

ENVIRONMENTAL SYSTEMS ENGINEERING, B.S.

Seven Penn State campuses are scheduled for closure after Spring 2027: DuBois, Fayette, New Kensington, Mont Alto, Shenango, Wilkes-Barre, and York. New students are not being admitted at these campuses.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

The program is unique as it is designed to address critical environmental, safety and health problems of the basic industries such as those involved in the extraction, conversion, and utilization of energy and mineral resources. The courses are sequenced so that students acquire an appropriate blend of theory, applications, and design and are equipped with the fundamentals necessary to maintain lifelong professional growth. Graduates are prepared to enter both the private and public sectors as environmental systems engineers or health and safety engineers or to pursue further education at the graduate level.

During the first two years, the program shares many common features with other more traditional engineering disciplines. Students then take a series of special courses that introduce engineering concepts in the extractive and process industries. Process engineering and a variety of solid-solid, solid-fluid, and fluid-fluid separations play a major and often dominant role in the prevention and/or remediation of environmental damage or the prevention of health and safety hazards resulting from industrial activity. Students can specialize in particular problems associated with air, land, water or environmental health and safety engineering through selection from an extensive list of relevant elective courses. The curriculum is structured so as to integrate design concepts into the various subject areas covered in the program.

The human, societal, economic, ethical, and regulatory aspects of the industrial impact on the environment and on the workers themselves are addressed through a combination of specific courses and components of other more general courses. This aspect of the program is designed to provide students with a deeper understanding, both of the impact of environmental degradation on society and of the effects on industrial activity of society's demands for protection of workers and the environment. The program culminates with the capstone design course, which is an integrated, problem-based, multi-faceted project in which students, working in a team setting, utilize fundamental concepts to design an environmental remediation system or an environmental health and safety protection system (or incorporate these design requirements into other associated designs).

What is Environmental Systems Engineering?

Protecting the health of workers and the environment, often during challenging projects, is the job of an environmental systems engineer. They understand, demonstrate, and apply systems engineering principles to environmental issues related to industrial activities and to the extraction of energy and mineral resources. These engineers work closely with project leaders, utilizing process systems engineering and environmental systems approaches, to evaluate and address the environmental impact of projects. Often these engineers work in the

government sector and offer expertise in big-picture projects facing cities, regions, nations, and the globe.

You Might Like This Program If...

- You want to minimize the environmental impact of industrial activities and protect the health of workers.
- You have strong math, science, and engineering skills and want to apply that to improving worker and environmental safety.