E S-ENVIRONMENTAL SCIENCE (E S)

E S 110G. Introductory Environmental Science
4 Credits (3+2P)
Introduction to environmental science as related to the protection, remediation, and sustainability of land, air, water, and food resources. Emphasis on the use of the scientific method and critical thinking skills in understanding environmental issues.

E S 256. Environmental Engineering and Science
3 Credits
Principles in environmental engineering and science: physical chemical systems and biological processes as applied to pollution control. Restricted to: Main campus, Alamogordo campus, Grants campus, Carlsbad campus. Crosslisted with: C E 256
Prerequisite(s): CHEM 111G and MATH 191G.

E S 256 L. Environmental Science Laboratory
1 Credit
Laboratory experiments associated with the material presented in E S 256. Same as C E 256L.
Corequisite: E S 256.

E S 300. Special Topics
1-4 Credits
Special subjects and credits to be announced in the Schedule of Classes. Consent of instructor required. Maximum of 4 credits per semester. Restricted to majors.

E S 301. Principles of Ecology
3 Credits
A survey of ecology including general theory, the adaptations of organisms, population dynamics, species interactions, and the structure and function of natural communities and ecosystems. Crosslisted with: BIOL 301
Prerequisite(s): BIOL 111G, A ST 311, and grade of C or better in MATH 191G or Math Placement Exam score adequate to enroll in mathematics courses beyond MATH 191G.

E S 312. Emergency Response to Hazardous Material Incidents
2 Credits
EPA approved Environmental Response Training Program Course 165.15. In compliance with OSHA 29 CFR 1910.120. Normally taken during last year of study. Same as E T 312 and WERC 312.
Prerequisite: consent of instructor.

E S 330. Environmental Management Seminar I
1 Credit

E S 361. Basic Toxicology
3 Credits
BIOL 110G or BIOL 190 recommended. Same as TOX 361.
Prerequisite: CHEM 110G, CHEM 112G, or CHEM 114.

E S 370. Environmental Soil Science
3 Credits
Continuation of SOIL 252 that emphasizes soil properties and processes that directly relate to environmental pollution problems. Same as SOIL 370.
Prerequisite: SOIL 252.

E S 391. Internship
3 Credits
Professional work experience under the joint supervision of the employer and a faculty member. A written report is required. Maximum of 3 credits toward a degree. Consent of instructor required. S/U Grading (S/U, Audit).

E S 422. Environmental Chemistry
3 Credits
Chemistry of organic and metal ion pollutants in the environment and principles important to their remediation including bioremediation. Restricted to: Main campus only. Crosslisted with: CHEM 422
Prerequisite(s): CHEM 112G and either CHEM 211 or CHEM 313.

E S 423. Environmental Toxicology
3 Credits
Toxicological tests required by the EPA to determine human and environmental safety of pesticides and industrial pollutants; discussion of environmental fate of major pesticide classes and industrial pollutants. Crosslisted with: TOX 423
Prerequisite(s): TOX 361 or TOX 461.

E S 430. Environmental Management Seminar II
1 Credit
Survey of practical and new developments in environmental management field, hazardous and radioactive, waste management, and related health issues, provided through a series of guest lectures and reports of ongoing research. Restricted to: Main campus only. Crosslisted with: C E 430, CH E 430, E E 430, E T 430, I E 430 and WERC 430

E S 434. Aquatic Contaminants and Toxicology
4 Credits
Basic principles and methodologies of aquatic toxicity testing. Routes of exposure and modes of action. Environmental legislation and ecological risk assessment. Crosslisted with: WLSC 434
Prerequisite(s): Senior standing or consent of instructor.

E S 449. Special Problems
1-3 Credits
Research problem, experience training, or other special study approved by a faculty adviser. Maximum of 3 credits per semester and 6 credits toward a degree. May be repeated up to 6 credits. Consent of instructor required. Restricted to: E S majors.

E S 451. Special Topics
1-4 Credits (1-4)
Specific subjects and credits to be announced in the Schedule of Classes. Maximum of 4 credits per semester and a total of 9 credits toward a degree. May be repeated up to 9 credits. Consent of Instructor required.

E S 452. Geohydrology
4 Credits (3+2P)
Origin, occurrence, and movement of fluids in porous media and assessment of aquifer characteristics. Development and conservation of ground water resources, design of well fields. Crosslisted with: C E 452 and GEOL 452.
Prerequisite(s): Junior or Senior.
E S 459. Aquatic Ecology
4 Credits
Ecological functions of plant and animal communities in aquatic ecosystems with emphasis on chemical and physical properties, productivity, species interactions, population dynamics, and concepts for diagnosing problems and restoring aquatic ecosystems. Crosslisted with: WLSC 459
Prerequisite(s): (E S, WLSC or BIOL 301), CHEM 112G, (MATH 142G or MATH 191G).

E S 460. Introduction to Air Pollution
3 Credits
An introduction to the physics and chemistry of tropospheric air pollution including sources of air pollution, local and long-range transport, instrumentation, regulatory requirements, control technology.
Prerequisite(s): PHYS 215G, CHEM 112G, MATH 191G.

E S 462. Sampling and Analysis of Environmental Contaminants
3 Credits (1+6P)
Theory, application, methodology, and instrumentation used in the sampling and analysis of environmental contaminants. Same as ENVE 462.
Prerequisites: E S 256.

E S 470. Environmental Impacts of Land Use and Contaminant Remediation
3 Credits
The course will cover the integrated assessment of soil erosion, contaminant transport in soil and water, and contaminant remediation from site scale to watershed scales. Understanding of the controlling factors for each type land use impact will be gained through the use of risk assessment, case studies, and computer modeling. Case studies will illustrate the processes under various environmental applications. This course will also cover the application of solute transport principles and methods for the remediation of contaminated soil and groundwater. It will also discuss the contaminated site characterization, monitoring, and remediation design. Discussions of innovative methodologies will be supported with case studies. Crosslisted with: WSAM 470.
Prerequisite(s): E S 256, E S 462, E S 370.

E S 485. Materials from Biorenewable Resources
3 Credits
Types, sources, composition and properties of biomass. Production, processing, and applications of biomass materials with energy, water, cost, sustainability, and waste management considerations. Crosslisted with: AGRO 485, HORT 486, SOIL 485 and CHME 485.
Prerequisite(s): CHEM 211 or CHEM 313 or permission of instructor.

E S 596. Masters Proposal
1 Credit
Current research proposal written by masters level graduate students. Consent of Instructor required. Crosslisted with: AGRO 596, GENE 596, HORT 596 and SOIL 596. Restricted to: Masters HORT; Masters PLEN majors.
Prerequisite(s): Master level graduate students.

E S 599. Master's Thesis
1-15 Credits