Civil and Environmental Engineering

Chair

A. Allen Bradley Jr.

Undergraduate majors: civil engineering (BSE); environmental engineering (BSE)

Graduate degrees: MS in civil and environmental engineering; PhD in civil and environmental engineering

Faculty: https://engineering.uiowa.edu/cee/cee-people

Website: https://engineering.uiowa.edu/cee

Facilities

Undergraduate Teaching Laboratories

Environmental Engineering Teaching Laboratory

Located at the water plant, this laboratory is designed to provide undergraduate students hands-on experience in water laboratory testing and analysis. It serves several program-required and elective courses with a laboratory component.

Engineering Fluids Laboratories

The Engineering Fluids Laboratories comprise a trio of rooms. The Fluids Fundamentals Lab includes recently built equipment and some that has been around for decades. The Advanced Measurements Lab includes larger experimental devices, such as a wind tunnel and a towing tank. The third laboratory, the Fluids Workshop, is a space in which students can perform their experiments.

Hydraulics Laboratory

The Hydraulics Laboratory experimental facilities include flumes and pipe systems to perform experiments on open-channel and closed-conduit flows. Instruments are available for measuring various flow quantities such as discharge, pressure, velocity, and temperature.

Computer-Aided Design (CAD) Lab

The CAD Lab contains 17 workstations, all connected to the engineering computer network, that allow students to access AutoCAD, Pro/ENGINEER, and a full complement of structural, hydraulic, transportation, and environmental software to support work on engineering design projects.

Geomechanics Laboratory

This modern 936-square-foot climate-controlled wet teaching lab features two sinks, 10 central compressed air outlets, 10 central vacuum outlets, and a fume hood. It can accommodate up to 18 students at a time. The lab is outfitted for measurements of soil grain specific gravities, soil densities, grain-size distributions, Atterberg limits, hydraulic conductivities, liquefaction, soil compressibility, time-dependent soil consolidation properties, shear strength of soils via direct shear and triaxial compression machines, and soil compaction behavior.

Structures, Mechanics, and Materials Laboratory

The Structures, Mechanics, and Materials Laboratory is a teaching lab where students conduct experiments to quantify the physical and mechanical properties of construction materials. Equipment is available to test metals, aggregates, concrete, and asphalt.

Graduate Laboratories

Structures, Mechanics, and Materials

Facilities for computations, materials testing, geotechnical experiments, and small-scale structural testing are available for research and teaching. Faculty, staff, and students in structures, mechanics, and materials (SMM) have access to the computing resources of the Engineering Technology Center and the Iowa Technology Institute (ITI). Both centers continuously update their computing facilities to maintain pace with the rapidly changing field.

A wide range of experimental facilities are available for testing structural materials such as Portland cement concrete, asphalt, metals, timber, and composites. These facilities include several loading frames (purely uniaxial, purely torsional, and axial-torsional) that are available with computer-based control and data collection systems. Facilities for creep testing, triaxial soil testing, and high-cycle fatigue testing are also available. The laboratories have a variety of ovens and other facilities for the preparation and treatment of test specimens.

Four well-equipped physical testing laboratories are dedicated to SMM teaching and research: the Civil Materials Laboratory, the Soil Mechanics Laboratory, the Plasticity Laboratory, and the Asphalt Laboratory. The Civil Materials Laboratory currently has a small-scale, single-degree-of-freedom shaker table. Faculty, staff, and students have access through ITI to a six-degree-of-freedom man-rated shaker table with a 4,000-pound payload and a 12-camera Vicon motion-capture system.

Transportation Engineering

The department's Asphalt Laboratory is equipped with a set of Superpave testing equipment and asphalt mixture performance testing equipment. The lab has a Hamburg wheel tracking device for measuring the moisture sensitivity of asphalt mixtures, asphalt foaming equipment for mix design of cold in-place recycled asphalt using foamed asphalt, and equipment for semi-circular bending and indirect tensile strength tests and volumetric analysis of asphalt mixtures. The Asphalt Laboratory is one of the department's many laboratories for testing the strength behavior of other materials.

Water and the Environment

The teaching and research functions of the department are closely connected to the research activities of IIHR—Hydroscience and Engineering. The institute houses some of the most modern research facilities in the world, including a 100-meter towing tank, a wave basin facility for ship hydrodynamics research, several flumes, an array of field instrumentation for hydrologic experiments, extensive laboratory space for hydraulic modeling, state-of-the-art

instrumentation for flow measurements and visualization, and comprehensive computational facilities.

Research related to ecohydraulics and the environment takes place at the Lucille A. Carver Mississippi Riverside Environmental Research Station. IIHR—Hydroscience and Engineering operates the 250-square-foot facility, which is located on the Mississippi River near Muscatine, Iowa. The station provides engineers and biological scientists with an ideal facility in which to examine the multifaceted ecohydraulic processes of the upper Mississippi. It is equipped with water quality laboratories, research boats, and a seminar room.

The Environmental Engineering and Science Laboratories provide state-of-the-art facilities, equipment, and expertise to support both undergraduate and graduate-level instruction and research. The labs support research in contaminant fate and transport in various media (air, water, soil, plants, and microbes), drinking water disinfection and distribution, wastewater treatment, geochemical-contaminant interactions, bioremediation, and phytoremediation. They also provide resources for analytical chemistry, electrochemistry, molecular biology, microscopy, computer modeling, and simulated environments at bench- and pilot-scale levels.

The Environmental Engineering and Science Laboratories are affiliated with the university's Center for Health Effects of Environmental Contamination, the Center for Global and Regional Environmental Research, the Environmental Health Sciences Research Center, an affiliate of the National Institute of Environmental Health Sciences (NIEHS), IIHR—Hydroscience and Engineering, and the Iowa Superfund Research Program.