Number and type of credits	3 hours seminar.
	Course Description	Use of geographic materials suitable for analysis, understanding and presenting aspects of the environment through seminar presentation. Previous courses GEOS 658 and ENVR 628 effective through Spring 2012.
EAES660	Title	Seminar in Environmental Management.
	Number and type of credits	3 hours seminar.
	Course Description	This is a methods seminar focusing on the techniques of managing a project with environmental significance. Students will design and plan in detail a project to improve an existing environmental problem or to implement an economically important project that would minimize environmental problems. Previous course ENVR 610 effective through Spring 2012.
EAES661	Title	Instructional Design for Environmental Education.
	Prerequisites	EAES 564.
	Number and type of credits	3 hours lecture.
	Course Description	This course will introduce students to the techniques for instructional design as they relate specifically to the goals, need, and objectives of environmental education. Previous course ENVR 553 effective through Spring 2012.
EAES662	Title	Energy and the Environment.
	Prerequisites	Enrollment in one of the following programs: MA in Environmental Studies (ESED, ESES or ESEM), MS in Geoscience (GEOS), MS in Sustainability Science (SSCI or SSBM), PSM in Sustainability Science w/concentration in Applied Sustainability Science (SSAS), PhD in Environmental Management (ENVM).

	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	In-depth study of present-day energy sources, the impact of their extraction and utilization on Earth's environment, and future options. Topics include physics of energy, carbon cycle, greenhouse effect, origin and production of fossil fuels, hydraulic fracturing ("fracking"), consequences of fossil fuel combustion, nuclear energy, renewable energy sources (including biomass, waste-to-energy, solar, hydro, wind, tidal), as well as the technical and sociopolitical aspects of energy utilization, efficiency, and conservation.
EAES680	Title	Reading Seminar in Geography and Urban Studies.
EAES680	Number and type of credits	2 hours seminar.
	Course Description	Required of all master's degree candidates concentrating in Geography and Urban Studies. This semester entails directed independent study in preparation for a 3-hour written comprehensive examination. Previous course EUGS 603 effective through Spring 2012.
EAES681	Title	Urban Studies Seminar.
	Number and type of credits	3 hours seminar.
	Course Description	The seminar is designed to analyze the contents and the concepts to formulate a holistic view of the city. Benchmark papers and research frontiers will be investigated. Previous course EUGS 610 effective through Spring 2012.
EAES690	Title	Research Project in Environmental Studies.
	Prerequisites	Departmental approval.
	Course Description	To complete the research proposal initiated in the research methods course. Previous course ENVR 695 effective through Spring 2012.
EAES696	Title	Applied Research or Internship Project in Sustainability Science.
	Prerequisites	EAES 509 and EAES 591 and departmental approval.
	Number and type of credits	6 hours lecture.
	Course Description	Students develop an independent applied research project or semester internship project in consultation with a faculty supervisor and an external advisor from academic, business, government or not-for-profit organization. Sectors of concern include energy use and conservation; urban design and the ecology of cities; green infrastructure design and engineering; globalization

and negative externalities; climate change mitigation and adaptation; global extinctions and biodiversity; eutrophication and nutrient flux; habitat loss, alteration and degradation; alteration of biogeochemical cycles and land use patterns; environmental and social justice, and the " north-south" divide; or an approved topic or internship experience. This project or full semester internship is aimed at providing real life experience and problem-solving analytics to address key sustainability issues. Students will prepare an extensive written report and deliver an oral presentation in a specific format provided by the Program at the end of the semester. Previous course ENVR 696 effective through Spring 2012.

EAES698	Title Prerequisites Course Description	<p>Master's Thesis.</p> <p>Departmental approval.</p> <p>Independent research project done under faculty advisement. Students must follow the MSU Thesis Guidelines, which may be obtained from the Graduate School. Students should take EAES 699 if they don't complete EAES 698 within the semester. Previous courses ENVR 698 and GEOS 698 effective through Spring 2012.</p>
EAES699	Title Prerequisites Course Description	<p>Master's Thesis Extension.</p> <p>EAES 698.</p> <p>Continuation of Master's Thesis Project. Thesis Extension will be graded as IP (in Progress) until thesis is completed, at which time a grade of Pass or Fail will be given. Previous courses ENVR 699 and GEOS 699 effective through Spring 2012.</p>
EAES700	Title Prerequisites Special Fee Number and type of credits Course Description	<p>Earth Systems Science.</p> <p>Matriculation in a College of Science and Mathematics (CSAM) graduate program or departmental approval.</p> <p>Special fee.</p> <p>3 hours lecture.</p> <p>This course investigates geosystems. In studying processes within the atmosphere, hydrosphere, biosphere, and lithosphere, the course provides a holistic understanding of earth's historical, present, and future systems. Current techniques and tools for data collection and analysis, such as field methods, GIS, Remote Sensing, are included in the course. Previous course</p>

EAES700	Course Description	ENVR 770 effective through Spring 2012.
EAES701	Title	Modeling in Environmental Science.
	Prerequisites	Matriculation in a College of Science and Mathematics (CSAM) graduate program or departmental approval.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	This course introduces fundamental concepts of interphase and intraphase transfer and transport related to our living environment. It focuses more on natural interphase transfer, including pathways and fate, and is mainly designed to understand the mechanics and processes. Previous course ENVR 775 effective through Spring 2012.
EAES710	Title	Advanced Geographic Information Systems.
	Prerequisites	Matriculation in an EAES graduate program and equivalent of one of the following: EAES 510, EAES 511, EAES 610 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	This course will allow students with demonstrated knowledge and skills in the geographic information sciences (GIS and/or Spatial Analysis and/or Remote Sensing) to expand on the range of techniques at their disposal for analyzing and visualizing geographic and other spatial data sets. Students are expected to develop and effect a small but well-defined research project which will result in a paper and an oral presentation. The course will make much use of industry standard GIS and Remote Sensing software packages in data application, manipulation and visualization. The course will cover programming in 3GLs, 4GLs and macro languages for processing and analyzing extensive spatial data sets as well as the construction of customized graphical user interfaces for specific applications. Previous course EUGS 770 effective through Spring 2012.
EAES726	Title	Environmental Remediation.
	Prerequisites	EAES 526 or EAES 527 or EAES 792.
	Number and type of credits	3 hours lecture.
	Course Description	This course presents the fundamental principles affecting the fate and transport of subsurface contaminants and the remediation of subsurface environments. This course covers regulatory aspects of contaminated sites and

		remedial actions; remedial action assessment; sources and characteristics of contaminants; fate and transport of contaminants in subsurface environments; traditional and innovative groundwater, soil and sediment cleanup technologies including pump and treat system, containment, soil vapor extraction, air sparging, bioremediation, phytoremediation, natural attenuation, stabilization/solidification, and in-situ reactive zones.
EAES760	Title	Organizational Environmental Management.
	Prerequisites	Matriculation in a graduate program or department approval.
	Number and type of credits	3 hours lecture.
	Course Description	This course examines the impact of profit, non-profit and public organizations on the natural environment. It analyzes the pressure, the types, and the procedures for implementing an environmental management system (EMS); and case studies from various organizations. It also studies the internal and external strategies of organizations relative to environmental sustainability goals. Previous course ENVR 760 effective through Spring 2012.
EAES790	Title	Colloquium in Environmental Management.
	Prerequisites	Matriculation in a graduate program or departmental approval.
	Number and type of credits	1 hour lecture.
	Course Description	Topical issues of current research in environmental management will be discussed. Presentations will be made by invited scholars, faculty, students, and research staff. For doctoral students in Environmental Management, the course may be repeated up to 10 times, but a maximum of 6 hours will be
EAES790	Course Description	applied towards the PhD degree. Previous course ENVR 705 effective through Spring 2012.
EAES791	Title	Research Methods.
	Number and type of credits	3 hours lecture.
	Course Description	Advanced research techniques, beginning with census reports, government surveys and reports from other agencies. Field research, both cultural and physical; mapping techniques; the design of appropriate scale and data transformation to familiarize the range of possibilities and the need for careful choice of data and maps. Computer applications in geographic problem solving. Previous course ENVR 721 effective through Spring 2012.

EAES792	Title Prerequisites Course Description	Special Topics. Departmental approval. Special Topics is a detailed and literature intensive exploration of one particular focus in contemporary environmental management. The topic for the course will fall under one of several general areas. Topics will cover specific research areas in water-land systems, sustainability, vulnerability and equity, modeling analysis and visualization. This course is designed to fulfill elective requirements of the Doctoral Degree in Environmental Management. This course may be repeated for a maximum of 8.0 credits. Previous course ENVR 704 effective through Spring 2012.
EAES895	Title Prerequisites Number and type of credits Course Description	Research Project in Environmental Management I. Matriculation in the PhD Environmental Management (ENVM) Program. 3 hours lecture. The course is structured to provide doctoral students with the opportunity to develop or update the research skills needed to design and complete a dissertation. Students can either develop an independent topic for their research project in consultation with faculty advisors or they can choose to work on one of the University's on-going environmental studies research projects. Previous course ENVR 895 effective through Spring 2012.
EAES896	Title Prerequisites Number and type of credits Course Description	Research Project in Environmental Management II. EAES 895. 3 hours lecture. The course is structured to provide doctoral students with the opportunity to develop or update the research skills needed to design and complete a dissertation. Students can either develop an independent topic for their research project in consultation with faculty advisors or they can choose to work on one of the University's on-going environmental studies research projects. Previous course ENVR 896 effective through Spring 2012.
EAES900	Title Prerequisites Course Description	Dissertation Advisement. Matriculation in the Ph.D. Environmental Management (ENVM) Program; Advancement to Candidacy. This department requires 30 credits of EAES 900. While enrolled in EAES 900, students will work with their Dissertation Chair and their Dissertation Committee. Credits are reported as IP (In Progress) while the dissertation is

		being written. At the conclusion of the dissertation defense, a final grade of Pass or Fail will be recorded. Previous course ENVR 900 effective through Winter 2012.
EAES901	Title	Dissertation Extension.
	Prerequisites	30 credits of Dissertation Advisement.
	Course Description	Once students have acquired 30 credits of EAES 900 Dissertation Advisement, they must enroll in 1 credit of EAES 901 in every semester in which they intend to work on the dissertation, up to and including the semester of the defense. Credits are reported as IP (In Progress) while the dissertation is being written. At the conclusion of the dissertation defense, a final grade of Pass or Fail will be recorded. EAES 901 may be repeated until the time
EAES901	Course Description	limitation for completion of the doctoral program as specified in the Doctoral Policy Manual has been reached. Previous course ENVR 901 effective through Spring 2012.
ECEL200	Title	Perspectives on Early Childhood and Elementary Education in a Democracy.
	Prerequisites	ENWR 105 or HONP 100 or equivalent writing course from an accredited college/university. Not open to freshmen.
	Number and type of credits	2 hours lecture, 1 hour other.
	Course Description	This course examines the education of children during their early and elementary school years from historical, political, social, and cultural perspectives. Students critically analyze issues influencing our current public education system to determine their impact on schools, teachers, children families, and society. They examine how our education systems reflect and respond to the changing needs, knowledge, and dispositions of our democratic society. Closed to Freshmen. 25 hours of field experience required.
ECEL209	Title	Promoting Infant Toddler Social Emotional Well-being in Educational Settings.
	Prerequisites	FCST 214 or equivalent.
	Number and type of credits	3 hours lecture.
	Course Description	The course is designed to foster an understanding of child development, early care and education of young children birth to age three. Students explore infant and toddler mental health and examine the impact of early experiences