

EARTH AND ENVIRONMENTAL SCIENCES (EESC)

EESC 1XX Earth and Environmental Science Transfer Credit (0 Credits)

EESC 2XX Earth and Environmental Science Transfer Credit (0 Credits)

EESC 109 Principles of Environmental Science (3 Credits)

This course explores the major principles of environmental science and focuses upon environmental challenges and potential solutions in the 21st century.

EESC 110 Physical Geography (3 Credits)

Presented in this course is an introduction to the influence of the natural environment on man's activities. This will be accomplished through the study of world climate patterns, landforms, soils, natural vegetation and water. Map-reading techniques are also strongly emphasized.

EESC 111 Principles of Earth Science (3 Credits)

A brief interdisciplinary study of the major areas of Geoscience are touched upon in this class. This course may not be counted towards a major or minor in Geoscience and/or Geography.

EESC 112 Introduction to Geology (3 Credits)

This course focuses on the exciting discoveries that have led to the current understanding of our dynamic Earth. It details the origin and significance of minerals, rocks, fossils, volcanoes and earthquakes and their relationship to continental drift and plate tectonics. It also discusses the relationship of geological processes to human activities and environmental challenges.

EESC 113 Human Impact (3 Credits)

This course offers an examination of man's impact on the environment with particular emphasis on the processes of ecological change, the immediate and extended effects on the environment, and the trends in time and space of these processes and effects.

EESC 114 Introduction to Meteorology (3 Credits)

Offered in this course is a study of meteorological science through the analysis of atmospheric circulation of air masses and fronts, micrometeorology, cloud physics, as well as other energy relationships. Laboratory work and measurements of weather components are an integral part of the course.

EESC 115 Introduction to Oceanography (3 Credits)

An examination of the physical, chemical, geological, and biological aspects of the oceans and their importance to man is presented in this course.

EESC 116 Cultural Geography (3 Credits)

A study of present-day cultures and their physical environment, with emphasis on economic development, technology levels, and population are the main focus in this course. Emphasis in this course is primarily placed on the developing world.

EESC 117 Problems of Modern Cities (3 Credits)

A study of present-day cultures and their physical environment, with emphasis on economic development, technology levels, and population is introduced in this course. Emphasis is especially placed on the study of mature industrial countries.

EESC 120 Water Explorer: Introduction to Water Science (3 Credits)

Water is essential for humans and all life on Earth. This course is designed to introduce the interdisciplinary aspects of water. Students will learn about the basic scientific principles of water resources, water quality, and water pollution, as well as social and economic issues related to water.

EESC 121 Mapping the City (3 Credits)

Mapping the City is a place-based course focusing upon important themes in our local, urban environment. Students will use high technology (GIS/GPS) in an activity-based, hands-on atmosphere to GATHER, ANALYZE, and SYNTHESIZE data about their communities that will provide new insights, especially when paired or clustered with other disciplines.

EESC 130 Understanding Ethnic Conflict (3 Credits)

This course will investigate competing theories on the cause of conflict, examine the political behavior of ethnic groups, and analyze how domestic and international actors influence a country's ethnic divisions. The students will analyze documentary and drama films to supplement class material.

EESC 135 Our Planet Earth: Introduction to Dynamic Earth Processes (3 Credits)

Planet Earth is home to human beings and millions of living species. The Earth consists of the geosphere, the hydrosphere, the atmosphere, and the biosphere, which are interconnected. This course will explore the basic principles of dynamic Earth processes, as well as complex interactions of the Earth's spheres.

EESC 201 Environmental Science for All: Introduction to Environmental Systems and Processes (3 Credits)

Environmental Science is an interdisciplinary science that integrates natural and social sciences. This course covers various environmental topics of the biosphere, the lithosphere, the hydrosphere, and the atmosphere, as well as social and economic challenges and solutions concerning environmental problems.

EESC 204 Meteorology (3 Credits)

EESC 209 Urban Environmental Issues & Policy (3 Credits)

A holistic approach concerning challenges to the modern urban environment, with a local focus. Technical issues are examined within the context of regulatory policy, including examples of both positive and negative environmental outcomes. Field experiences present evidence of the effects of regulatory policy and decision making upon the urban environment.

EESC 211 Field Studies in Geoscience: Bahamas (3 Credits)

This is a field oriented, 8 to 10 day course offered during Winter Intersession (alternate years). It examines the geology and biology associated within modern and ancient reef environments and natural history of their surrounding coastal areas. Emphasis is placed upon human Impacts to this fragile ecosystem. The role that reefs play in global systems change will also be explored.

EESC 214 Field Studies in Geoscience IV (3 Credits)

Extended study trips to selected locations. Variable credit.

EESC 221 Essential Methods of Geology (3 Credits)

Course details the hand-specimen properties, identification and interpretation of minerals and igneous, sedimentary and metamorphic rocks. In addition, it covers the basic principles involved in producing, reading and interpreting topographic maps, contour diagrams and other types of surface images.

EESC 222 Experimental Geology (2 Credits)

This course is made up of basic research and field experiences in geology.

EESC 223 The Blue Planet: The Oceans (3 Credits)

The Earth is called the Blue Planet because Earth's surface is mainly covered by oceans. The topics of this course include the origin of oceans, the sea floor, ocean basin, plate tectonics, marine sediments, coastal environments, seawater chemistry, ocean currents-tides-waves, ocean-atmosphere interaction, and biological activities in marine environment.

EESC 224 Experimental Oceanography (2 Credits)

Laboratory investigations of chemical and physical properties of seawater and its movement in the Hydrosphere are offered in this course. Also, studies of the beach and beach compositions will be conducted.

EESC 225 Experimental Meteorology & Oceanography (2 Credits)

This interdisciplinary research and field experience course will extend and complement the concepts introduced in GEOS 114 and 115. Lab and field exercises will introduce students to modern data collection and interpretation techniques used to understand and predict the behavior of these complex systems.

EESC 226 Earth 360: Integrated Geography (3 Credits)

Course explores Earth's deep and surface processes, and examines landscapes of human activities. It focuses on global patterns and processes, and their spatial and temporal variations at specific locations throughout the world. Students also encompass environmental aspects of interactions between humans and their natural settings.

EESC 227 Hands on Earth: Earth Lab (3 Credits)

Earth is a dynamic planet that changes constantly. This course introduces students to geological, hydrological, and atmospheric processes of Earth through various hands-on activities. Topics include minerals and rocks, plate tectonics, geologic history, landscapes, topographic maps, earthquakes, and surface water and groundwater.

EESC 228 Experimental Meteorology (2 Credits)

Basic research and field experiences in meteorology.

EESC 231 Water Chronicles (3 Credits)

Water scarcities due to economic growth, ecosystem demands and climate change require integrative approaches to water use and management. This class introduces students to the science of surface, ground and coastal waters as well as taking a case study approach to human and ecological needs for water and sustainable water management.

EESC 235 Global Climate Change (3 Credits)

This course introduces principles of Earth's climate systems, and discusses evidence for past, present and future climate changes. Students examine natural and anthropogenic climate forcing agents, negative and positive feedback mechanisms. The course focuses on social, historical and environmental aspects of climate change, and thus aims to promote climate-science literacy.

EESC 236 Our Sustainable World: Urban and Global Sustainability (3 Credits)

This course introduces concepts and framework of sustainability on the local to global scale and examines the environmental, economic, political, and social aspects of urban and global sustainability. This course will explore various sustainability issues in human and natural systems as well as solutions to sustainability challenges.

EESC 237 Environmental Issues and Policy: Global and Urban Perspectives (3 Credits)

This course examines various environmental issues on local, national, and global scales, including water and air pollution to global climate change. Students will develop in-depth understanding of environmental policies in the U.S. and global communities. Students will learn important functions of environmental policies in managing environmental quality.

EESC 238 Wonders of Weather. The Atmosphere (3 Credits)

It is important to understand how weather works because weather affects our daily life. This course covers a variety of topics related to the weather and the atmosphere, including temperature, humidity, clouds, precipitation, wind, weather forecasting, weather disasters, air pollution, and climate.

EESC 241 Historical Geology (4 Credits)

This course investigates geological and biological aspects of earth history as developed through the use of fossil evidence and the principles of stratigraphy, geochronology, and the geology of structures. Laboratory work and on-site field experiences are integral parts of the course.

Pre-Requisite(s): EESC 221

EESC 242 Global Tectonics (3 Credits)

This class traces the development of modern concepts in plate tectonics and related models of the Earth's interior. It also discusses the methods used to delineate recent plate motions and geological and oceanographic features associated with different types of plate boundaries. Further, it demonstrates how ancient plate geometries can be inferred and how global tectonic processes have operated in the past.

EESC 244 Minerals and Igneous Rocks (4 Credits)

This course is designed to provide students with a deeper understanding of the compositions, structures, uses and properties of minerals and rocks. Its main focus is on the recurring associations of minerals and rocks within the Earth, the processes that generate them and their relationship to global tectonics. Field trips are required.

EESC 245 Sedimentary & Metamorphic Rock (4 Credits)

This course is designed to provide students with a deeper understanding of the textures, compositions and structures of sedimentary and metamorphic minerals and rocks. Its main focus is on the recurring associations of sedimentary and metamorphic minerals and rocks within the Earth, the processes that generate them and their relationship to global tectonics. Field trips are required.

EESC 246 Earth Materials (4 Credits)

This course deals with the description, analysis, and interpretation of Earth Materials. It details the methods used to identify the mineralogy and texture of volcanic, plutonic, and metamorphic rocks, their classification and interpretation, and the formation of major Igneous and Metamorphic rock associations in relationship to plate tectonics.

EESC 250 Plunder: The Race for Natural Resources (3 Credits)

The race for natural resources has driven human civilization and conquest. Raw materials are found in different geological and geographical areas. This course will explore the geology behind these deposits and the ensuing environmental consequences of resource exploitation as a consequence of the rise and fall of empires.

EESC 252 GIS I: Contemporary Applications of GIS (3 Credits)

Geographic Information System (GIS) computer technology allows one to store, retrieve, map, and analyze different types of data (scientific, political, cultural, economic, etc.) GIS skills are utilized in a variety of job settings. Students will learn the basic theory behind GIS and be exposed to applications in various disciplines.

EESC 300 History of Science (3 Credits)

This course presents a humanistic study of the origins and development of scientific thought. An analysis of the contributions of scientific findings to society and the interdependence between society and scientific advancement are included.

EESC 301 Field Studies in Geoscience (3 Credits)

Extended study trips to selected locations. Variable credit.

EESC 302 Field Studies Geoscience (3 Credits)

Extended study trips to selected locations. Variable credit.

EESC 303 United States and Canada (3 Credits)**EESC 317 Structural Geology (4 Credits)**

This course focuses on linear, planar and three-dimensional deformation features in rocks, including folds and faults. It details their recognition, geometrical properties, classification, and genesis. The course covers the kinematic and dynamic processes that produce such features and their relationships to local, regional and global tectonic patterns through time. Laboratories and field projects allow students to refine techniques for representing structures and for inferring the stresses and strains that generated them.

Pre-Requisite(s): EESC 246 and Math 165

EESC 320 Seminar in Geoscience I (1 Credit)

Research seminar for Geoscience majors. Junior status.

EESC 325 GIS for the Urban Community (3 Credits)

GIS is a powerful tool for urban planners to understand complex urban issues. GIS is utilized for analysis, modeling and visualization of urban areas. This course focuses on the applications of GIS for urban planning and management and covers various issues and challenges of urban communities.

Pre-Requisite(s): 8 Gen Ed Courses across Tier 1 and Tier 2.

EESC 330 Cartography (3 Credits)

A laboratory course in basic principals of graphing, symbolic representation, and map interpretation. The compilation and design of maps.

EESC 331 Minerology (4 Credits)

This course focuses on the crystal structures, chemical compositions and recurring associations of minerals - the major components of the Earth. It also discusses, in depth, the processes that generate and are recorded by mineral associations and their relationship to plate tectonics. Laboratory studies are designed to clarify and elaborate important concepts and analytical techniques related to the recognition and interpretation of individual minerals, their structure and composition as well as their association within the Earth.

EESC 332 Optical Minerology (4 Credits)

Offered in this class is an intensive study of the light transmitting properties of minerals. Laboratories are devoted to learning a variety of microscopic techniques in order to identify mineral samples using light transmitting properties.

Pre-Requisite(s): EESC 246

EESC 333 Paleontology (4 Credits)

Classification and recognition of the various forms of invertebrates found as fossils examined in this course. Emphasis is on the distribution, evolution and extinction of major groups. Laboratories primarily deal with the classification of significant invertebrate fossil groups.

EESC 334 Stratigraphy (4 Credits)

This course deals with the description, classification, and interpretation of sedimentary rocks within a context for their spatial and temporal distribution. Emphasis is placed on the processes affecting their composition, textures, and sedimentary structures as well as on methods useful in inferring sedimentary processes and environments of deposition from the rock record. Laboratories and field trips emphasize concepts learned in the classroom.

Pre-Requisite(s): EESC 135

EESC 335 Geomorphology (4 Credits)

This course is designed to give students an in-depth knowledge of the origin of major landforms. A detailed study will be made of the physiographic provinces of the United States to illustrate their history, geological structures and landform evolution. Laboratories are devoted to landform interpretation from topographic maps and aerial photographs.

EESC 336 Field Methods in Geoscience (4 Credits)

In this field oriented course, both traditional and modern methods of locating, describing, and mapping field data are introduced. Lectures introduce concepts and techniques, and field exercises allow the student to develop mapping abilities that can be utilized in both urban and rural areas, in the field and in the office.

Pre-Requisite(s): EESC 135

EESC 340 Hydrology I (3 Credits)

This course offers a study in the hydrological cycle, the physical, optical, and general characteristics of water and uses. Major types of pollution and their effect on the user, water supply, water resources, floods, and water management are covered.

Pre-Requisite: EESC 209

EESC 341 Hydrology II (3 Credits)

This course is a continuation of EESC 340 with emphasis on aquifer hydraulics including principals of groundwater flow, geology of groundwater occurrence, regional groundwater flow, well hydraulics, groundwater quality and groundwater contamination, field methods and groundwater modeling techniques. Regulatory applications to groundwater are also studied.

EESC 342 Sedimentology (4 Credits)

Deals with the description, classification and interpretation of sedimentary rocks. Emphasizes the processes affecting their composition, textures, structures, and distribution. Stresses methods useful in inferring sedimentary processes and environments from the rock record. Laboratories and field trips support a solid grounding in the description, classification, and interpretation of sedimentary rocks in their regional and global tectonic contexts.

EESC 343 Regional Geography (3 Credits)

Offered in this course is a study of the United States and Canada based on the sequent occupancy of the major regions. An intensive study of the geography of New Jersey is included.

EESC 348 Environmental Geology (3 Credits)

This course investigates the relationship between humanity and the geological environment. Emphasis is placed on humans as geologic agents and the consequences of human value systems with respect to earth resources.

Pre-Requisite(s): EESC 135

EESC 349 Introduction Hazmat Field Techniques (4 Credits)

Course which will teach the fundamentals of field techniques for hazardous waste site investigations. Procedures for conducting Phase I and II Site Investigations, Preliminary Site Assessments, and Remedial Investigation/Feasibility Studies (RIFS). The student will be instructed in the recognition, evaluation, and control of hazardous events. The basic principals of health and safety, including the use of personnel protection equipment, and basic response organization will also be presented. During the course, the student will receive a 40-hour OSHA HAZMAT training and receive a 40-hour OSHA certification.

EESC 350 GIS II: Contemp Analysis w/GIS (3 Credits)

This course builds upon the skills sets developed in GEOG 250, where students learned how to use Geographic Information System (GIS) technology to acquire and map data. GEOG 350 trains the student in techniques needed to analyze these data. GIS analysis can take many forms, but typically requires the evaluation of multiple data sets in order to understand and predict certain patterns and/or outcomes. Computer lab exercises will provide practical, hands-on experience.

Pre-Requisite(s): EESC 252

EESC 400 International Education I (6 Credits)**EESC 402 Geography in Latin America (3 Credits)**

Area study of the regions south of the border, focusing on the individual national geographic personalities, and analyzing historic and environmental factors that have provided a common background.

EESC 410 Urban Soil Survey (4 Credits)

This course provides hands-on, experiential learning opportunities in field and laboratory settings to comprehend geological and hydrological functions of urban soils. Physical, chemical, structural and textural properties of urban and natural soils are compared and contrasted to evaluate soil quality and relate quality to environmental sustainability.

Pre-Requisite(s): EESC 135

EESC 420 Seminar in Geoscience (1 Credit)

This is an ongoing research seminar for Geoscience majors. Junior or Senior standing.

EESC 421 Seminar in Geoscience II (1 Credit)

This is an advanced research seminar for Geoscience majors.

Pre-Requisite(s): Senior Status

EESC 422 Urban Geography (3 Credits)

An analysis of forms and patterns of distribution; the central Place Theory and the economic structure of cities; a study of urban problems with emphasis of the New York Metropolitan Region.

EESC 431 Petrology (4 Credits)

This course examines the composition, texture, classification and interpretation of igneous and metamorphic rocks. It covers the major processes responsible for the evolution of major volcanic, plutonic and metamorphic rock association and their relationships to regional and global tectonic patterns. Laboratories and field trips emphasize techniques used to represent and more fully understand the processes that generate rocks association through time.

Pre-Requisite(s): EESC 246

EESC 434 Earth Surface Processes (4 Credits)

The course explores a variety of landscapes and focuses upon the processes that have shaped, and continue to alter, the Earth's surface. It is an integrated, systems-oriented view of the evolution and properties of sedimentary systems and landscapes. Students study the interactions between landscapes and sediments, and how those systems respond to arrange of both naturally and anthropogenically induced disturbance events.

Pre-Requisite(s): EESC 246 and MATH 140

EESC 435 Western Europe (3 Credits)**EESC 436 Coastal Zone: Problems & Solutions (3 Credits)**

This interdisciplinary course provides natural and social scientists with tools to manage intersecting and sometimes divergent interests of their respective fields in addressing complex contemporary environmental issues and challenges. The multiproblem coastal zone is the principal focus. Guest lecturers, government publications, attendance at and participation in public meetings, and field visits complement the classroom work.

Pre-Requisite(s): Junior or Senior status, or Permission of Instructor

EESC 437 Environmental Health (3 Credits)

An overview of the environment and the environmental factors that affect human health with emphasis on identifying and evaluating environmental sources and hazardous agents.

EESC 440 Population Geography (3 Credits)**EESC 441 Paleoecology (3 Credits)**

Course deals with the distribution of fossil communities and their relationship to ancient environments. It covers comparisons with modern populations and deduction of environmental processes from functional morphology, skeletal composition, and organic traces.

EESC 446 Introduction to Geochemistry (3 Credits)

This course is an in-depth study of the origin of elements, the principles governing their presence in minerals, and the application of chemistry to mineral exploration.

Pre-Requisite(s): EESC 135

EESC 447 Introduction to Geophysics (4 Credits)

This field oriented course introduces the student to the application of principles of physics to mapping and interpretation of the subsurface. Field exercises in different environments with modern geophysical equipment enable students to gain experience in the emerging discipline of "non-invasive site characterization", an increasingly important method for decision making in the 21st century.

Pre-Requisite: EESC 135

EESC 451 Guided Study (3 Credits)

This study offers students the opportunity to engage in advanced study or research in which they develop and report on major individual research projects. Variable credit.

EESC 452 Guided Study (2 Credits)

This study offers students the opportunity to engage in advanced study or research in which they develop and report on major individual research projects. Variable credit.

EESC 453 Guided Study (1 Credit)

This study offers students the opportunity to engage in advanced study or research in which they develop and report on major individual research projects. Variable credit.

EESC 455 GIS III: Modeling with GIS (3 Credits)

This course introduces advanced GIS users to geodatabase design and modeling techniques/applications. It is the final course in a 3 course GIS series at NJCU.

Pre-Requisite(s): EESC 252

EESC 503 Field Studies in Geoscience (3 Credits)

Extended study trips to selected locations. Variable credit.

EESC 504 Common Ground New Jersey Environmental Ed Seminar for Teachers (2 Credits)**EESC 510 Elementary School Science Workshop (3 Credits)****EESC 512 Wildlife in Winter (1 Credit)****EESC 513 PEEC Birding Tours II (1 Credit)****EESC 514 Breeding Birds of the Poconos (1 Credit)****EESC 520 Forensic Science (3 Credits)**

This course focuses on the application of scientific principles and techniques to legal matters especially as it relates to the collection, examination, and analysis of physical evidence more specifically the analysis and identification of earth materials.

EESC 522 In Search of Eagles (1 Credit)**EESC 523 Natural History of the Poconos (1 Credit)****EESC 524 Critical Issues of the Environment Seminar for New Jersey Teachers (2 Credits)****EESC 526 Bird Watching for Beginners (1 Credit)****EESC 527 Warblers on the Wing Pt I (1 Credit)****EESC 528 Warblers on the Wing Pt.2 (1 Credit)****EESC 529 Reptiles Amphib Anthropods (1 Credit)****EESC 530 First Birds of Spring (1 Credit)****EESC 540 Geology of New Jersey (3 Credits)**

This course studies the geological features of New Jersey. Topics include the state's geologic history, physiography and economic earth resources including water resources and waste management. An investigative course of geological and fossil aspects of New Jersey's geologic history as developed through the use of rock and fossil evidence and the principles of stratigraphy, geochronology, and geologic structures. Collecting and identifying fossils, minerals and rocks will be a major part of the course. All field trips are REQUIRED. Taught in the summer session.

UG Pre-Requisite(s): EESC 112

EESC 550 Geology of National Parks (4 Credits)

The course explores the geologic framework that underlie the geologic processes and principals of mountain building, volcanism, stream erosion, glacial and shoreline processes and explains the geological history and features of selected National Parks, Monuments and National Seashores. Lecture course supplemented with an 8 to 10 day field trip to localities of interest. Taught in the Summer.

Pre-Requisite(s): EESC 112