Undergraduate Environmental Engineering Courses

ENVE 2251. Fundamentals of GIS for Engineers. 2 Credit Hours (Lecture: 1 Hour, Lab: 3 Hours).
This course offers an introduction to methods of managing and processing geographic information. Basic principles of geographic information systems and their use in spatial analysis and information management are introduced. Students gain experience with cutting-edge geospatial technologies and an understanding of their capabilities. Application in engineering is emphasized. Lab fee: $2.

ENVE 2310. Introduction to Environmental Engineering. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).
Introduction to environmental and occupational health, atmospheric systems and air pollution control, hazardous waste management, solid waste management, waste water management, and water supply treatment. Prerequisites: CHEM 1409 or CHEM 1312 and 1112.

ENVE 2311. Soil Mechanics. 3 Credit Hours (Lecture: 3 Hours, Lab: 2 Hours).
Introduction to the principles of soil and their influence on the hydrological cycle, Darcy's law and fluid flow through porous medium, stress distribution and consolidation of soil, subsurface exploration. Prerequisite: MATH 2413; PHYS 2425 or concurrent enrollment Lab fee: $2.

ENVE 3300. Fluid Mechanics. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).
Principles of hydrostatics, dynamics of viscous and inviscid non-viscous fluids, resistance to flow in pipes and open channels, transport processes, energy equation, Bernoulli equation, conservation of mass, conservation of momentum, pump characteristics, similitude, dimensional analysis. Includes an introduction to computational analysis of fluid flow and pressure distributions and laboratory experiences. Prerequisites: PHYS 2425 and MATH 2414.

ENVE 3301. Environmental Systems Modeling. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).
Apply conceptual and numerical techniques to model environmental systems. Use differential equations to describe processes. Prerequisites: MATH 3306 or concurrent registration, ENVE 2310.

ENVE 3310. Engineering Hydrology. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours). [WI (https://catalog.tarleton.edu/academicaffairs/)]
Study of the hydrologic cycle, precipitation processes, soil moisture, infiltration, groundwater, rainfall-runoff processes, utilization of water resources, and frequency analysis; introduction to HEC-HMS programs for modeling hydrologic processes, elementary principles of field work. Prerequisite: ENVE 3300.

ENVE 3333. Groundwater Contamination and Remediation. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).
This course is an introduction to the fundamentals of subsurface flow with emphasis on the examination of the fate and transport of inorganic and organic contaminants therein and their management. Topics include groundwater flow and well hydraulics, modeling of contaminant transport processes, site investigations, natural attenuation, remediation and legal issues in groundwater protection. Prerequisite: ENVE 3310; MATH 3306 or concurrent registration.

ENVE 3340. Environmental Risk Assessment. 3 Credit Hours (Lecture: 3 Hours, Lab: 2 Hours).
Introduction to the fundamentals of environmental and ecological risk assessment, including toxicity assessment, characterizing fate and transport processes in various environmental media, evaluating exposure pathways, dose-response assessment and modeling uncertainty. Prerequisites: ENVE 2310 and ENGR 3311 Lab fee: $2.

ENVE 3401. Environmental Systems Modeling. 4 Credit Hours (Lecture: 3 Hours, Lab: 3 Hours).
Apply conceptual and numerical techniques to model environmental systems. Use differential equations to describe processes. Prerequisites: MATH 3306 and ENVE 2310. Lab fee: $2.

ENVE 3420. Groundwater Hydrology. 4 Credit Hours (Lecture: 3 Hours, Lab: 3 Hours).
Topics include aquifer characteristics, infiltration, fluid dynamics of groundwater flow, potential flows, well analysis, water quality, groundwater pollution, legal issues in groundwater. Credit for both HYDR 320 and ENVE 320 will not be awarded. Prerequisites: ENVE 2411, GEOL 1403 or ENVE 2310, CHEM 1312 and 1112, MATH 2414. Lab fee: $2.

ENVE 3450. Environmental Biotechnology. 4 Credit Hours (Lecture: 3 Hours, Lab: 3 Hours).
Application of fundamental principles of aquatic chemistry, molecular biology and biochemistry to understand and analyze complex chemical/biological processes in environmental engineering (natural and engineered systems). Prerequisites: CHEM 1409 or CHEM 1312 and 1112, MATH 2414, ENVE 2310 Lab fee: $2.

ENVE 3350. Environmental Biotechnology. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).
Application of fundamental principles of aquatic chemistry, molecular biology and biochemistry to understand and analyze complex chemical/biological processes in environmental engineering (natural and engineered systems). Prerequisites: CHEM 1409 or CHEM 1312 and 1112; MATH 2414; ENVE 2310.

ENVE 4086. Special Problems. 1-4 Credit Hours (Lecture: 1-4 Hours, Lab: 0 Hours).
Directed study of selected topics in Environmental Engineering. May be repeated with approval of department head.

ENVE 4220. Environmental Lab. 2 Credit Hours (Lecture: 1 Hour, Lab: 2 Hours).
This course provides an understanding of theoretical concepts in conjunction with practical experimental approaches, skills and techniques pertinent to environmental engineering, water and waste water treatment methods and water quality analysis. Laboratory methods and interpretation of results will be focused. Prerequisite: ENVE 3301 or concurrent registration; ENVE 2310 Lab Fee: $2.

ENVE 4225. Environmental Monitoring and Measurements. 2 Credit Hours (Lecture: 1 Hour, Lab: 3 Hours).
Studying and analyzing environmental engineering processes and systems through appropriate experimental methods. The course will include sampling, protocol development and design of experiments, relevant measurement techniques and experimental methods. Emphasis on quality control, calibration, documentation and interpretation of results facilitating the development of best practice approaches for experimental design and analysis. Prerequisite: ENVE 3350 (coreq); ENVE 4320 (coreq) Lab Fee: $2.

ENVE 4302. Atmospheric Systems and Air Pollution Control. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).
Study of atmospheric impact on air pollution. Study of sources of air pollution and their control to include gases and particulate matter. Study of air pollution regulations and air pollution modeling. Design of systems to control and abate air pollution. Study and design of sampling systems to monitor air pollution. Prerequisite: CHEM 1409, ENGR 2322.

ENVE 4310. Water Resources Engineering. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours). [WI (https://catalog.tarleton.edu/academicaffairs/)]
Fundamentals of hydraulics applicable to open channel flow, natural streams and waterways; irrigation flow characteristics; hydrologic analysis; fluid measurement methods; introduction to hydraulic models including HEC-RAS; and economic aspects of water resources. Prerequisite: ENVE 3300.

ENVE 4319. Physical Operations in Water and Wastewater Treatment. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).
Physical operations in water and wastewater treatment are covered in this course. These include the design of lift stations and gravity sewers, screens, sedimentation tanks, clarifiers and holding basins. Prerequisite: ENVE 3300.

ENVE 4320. Chemical and Biological Processes in Water and Wastewater Treatment. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).
This course covers processes associated with water and wastewater treatment that are mediated chemically or using biological means as well as the design of systems that use such mechanisms. Design of secondary treatment systems, removal of nutrients and design of tertiary treatment systems are covered. Prerequisites: CHEM 2323 (coreq); ENVE 3350 (coreq).

ENVE 4325. Environmental Monitoring and Measurements. 3 Credit Hours (Lecture: 1 Hour, Lab: 3 Hours).
Studying and analyzing environmental engineering processes and systems through appropriate experimental methods. The course will include sampling, protocol development and design of experiments, relevant measurement techniques and experimental methods. Emphasis on quality control, calibration, documentation and interpretation of results facilitating the development of best practice approaches for experimental design and analysis. Prerequisite: ENVE 3350 (coreq); ENVE 4320 (coreq) Lab fee: $2.

ENVE 4330. Texas Water Resource Management. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours). [WI (https://catalog.tarleton.edu/academicaffairs/)]
The ecological relation of water in this biosphere with special reference to the human role; the role of behavioral sciences (social, legal, economic, political, and psychological) in the development, conservation, regulation, and utilization of water resources; current political structure and laws pertaining to the administration of water resources in the state of Texas. Prerequisites: ENVE 3310 and GOVT 2306.

ENVE 4350. Solid and Hazardous Waste Management. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).
This course is designed to provide students with the necessary background and knowledge pertaining to the engineering design of solid and hazardous waste management and disposal. Topics covered include landfill design, resource conservation recovery and reuse, hazardous waste management. Prerequisites: CHEM 1409 or CHEM 1312 and 1112, and ENVE 2310.

ENVE 4420. Water and Waste Water Treatment. 4 Credit Hours (Lecture: 3 Hours, Lab: 3 Hours).
Treatment and distribution of residential and industrial water supplies, waste water treatment and disposal methods of municipal and industrial systems, environmental toxicology; aspects of groundwater monitoring and water quality maintenance. Laboratory analysis of water and waste water quality. Design of elementary treatment, distribution, and collection systems. Prerequisites: CHEM 2423 or both CHEM 2323 and CHEM 2123, ENVE 2310, and ENVE 3300 Lab fee: $2.