

CHEMICAL, ENVIRONMENTAL AND MATERIALS ENGINEERING (CET)

CET 240. Environmental Quality Control. 3 Credit Hours.

Exploration of contemporary environmental issues. Introduction to engineering approaches for protecting and cleaning up the environment, techniques for assessing the impact of human activity on the environment, strategies for pollution control and implementation of environmental mitigation measures. Not open to civil or environmental engineering majors.

Requisite: Sophomore Standing or Higher.

Components: LEC.

Grading: GRD.

Typically Offered: Spring.

CET 330. Fluid Mechanics. 3 Credit Hours.

Properties of fluids, gas systems, pressure distribution in static fluids, and hydrostatic forces on plane and curved surfaces are discussed. Kinematics and dynamics of fluid motion, dimensional analysis and similitude, flow in closed conduits, pumps, design of water distribution systems, and an introduction to flow in open channels is also included.

Prerequisite: CAE 210 and PHY 222.

Components: LEC.

Grading: GRD.

Typically Offered: Fall & Spring.

CET 340. Introduction to Environmental Engineering. 3 Credit Hours.

Environmental mass and energy balances, introduction to environmental chemistry, air pollution, water pollution, sustainable solid waste management, risk assessment, and global atmospheric change are discussed.

Prerequisites: MTH 162 or MTH 172, and CHM 121 or CHM 151.

Components: LEC.

Grading: GRD.

Typically Offered: Spring.

CET 345. Environmental Laboratory and Analysis. 3 Credit Hours.

Laboratory-based course focusing on the analysis of environmental samples including water, wastewater, air, and solids. Basic analytical techniques and quality control are also included as well as an introduction to advanced analytical measurements.

Prerequisite: CHM 121 and CET 340.

Components: LEC.

Grading: GRD.

Typically Offered: Fall.

CET 395. Undergraduate Research. 1-3 Credit Hours.

This course allows undergraduate students to engage in research (experimental and/or computational) dealing with an ongoing research topic in the environmental engineering field.

Components: RSC.

Grading: GRD.

Typically Offered: Fall, Spring, & Summer.

CET 403. Senior Design Project I - Engineering Design. 3 Credit Hours.

A two semester comprehensive design project applying the knowledge acquired during earlier coursework and implementing the pedagogy of life-long learning. Team projects incorporate interdisciplinary design skills, engineering standards and realistic constraints. The faculty coordinator working with practicing design professionals provide consultation, guidance and recommendations on aspects such as problem definition, evaluation of design alternatives and approaches. The course progresses along the customary design sequence of pre-design, schematic design and design development phases established in Civil, Architectural and Environmental Engineering practice.

Components: LEC.

Grading: GRD.

Typically Offered: Fall.

CET 404. Senior Design Project II – Integrated Engineering Documents. 3 Credit Hours.

The second semester of a two semester comprehensive design project applying the knowledge acquired during earlier coursework and implementing the pedagogy of life-long learning. Team projects incorporating interdisciplinary design skills, engineering standards and realistic constraints. The faculty coordinator working with several practicing design professionals provide consultation, guidance, and recommendations on aspects of preparing the construction documents required for project procurement and construction. Using the designs produced in CET 403 the course develops the drawings, specifications and calculations required for a comprehensive construction documents package.

Prerequisite: CET 403.

Components: LEC.

Grading: GRD.

Typically Offered: Spring.

CET 430. Water-Resources Engineering I. 3 Credit Hours.

Basic principles of open channel flow. Computation of water surface profiles. Design of hydraulic structures, design of lined and unlined open channels, and design of sanitary sewer systems. Introduction to hydrology and analysis of hydrologic data. Rainfall characteristics and peak runoff models.

Prerequisite: CET 330.

Components: LEC.

Grading: GRD.

Typically Offered: Spring.

CET 440. Water Quality Control Systems. 3 Credit Hours.

Physical, Chemical and Biological Transformations; Water and Wastewater Treatment Processes; Water Treatment Plant Design; Wastewater Treatment Plant Design; Case Studies

Prerequisite: CET 330 or CAE 330 and CET 340.

Components: LEC.

Grading: GRD.

Typically Offered: Spring.

CET 530. Water Resources Engineering II. 3 Credit Hours.

Runoff models, routing models, water-quality models, and evapotranspiration models. Design of storm water management systems. Principles of groundwater flow. Design of wells and wellfields for public water supply. Legal regulatory, and economic components of water-resources management systems. Comprehensive design project.

Prerequisite: CET 430.

Components: LEC.

Grading: GRD.

Typically Offered: Fall.

CET 533. Water-Quality Control in Natural Systems. 3 Credit Hours.

Water quality regulations, fate and transport processes, water-quality control in rivers, lakes, wetlands, oceans, and ground water.

Pre or Corequisite: CAE 430. And CAE 440.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 540. Environmental Chemistry. 3 Credit Hours.

Kinetics, equilibrium, acid-base, oxidation-reduction, and reaction chemistry applied to water and wastewater engineering.

Prerequisite: CHM 121.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 541. Environmental Engineering Microbiology. 3 Credit Hours.

Classification of microorganisms. Microbial agents of infectious diseases and modes of disease transmission. Control of pathogens through water and waste treatment, food protection, and insect control. Microbial ecology and bioremediation systems. Laboratory exercises in microbiology.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 542. Solid and Hazardous Waste Engineering. 3 Credit Hours.

Solid-waste characteristics, recycling, incineration, hazardous waste characteristics, prevention, and physical and chemical treatment are covered. Design projects are also included.

Prerequisite: CET 340.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 543. Air Pollution Control Engineering. 3 Credit Hours.

Fundamentals of air pollution and air quality; properties and control of particulates, volatile organic compounds, carbon monoxide, sulfur oxides, and nitrogen oxides; motor vehicle emissions; health and aesthetic effects (acid rain, visibility), laws and regulations, meteorology and pollutant transport in the atmosphere; indoor air pollution.

Prerequisite: MAE 303 and (CET 330 or CAE 330 or MAE 309).

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 590. Special Topics. 1-3 Credit Hours.

A course that does not have an established course number. Usually a one-time course offering or an experimental course prior to assigning a formal course number.

Components: LEC.

Grading: GRD.

Typically Offered: Fall, Spring, & Summer.

CET 595. Special Problems. 1-3 Credit Hours.

Project course introducing methods of research through an individual investigation of current problems. Offered by special arrangement only.

Components: RSC.

Grading: GRD.

Typically Offered: Fall, Spring, & Summer.

CET 605. Master's Project. 3 Credit Hours.

Project in Chemical, Environmental or Materials Engineering. Course is an option for the non-thesis master's student.

Components: IND.

Grading: GRD.

Typically Offered: Fall, Spring, & Summer.

CET 630. Water Resources Engineering II. 3 Credit Hours.

Runoff models, routing models, water-quality models, and evapotranspiration models. Design of storm water management systems. Principles of groundwater flow. Design of wells and wellfields for public water supply. Legal regulatory, and economic components of water-resources management systems. Comprehensive design project.

Prerequisite: CET 430.

Components: LEC.

Grading: GRD.

Typically Offered: Fall.

CET 633. Water-Quality Control in Natural Systems. 3 Credit Hours.

Water quality regulations, fate and transport processes, water-quality control in rivers, lakes, wetlands, oceans, and ground water.

Pre or Corequisite: CET 430 and CET 440.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 640. Environmental Chemistry. 3 Credit Hours.

Kinetics, equilibrium, acid-base, oxidation-reduction, and reaction chemistry applied to water and wastewater engineering.

Prerequisite: CHM 121.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 641. Environmental Engineering Microbiology. 3 Credit Hours.

Classification of microorganisms. Microbial agents of infectious diseases and modes of disease transmission. Control of pathogens through water and waste treatment, food protection, and insect control. Microbial ecology and bioremediation systems. Laboratory exercises in microbiology.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 642. Solid and Hazardous Waste Engineering. 3 Credit Hours.

Solid-waste characteristics, recycling, incineration, hazardous waste characteristics, prevention, and physical and chemical treatment are covered. Design projects are also included.

Prerequisite: CET 340.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 643. Air Pollution Control Engineering. 3 Credit Hours.

Fundamentals of air pollution and air quality; properties and control of particulates, volatile organic compounds, carbon monoxide, sulfur oxides, and nitrogen oxides; motor vehicle emissions; health and aesthetic effects (acid rain, visibility), laws and regulations, meteorology and pollutant transport in the atmosphere; indoor air pollution.

Prerequisite: MAE 303 and (CET 330 or CAE 330 or MAE 309).

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 690. Special Topics. 1-3 Credit Hours.

Sub-titles describing the topics to be offered will be shown in parentheses in the printed class schedule, following the title Special Topics.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 695. Special Problems. 1-3 Credit Hours.

Project course introducing methods of research through an individual investigation of current problems. Offered by special arrangement only.

Components: RSC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 703. Graduate Research Seminar. 1 Credit Hour.

Attendance and active participation in a designated semester seminar series.

Components: LEC.

Grading: SUS.

Typically Offered: Fall & Spring.

CET 704. Graduate Teaching. 1-3 Credit Hours.

Teaching or assisting in a course with a substantial level of instructional responsibility. Only open to doctoral students.

Components: LEC.

Grading: SUS.

Typically Offered: Fall & Spring.

CET 730. Environmental Hydrology. 3 Credit Hours.

Principles of ecohydrology, agricultural hydrology, impacts of climate change, fundamentals of remote sensing and geographic information systems for hydrologic applications, statistical applications in hydrology.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 735. Water and Wastewater Engineering: Treatment and Reuse. 3 Credit Hours.

Physical treatment processes; Chemical unit processes; Advanced biological treatment processes; Sludge treatment and disposal; Industrial water supply and wastewater treatment; Membrane systems for wastewater treatment and case studies; Advanced wastewater treatment and reuse; Environmental nanotechnology.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 743. Risk Analysis. 3 Credit Hours.

Probabilistic risk assessment, Poisson processes, Bayesian methods, fault trees, contaminant transport models, and dose-response relationships for assessment of natural and technological risks.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 780. Indoor Environmental Modeling. 3 Credit Hours.

Prediction of indoor environment using computational fluid dynamics techniques. Advanced topics in thermal comfort and indoor air quality. Basic concepts of turbulence modeling and numerical methods for natural, forced, and mixed convection and jet flows indoors. Simulation of air velocity, temperature, and contaminant concentrations in buildings. Comparison of the simulated results with measured data.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 790. Advanced Topics. 1-3 Credit Hours.

Subject matter offerings based upon student demand and availability of faculty. Subtitles describing the topics to be offered will be shown in parentheses in the printed class schedule, following the title Advanced Topics.

Components: LEC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 795. Special Problems. 1-3 Credit Hours.

Research and/or design projects. Individual investigation of current problems. Offered by special arrangement only.

Components: RSC.

Grading: GRD.

Typically Offered: Offered by Announcement Only.

CET 830. Pre-Candidacy Doctoral Dissertation. 1-12 Credit Hours.

Doctoral dissertation credits taken prior to the Ph.D. student's candidacy. The student will enroll for credit as determined by his/her advisor. Not more than 12 credit hours of CET 830 may be taken in a regular semester, nor more than 6 credit hours in a summer session.

Components: THE.

Grading: SUS.

Typically Offered: Fall, Spring, & Summer.

CET 840. Post-Candidacy Doctoral Dissertation. 1-12 Credit Hours.

Doctoral dissertation credits taken after the Ph.D. student has been admitted to candidacy. The student will enroll for credit as determined by his/her advisor. Not more than 12 credit hours in CET 840 may be taken in a regular semester, nor more than 6 credits in a summer session.

Components: THE.

Grading: SUS.

Typically Offered: Fall, Spring, & Summer.

CET 850. Research in Residence. 1 Credit Hour.

Used to establish research in residence for the Ph.D. after the student has been enrolled for the permissible cumulative total in appropriate doctoral research. Credit not granted. May be regarded as full-time residence as determined by the Dean of the Graduate School.

Components: THE.

Grading: SUS.

Typically Offered: Fall, Spring, & Summer.