

Special topics include sports, travel, food and humor. Prerequisite: JOUR 201 or consent. Offered fall of even-numbered years.

### 435 Advanced Newswriting (3) **W**

An advanced course in the collection and reporting of news in which students are expected to demonstrate independence and initiative in their work. Each student learns to develop a beat and make use of sources. Emphasis is placed on skepticism. Prerequisite: JOUR 201. Offered spring of odd-numbered years.

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## COMPUTER SCIENCE

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(See Mathematics/Computer Science)

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## CRIMINAL JUSTICE

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(See Sociology/Criminal Justice)

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## EARTH AND ENVIRONMENTAL SCIENCES

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DR. J. CHRISTOPHER HALEY  
 DR. ELIZABETH G. MALCOLM, Program Coordinator  
 and Division Chairperson  
 DR. GARRY E. NOE  
 DR. MAYNARD H. SCHAUS

Earth and environmental sciences is a multi-disciplinary field that addresses the interactions between humans and the environment. Study in this field includes both an understanding of the basic principles that govern geological, biological, and chemical interactions as well as the applied context of developing solutions to current environmental problems. The earth and environmental sciences curriculum is designed to provide a solid foundation in both earth science and environmental science as well as supporting coursework in chemistry, biology and physics. The B.A. program is designed to provide a broad background in the fundamentals of Earth Science for students who intend to have careers in secondary education, business, law, other areas, or double major. The B.S. program is intended for students who plan to pursue a graduate degree in earth or environmental sciences and has additional mathematics requirements.

Those seeking secondary certification in Earth science must take EES 210 and either PHYS 141 or 142. Recommended elective courses: MBE 201, PHIL 304, POLS 323.

### Bachelor of Arts:

COURSE NUMBER AND TITLE	SEM. HRS.
EES 124/125 Evolution of the Earth and Evolution of the Earth Lab EES 130/131 Physical Geology and Physical Geology Lab	OR 4
EES 132/133 Environmental Geology and Environmental Geology Lab	4
BIO 131 Principles of Biology I BIO 207 Environmental Biology	OR 4
CHEM 117 College Chemistry I	4
CHEM 118 College Chemistry II	4
CHEM 210 Analytical Chemistry EES 270 Environmental Chemistry	OR 4
PHYS 215 General Physics PHYS 221 Physics	OR 4
EES 200 Oceanography EES 210 Meteorology	OR 4
BIO 316 General Ecology	4
INST/EES 300 Introduction to Geographic Information Systems	4
EES 320 Energy and the Environment	3
EES 330 Geology of Mountain Belts	4
EES 410 Watershed Hydrology	3
EES 450 Global Environmental Cycles	4
EES 480 Seminar in Earth and Environmental Sciences	1

*See continuation of choices next page*

Chart continued from previous page

AT LEAST TWO OF THE FOLLOWING: EES 340, 489; BIO 355, 445, 482/484; CHEM 260, 311/321; 312/322; 411, 412	6-8
<b>TOTAL</b>	<b>61-63</b>

### Bachelor of Science:

COURSE NUMBER AND TITLE	SEM. HRS.
EES 124/125 Evolution of the Earth and Evolution of the Earth Lab EES 130/131 Physical Geology and Physical Geology Lab	OR 4
EES 132/133 Environmental Geology and Environmental Geology Lab	4
BIO 131 Principles of Biology I BIO 207 Environmental Biology	OR 4
CHEM 117 College Chemistry I	4
CHEM 118 College Chemistry II	4
CHEM 210 Analytical Chemistry EES 270 Environmental Chemistry	OR 4
PHYS 221 Physics	4
MATH 172 Calculus II	4
MATH 271 Calculus III MATH 226 Introduction to Statistical Modeling	OR 3
EES 200 Oceanography EES 210 Meteorology	OR 4
BIO 316 General Ecology	4
INST/EES 300 Introduction to Geographic Information Systems	4
EES 320 Energy and the Environment	3

EES 330 Geology of Mountain Belts	4
EES 410 Watershed Hydrology	3
EES 450 Global Environmental Cycles	4
EES 480 Seminar in Earth and Environmental Sciences	1
AT LEAST TWO OF THE FOLLOWING: EES 340, 489; BIO 355, 445, 482/484; CHEM 260, 311/321; 312/322; 411, 412	6-8
<b>TOTAL</b>	<b>67-69</b>

### Minor Requirements

COURSE NUMBER AND TITLE (See p. 32 for general minor requirements)	SEM. HRS.
EES 124/125 Evolution of the Earth Evolution of the Earth Lab EES 130/131 Physical Geology Physical Geology Lab EES 132/133 Environmental Geology Environmental Geology Lab	OR OR 4
EES electives at 200 level or above and/or BIO 207	8
EES electives at 300 level or above and/or BIO 316	9
<b>TOTAL</b>	<b>21</b>

## EARTH AND ENVIRONMENTAL SCIENCES (EES)

### 124 Evolution of the Earth (3) (E)

Explores the physical, chemical, and biological events of earth history. Topics such as the origin of the earth, the birth of ocean basins, continents, and mountain ranges, the beginning of life in the oceans and on the continents, and patterns and causes of climate changes, continent shifting, and mass extinction are examined. Optional lab offered concurrently (EES 125). Offered spring of odd-numbered years.

### 125 Evolution of the Earth Lab (1)

Explores the major geologic events of earth history as recorded by geologic deposits and fossils. The course combines local geology field trips and indoor exercises,

including geologic map interpretation, to reconstruct the geologic history of areas such as Virginia Beach. The course is intended for either science or non-science majors and fulfills the laboratory requirements for students intending to graduate with honors. Prerequisite or corequisite: EES 124. Offered spring of odd-numbered years.

### **130 Physical Geology (3) (E)**

One of the most significant advances of the 20th century has been the recognition of earth as a dynamic and continually changing planet. This course explores the interior of the earth through the rock cycle and the unifying theory of plate tectonics. The causes and consequences of earthquakes and volcanic eruptions, the origin of mountain ranges, and the vastness of geologic time are topics addressed. Optional lab offered concurrently (EES 131). Offered each fall.

### **131 Physical Geology Lab (1)**

Explores the materials and processes of the physical earth. Activities include the basic identification of rocks and minerals, reading and interpretation of topographic and geologic maps, assessment of earthquake and volcanic hazards and geologic time. For either science or non-science majors. Prerequisite or corequisite: EES 130. Offered each fall.

### **132 Environmental Geology (3) (E)**

Investigates the interaction between people and the earth. This course acquaints students with the geologic origin, distribution, and exploitation of mineral, water, and energy resources. Issues surrounding the consequences, both good and bad, of human alteration of the environment are investigated with particular emphasis on those currently in the news. Optional lab offered concurrently (EES 133). Offered each spring.

### **133 Environmental Geology Lab (1)**

Explores the impact of humans on their physical environment and vice versa. Topics include recognition of earth materials, field and laboratory techniques of water and soil quality analysis, basic map reading and interpretation, geologic hazard assessment, and natural resource availability. Several labs utilizing Geographic Information Systems (GIS) are included. For either science or non-science majors. Prerequisite or corequisite: EES 132. Offered each spring.

### **200 Oceanography (4) (E)**

The world's oceans remain one of the least explored places on earth. Despite this reality, the science of oceanography has progressed rapidly in recent decades revealing that the oceans hold many clues to unravel the evolution of the planet earth. In this course, the geology of the ocean basins and the physical and chemical nature of seawater are explored. Topics studied include ocean waves, tides, and currents. Links between the oceans and the atmosphere are explored with special emphasis on the effect of oceans on climate, El Nino and climate change. Lecture three hours,

laboratory three hours each week. Designed for science and non-science majors. Prerequisite or corequisite: MATH 104 or 105. Offered each fall.

### **210 Meteorology (4) (E)**

An introduction to the atmosphere and the science behind weather phenomena such as clouds, hurricanes and tornadoes. Students practice weather forecasting, use meteorological instrumentation and analyze global meteorological datasets. Designed for science or non-science majors. Prerequisite or corequisite: MATH 104 or 105. Lecture three hours, laboratory three hours each week. Offered each spring.

### **220 Paleontology of Dinosaurs (4)**

A study of the diversity, morphology, and ecology of dinosaurs. Intended for science majors and non-majors who are interested in discovering the modern concepts surrounding the evolution, biology, and extinction of the dinosaurs. Lecture three hours, laboratory three hours each week. Offered spring of odd-numbered years.

### **250 Field Experiences in Earth and Environmental Sciences (3) (E)** (Winter Session)

Provides students with an intensive field experience in selected habitats. Studies will be conducted to examine various geological sites and sample particular habitats. May be repeated for credit as topics change. Does not fulfill the Natural Science requirement for Latin Honors. Lab fee. Offered in selected Winter Sessions or summers on demand.

### **270 Environmental Chemistry (4)**

An understanding of the chemistry of the natural world is vital to an understanding of earth processes, the fate of pollutants, and the proposal of solutions to environmental problems. Students explore the earth system and human perturbations to that system from a chemical perspective. Topics covered include ozone depletion, persistent organic pollutants, wastewater treatment, and toxicity of environmental contaminants. Laboratory exercises give students experience in environmental sampling and analysis. Identical to CHEM 270. Prerequisites: CHEM 117 and 118. Lecture three hours, laboratory three hours each week. Offered fall of odd-numbered years.

### **320 Energy and the Environment (3)**

An introduction to the fundamental physical concepts underlying energy, its conversion, and its impact on the environment. Topics include fossil fuels, nuclear-fueled power plants, renewable forms of energy, pollution, and energy conversion. Prerequisite: MATH 135. Offered fall of odd-numbered years.

### **330 Geology of Mountain Belts (4)**

An introduction to the disciplines of stratigraphy and structural geology focusing on mountain belts as case studies. Topics include 1) the observation, description and

interpretation of the sedimentary record; 2) the measurement and analysis of folds, faults and other features associated with tectonic uplift and 3) the tectonic history of the Appalachians. Prerequisites: EES 124/125 or EES 130/131 or consent. Lecture three hours, laboratory three hours each week. Includes at least two required field trips to key locations in the central Appalachians. Offered spring of even-numbered years.

### 340 Climatology (3)

**W**

An examination of the earth's climate system and the science of climate change. Concern over global warming has stimulated public discourse and motivated research on climatology. The importance of the climate system is not new; the earth's climate has always had a fundamental influence on human civilization and all life on earth. Topics covered include the dynamics and feedbacks of the climate system, ocean and biosphere influences on climate, reconstruction of past climate, predications of future climate, and human influences on global and regional weather patterns. Prerequisite: EES 200 or EES 210. Offered fall of even-numbered years.

### 410 Watershed Hydrology (3)

An introduction to the underlying theory and practical applications of water science at the watershed scale. Lectures include brief in-class exercises and problems that illustrate hydrologic principles. Prerequisites: MATH 135 and junior/senior status or consent. Offered spring of even-numbered years.

### 450 Global Environmental Cycles (4)

Explores the connections between the atmosphere, hydrosphere, lithosphere and biosphere through exploration of global cycling of nutrients and pollutants. We investigate these biogeochemical cycles through analysis of primary research articles, field measurements, chemical analysis and a self-designed research project. Prerequisite: junior/senior status and a major in the natural sciences. Lecture three hours, laboratory three hours each week. Identical to CHEM 450. Offered spring of odd-numbered years.

### 470 Internship in the Natural Sciences (3)

An intensive study of a particular field of science through on-site field experience. Internships involve hands-on opportunities in the sciences that are relevant to that particular site. Students are expected to devote a minimum of at least 120 hours for three semester hours, but some placements may require more time. Students must coordinate their internship placement with the supervising faculty member at least two months prior to placement. Pass/fail grading. Prerequisites: junior/senior status and consent. Offered each semester.

### 480 Seminar in Earth & Environmental Sciences (1)

An advanced seminar on various announced topics in earth and environmental sciences. Topics may include, but

are not limited to: conservation of biodiversity, risk assessment, the Chesapeake Bay, habitat restoration, environmental monitoring, biogeochemistry, environmental policy, and sustainable development. Prerequisite: junior/senior standing and consent. Offered each spring.

### 485 Earth and Environmental Science for Secondary School Teachers (1-4)

Provides in-service middle and high school earth science teachers with an intensive survey of an advanced topic in the earth or environmental sciences. Topics covered are tailored to the needs of the school district requesting the course and may include such topics as historical or structural geology, meteorology, oceanography or geographic information systems (GIS). The requirements for SOLs will strongly influence the selection of course material. Discussions include how to effectively convey the scientific information to students. Identical to GEOG 485. Prerequisite: consent. Offered on demand.

### 489 Research in the Natural Sciences (3)

Identical to BIO 489 and CHEM 489.

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## ECONOMICS

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(See Management, Business, and Economics)

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## EDUCATION/ SPECIAL EDUCATION/ ALTERNATE CERTIFICATION FOR TEACHERS

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DR. KAREN BOSCH, Director of Teacher Education  
MR. THOMAS R. FARLEY, Program Development

Coordinator for K-12; Alternate Certification for Teachers (ACT)

MS. GINGER L. FERRIS

DR. B. MALCOLM LIVELY

DR. JAYNE E. SULLIVAN

MRS. STACEY WOLLERTON, Director of Field Experiences

### Mission Statement

The Education Department is committed to providing prospective teachers with a broad-based, liberal arts-oriented education as well as the highest quality of disciplinary preparation in the content area fields and teaching methodology. Unique features of this program include early supervised field experiences usually beginning in the sophomore year, strong mentoring efforts by faculty and staff, and the development of area school partnerships through advisory committees and school division contacts.

### Admission to the Education Department

The professional education programs at Virginia Wesleyan College are periodically reviewed by the State Department of Education and have been designated by the State Board of Education as state approved. Students who