

# ENVIRONMENTAL ENGINEERING (ENVE)

---

## **ENVE 5020. Independent Graduate Study in Environmental Engineering. (1-6 Credits)**

Special problems in environmental engineering as arranged by the student with a supervisory instructor of his or her choice.

May be repeated for a total of 12 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205020>)

## **ENVE 5090. Advanced Topics in Environmental Engineering. (1-3 Credits)**

Classroom or laboratory courses as announced for each semester.

May be repeated for a total of 12 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205090>)

## **ENVE 5094. Seminar in Environmental Sciences and Engineering. (0 Credits)**

Extended discussions on presentations contributed by staff, students and outside speakers. A certificate of completion will be issued from the Environmental Engineering Program.

May be repeated for a total of 12 credits

**Grading Basis:** Registered

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205094>)

## **ENVE 5110. Brownfield Redevelopment. (3 Credits)**

Interdisciplinary study of the process of investigating, cleaning up and putting back into use abandoned sites with suspected contamination, also known as brownfields. Legal, environmental, financial and social aspects are discussed. Service learning component working with communities on local brownfield sites.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205110>)

## **ENVE 5210. Environmental Engineering Chemistry - I. (3 Credits)**

(Also offered as CE 5210.) Quantitative treatment of chemical behavior in environmental systems. Thermodynamics and kinetics of acid/base, complexation, precipitation/dissolution, sorption and redox reactions; degradation and partitioning of organic contaminants; software for speciation and partitioning computation.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205210>)

## **ENVE 5240. Biodegradation and Bioremediation. (3 Credits)**

Biochemical basis of the transformation of key organic and inorganic pollutants; quantitative description of kinetics and thermodynamics of pollutant transformation; impact of physiochemical and ecological factors on biotransformation.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205240>)

## **ENVE 5252. Environmental Remediation. (3 Credits)**

Regulatory framework. Soil clean-up criteria. Risk analysis. In situ and ex situ Treatment technologies: chemical oxidation, chemical reduction, pump-and-treat, permeable reactive barriers, solidification, stabilization, thermal processes, bioremediation.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205252>)

## **ENVE 5310. Environmental Transport Phenomena. (3 Credits)**

Development and solutions of partial differential equations describing diffusion, advection, and sources/sinks common to transport of mass, energy, and momentum. Mass sources/sinks used to describe sorption and chemical reaction. Extension to dispersion and turbulent mixing.

Applications to predicting the movement of environmental contaminants.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205310>)

## **ENVE 5311. Environmental Biochemical Processes. (3 Credits)**

Major biochemical reactions; stoichiometric and kinetic description; suspended and attached growth modeling; engineered biotreatment systems for contaminant removal from aqueous, gaseous, and solid streams; process design.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205311>)

## **ENVE 5320. Quantitative Methods for Engineers. (3 Credits)**

Topics on data analysis: random variables and probability distributions, parameter estimation and hypothesis testing, simple and multiple regression; Monte Carlo simulation; autoregression and models for time series; analytical solutions of ordinary and partial differential equations; Fourier series; numerical solutions of ordinary differential equations; solution of partial differential equations with finite differences; basics of modeling.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205320>)

## **ENVE 5330. Probabilistic Methods in Engineering Systems. (3 Credits)**

Common probabilistic models used in engineering and physical science design, prediction, and operation problems; derived distributions, multivariate stochastic models, and estimation of model parameters; analysis of data, model building and hypothesis testing; uncertainty analysis.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205330>)

## **ENVE 5331. Predictive Analytics for Scientists and Engineers. (3 Credits)**

Topics include exploratory data analysis, clustering, dimensionality reduction, classification and regression models, text mining, geospatial data processing and more. Individual in-depth data analysis projects. Some background in programming and statistics desired.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205331>)

## **ENVE 5530. Environmental Site Investigations. (3 Credits)**

Technical and Regulatory Framework for the investigation of potentially contaminated sites; basic geochemistry and hydrogeology principles; design of soil and groundwater investigations; human and ecological risk assessment; data analysis; principles of hazardous waste management at contaminated sites.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205530>)

**ENVE 5540. Design of Groundwater Systems. (3 Credits)**

Design of groundwater engineering systems used for water supply and/or preservation/improvement of water quality. Steady and transient flow, pumping tests, well hydraulics, and well-field design. Unsaturated zone hydrology, design and evaluation of landfills. Heterogeneity in natural systems, parameter estimation and inverse methods. Application of basic geostatistics in the design of groundwater systems.

**Enrollment Requirements:** Not open for credit to students who have passed ENVE 4540.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205540>)

**ENVE 5810. Hydrometeorology. (3 Credits)**

Global dynamics of aquatic distribution and circulation. Hydrologic cycle, atmospheric circulation, precipitation, interception, storage, infiltration, overland flow, distributed hydrologic modeling, and stream routing.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205810>)

**ENVE 5811. Hydroclimatology. (3 Credits)**

Focuses on the physical principles underlying the spatial and temporal variability of hydrological processes. Topics include atmospheric physics and dynamics controlling the water/energy budgets; global water cycle, its dynamics, and causes of variability/changes; occurrence of drought and flood; climate teleconnections and their hydrological application; hydrological impact of global changes; quantitative methods in hydroclimatic analysis.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205811>)

**ENVE 5821. Vadose Zone Hydrology. (3 Credits)**

Theoretical and experimental elements of primary physical and hydrological properties of porous media and processes occurring in partially-saturated soils. Practical experience in measurement and interpretation of hydrological information and methods of analysis for vadose-zone related environmental problems.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205821>)

**ENVE 5830. Groundwater Flow Modeling. (3 Credits)**

Basics of modeling with Finite Difference and Finite Element Methods. Modeling flow in saturated and unsaturated zones. Model calibration and validation. Parameter estimation. Treatment of heterogeneity. Basic geostatistics. Modeling surface-groundwater interactions. Application to field sites.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%205830>)

**ENVE 6920. Doctoral Teaching Practicum. (0-3 Credits)**

(Also offered as CE 6920.) Offered by special arrangement. Practical experience in classroom teaching with mentoring from a member of the graduate faculty.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=ENVE%206920>)