

REQUIREMENTS FOR THE BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCE

COLLEGE OF ENGINEERING THE UNIVERSITY OF OKLAHOMA

GENERAL REQUIREMENTS

Total Credit Hours 123•
Minimum Retention/Graduation Grade Point Averages:
 Overall - Combined and OU **2.00**
 Major - Combined and OU **2.00**
 Curriculum - Combined and OU **2.00**
 A minimum grade of C is required for each course in the curriculum.

Environmental Science

0922A
 Bachelor of Science in
 Environmental Science

For Students Entering the
 Oklahoma State System
 for Higher Education:
**Summer 2000 through
 Spring 2001**

Year	FIRST SEMESTER	Hours	SECOND SEMESTER	Hours
FRESHMAN	ENGL 1113 , Prin. of English Composition (Core I)	3	BOT 1114 , General Botany	4
	CHEM 1315 , General Chemistry (Core II)	5	ENGL 1213 , Prin. of English Composition (Core I)	3
	MATH 1823 , Calculus & Analytic Geometry I (Core I)	3	CHEM 1415 , General Chemistry	5
	HIST 1483 , U.S., 1492-1865, or	3	MATH 2423 , Calculus & Analytic Geometry II (Core I)	3
	1493 , U.S., 1865-Present (Core IV)	3	E S 2111 , Environmental Science Seminar	1
	E S 1112 , Intro. to Environmental Science	2		
	TOTAL CREDIT HOURS	16	TOTAL CREDIT HOURS	16
SOPHOMORE	CHEM 3053 , Organic Chemistry	3	CHEM 3153 , Organic Chemistry	3
	PHYS 2514 , Gen. Physics for Engineering & Science, or	4	PHYS 2524 , General Physics for Engineering & Science, or	4
	2414 , Gen. Physics for Life Sciences		2424 , Gen. Physics for Life Sciences	
	ZOO 1114 , Intro. Zoology (Core II)	4	P SC 1113 , American Federal Government (Core III)	3
	ZOO 1121 , Intro. Zoology Lab (Core II)	1	ZOO 3403 , Principles of Ecology, or	3
	E S 2313 , Environmental Science I	3	BOT 3453 , Principles of Plant Ecology	3
			E S 2323 , Environmental Science II	3
	TOTAL CREDIT HOURS	15	TOTAL CREDIT HOURS	16
JUNIOR	E S 3603 , Environmental Science III	3	E S 4493 , Environmental Eval. & Management	3
	ENGL 3153 , Technical Writing	3	E S 4863 , Environmental Impact Assessment	3
	MBIO 2815 , Introduction to Microbiology	5	‡E S Elective	3
	P SC 3233 , Environmental Policy & Administration	3	†Approved Elective: Non-Western Culture (Core IV)	3
	†Approved Elective: Western Civ. & Culture (Core IV)	3	E S Track Elective	3
	TOTAL CREDIT HOURS	17	TOTAL CREDIT HOURS	15
SENIOR	E S 4114 , Chemical Aspects of Envir. Science	4	E S 4905 , Environmental Science Capstone	5
	E S 4324 , Biological Aspects of Environmental Science	4	E S Track Elective	3
	‡E S Elective	3	E S Track Elective	3
	†Approved Elective: Artistic Forms (Core IV)	3	†Approved Elective: Social Science (Core III)	3
	TOTAL CREDIT HOURS	14	TOTAL CREDIT HOURS	14

Courses designated as Core I, II, III or IV are part of the General Education curriculum. Students must complete a minimum of 40 hours of General Education courses, chosen from the approved list.

† To be chosen from the University-Wide General Education Approved Course List. Six of these 12 hours must be upper-division (3000-4000). See list in the Class Schedule.

In the College of Engineering, in order to progress in your curriculum, and as a specific graduation requirement, a grade of C or better is required in each course in the curriculum. Please refer to the General Catalog for additional enrollment limitations.

Students should read the College of Engineering Scholastic Regulations which are posted on the Advising Bulletin Board across from CEC 104.

Students must successfully complete prerequisite courses (with a minimum C grade) before proceeding to the next course.

• Two college-level courses in a single foreign language are required; this may be satisfied by successful completion of 2 years in a single foreign language in high school. Students who must take foreign language at the University will have an additional 6-10 hours of coursework.

‡ The Environmental Science electives will be selected from Civil Engineering and Environmental Science courses with the approval of the adviser.

COURSES IN BOTANY (BOT)

1114 General Botany. Previous course in chemistry (high school or college) recommended. Fulfills Arts and Sciences' biological science requirement. Basic processes and structures in plants; their relation to factors in the environment; reproduction; heredity, heritable and nonheritable variations in plants and their causes and consequences are studied. Scientific procedures are acquired through application and discussion. **Laboratory** (F, Sp, Su)

†G3453 Principles of Plant Ecology. Prerequisite: 3534 or equivalent. Introduction to physiological, population and community ecology. Emphasis is placed on environmental factors, disturbance and succession and how these factors affect species diversity and landscape patterns. One optional field trip. (F)

COURSES IN CHEMISTRY AND BIOCHEMISTRY (CHEM)

1315 General Chemistry. Prerequisite: Mathematics 1503 or 1643, or math ACT equal to or greater than 23. First of a two-semester sequence in general chemistry. Topics covered: basic measurement, gas laws and changes in state, stoichiometry, atomic theory, electron configuration, periodicity, bonding, molecular structure and thermochemistry. **Laboratory** (F, Sp, Su)

1415 General Chemistry (Continued). Prerequisite: 1315 with a minimum grade of C or a satisfactory score on the chemistry placement examination. Topics covered include: nature of solutions, equilibrium, thermodynamics, acid and base properties, kinetics and electrochemistry. **Laboratory** (F, Sp, Su)

3053 Organic Chemistry. Prerequisite: 1415 or 1425. Two-semester sequence (3053 and 3153) covering the fundamental concepts of organic structure and reactions of the principal functional groups. Reaction mechanisms. (F, Sp, Su)

3153 Organic Chemistry. Prerequisite: 3053 or 3013 and permission. Two-semester sequence (3053 and 3153) covering the fundamental concepts of organic structure and reactions of the principal functional groups. Reaction mechanisms. (F, Sp, Su)

COURSES IN ENVIRONMENTAL SCIENCE (E S)

1112 Introduction to Environmental Science. Prerequisite: permission of instructor. Intended for Environmental Science majors. Designed to develop necessary skills and tools for sound scientific discourse in environmental science studies. Introduction to accessing E S information located in libraries, computer databases, and Web sites will be addressed. Also includes the development of communications, reasoning, writing and computer skills in a variety of activities which include lectures, group discussions, field trips, and computer labs. (F)

2111 Environmental Science Seminar. Prerequisite: 1112. Continuation of 1112. Strong emphasis on presentation skills of scientific materials. Seminars by guest speakers and E S faculty. (Sp)

2313 Environmental Science I. Prerequisite: 2111. Survey of various types of environments (air, water, land, urban, rural, occupational); sources, levels and effects of pollution in these environments; environmental quality criteria. (F)

2323 Environmental Science II. Prerequisite: 2313. Environmental movements; interactions and transfers; movement of specific pollutants; environmental impact and assessments. (Sp)

3603 Environmental Science III. Prerequisite: 2323. Environmental health, toxicology and risk assessment, human population growth and associated environmental problems, drinking water collection, treatment and disinfection, occupational health. (F)

4114 Chemical Aspects of Environmental Science (Crosslisted with Civil Engineering 4114). Prerequisite: senior standing and one year of general chemistry. Soil, water, and air pollution chemistry; measurements, sampling and statistics; and analysis of volatiles, metals, and anions. **Laboratory** (Sp)

4324 Biological Aspects of Environmental Science (Slashlisted with 5324). Prerequisite: senior standing in Environmental Science. Examines applied environmental biology; biological consequences of environmental impacts; mitigation of environmental impacts via biogeochemical, ecological and microbial processes. Topics include anthropogenic and natural pollutants, invasive species, habitat alteration; bioaccumulation, biochemical disruption, disease, transgenic organisms; bioassays, toxicity testing, bioremediation, natural attenuation, phytoremediation, ecological rehabilitation, restoration and creation; ecological engineering. No student may earn credit for both 4324 and 5324. **Laboratory** (F)

4493 Environmental Evaluation and Management (Slashlisted with 5493). Prerequisite: senior standing. Broad overview of natural resources management with attention to techniques used in decision making and analysis. Class discussion and readings include a review of measures used to value natural systems (e.g. benefit cost analysis) and the role of private and public institutions in management. No student may earn credit for both 4493 and 5493.

4905 Environmental Science Capstone. Prerequisite: 4114, 4324. Capstone course addressing real-world environmental problems and requiring the application of principles from various subdisciplines of environmental science. Students work in multidisciplinary teams and are evaluated by practicing environmental professionals. (Sp)

COURSES IN MATHEMATICS (MATH)

1823 Calculus and Analytic Geometry I. Prerequisite: 1523 at OU, or satisfactory score on the placement test, or satisfactory score on the ACT/SAT. Topics covered include equations of straight lines; conic sections; functions, limits and continuity; differentiation; maximum-minimum theory and curve sketching. A student may not receive credit for this course and 1743. (F, Sp, Su)

2423 Calculus and Analytic Geometry II. Prerequisite: 1823. Integration and its applications; the calculus of transcendental functions; techniques of integration; and the introduction to differential equations. A student may not receive credit for this course and 2123. (F, Sp, Su)

COURSES IN MICROBIOLOGY (MBIO)

2815 Introduction to Microbiology. Prerequisite: one course in college chemistry. Introduction to microorganisms as biological entities. Survey of the roles of microorganisms in the ecosystem. Application of microorganisms to industrial and environmental problems. Discussion of microorganisms as causes of human disease and response of hosts to microbial invasion. This course does not count for major credit in Microbiology or Botany. **Laboratory** (F, Sp, Su)

COURSES IN PHYSICS (PHYS)

2414 General Physics for Life Science Oriented Majors. Prerequisite: Mathematics 1523 or 1743. Not open to students with credit in 1205 or 2514. Kinematics and dynamics of particles and rigid bodies, gravitation, equilibrium, momentum, energy, static and flowing fluids, kinetic theory, heat and thermodynamics, vibrations, waves and sound. (F, Sp, Su)

2424 General Physics for Life Science Oriented Majors. Prerequisite: 2414. Not open to students with credit in 1215 or 2524. Electric charge, electric field, electric potential, energy, DC and AC currents, magnetic fields, electromagnetic induction, geometrical optics, wave nature of light, optical instruments, early quantum theory, models of the atom, the nucleus, radioactivity, nuclear reactions and nuclear energy. (F, Sp, Su)

2514 General Physics for Engineering and Science Majors. Prerequisite: Mathematics 1823. Not open to students with credit in 1205. Vectors, kinematics and dynamics of particles, work and energy systems of particles, rotational kinematics and dynamics, oscillations, gravitation, fluid mechanics, waves. (F, Sp, Su)

2524 General Physics for Engineering and Science Majors. Prerequisite: 2514 and Mathematics 2423. Not open to students with credit in 1215. Temperature, heat, thermodynamics, electricity, magnetism, optics. (F, Sp, Su)

COURSES IN ZOOLOGY (ZOO)

1114 Introductory Zoology. Major biological principles and concepts as illustrated in the structure, function and evolution of animals. Emphasis is on self-regulatory mechanisms, especially in the vertebrates, and their adaptive significance. (F, Sp, Su)

1121 Introductory Zoology Laboratory. Prerequisite: previous completion or concurrent enrollment in 1114. Laboratory study of structure and development of organ systems. Experiments on physiological process of selected vertebrates and invertebrates. (F, Sp, Su)

†G3403 Principles of Ecology. Prerequisite: eight hours of zoology. Patterns of environments and biological communities; the processes maintaining these patterns. **Laboratory** (Sp)