

Water Resources and Environmental Engineering Option in the Civil Engineering Graduate Program

Lyles College of Engineering, California State University Fresno

Program Mission, Goals, and Student Learning Outcomes

Mission

The mission of the Water Resources and Environmental Engineering (WREE) Option is to prepare students for professional practice in water resources and/or environmental engineering. Graduates of the program, entrusted by society, will create a sustainable world and enhance the quality of life during the 21st century as managers of the natural environment, and planners, managers, analysts, designers, constructors, and operators of water-related infrastructure of the built environment. As professionals, using the principles of mathematics and the natural sciences, they will use economically the materials and forces of nature for the progressive well-being of society to support community living, a thriving economy, healthy environment, and an extraordinary quality of life for all.

Goals

The overall goal of the WREE Option is to prepare students for professional practice and further advanced study. Specific goals include having graduates of the program:

1. Embrace principles of professional ethics, personal responsibility, and environmental stewardship.
2. Describe and explain, beyond the undergraduate level, the scientific principles involved in the analysis, design, or evaluation of water-related infrastructure and environmental protection and remediation systems.
3. Evaluate and employ advanced techniques of analysis, including mathematical analysis and modeling, numerical techniques, and professional software for analysis and design in water resources and environmental engineering.
4. Evaluate and employ advanced concepts and methodologies for the design of the water-related infrastructure.
5. Describe the political, social, legal, and economic constraints in water resources management and planning.
6. Exhibit excellent communication skills in writing, oral, graphical, and public speaking.

Student Learning Outcomes

Students graduating from the WREE Option will be able to:

1. Adhere to principles of professional ethics, personal responsibility, and environmental stewardship.
2. Describe and explain the major scientific principles that underlie the hydraulic analysis of systems associated with water supply and distribution, storm drainage management and flood control, wastewater collection, water storage, water and wastewater pumping, water/wastewater treatment, and environmental protection and remediation.

3. Describe, explain, and employ modern procedures for the analysis and design of the systems and facilities identified in Learning Outcome 2 above.
4. Identify major regulations, codes, and specifications applicable to the planning and design of the systems and facilities identified in Learning Outcome 2 above, and be able to specify where they can be obtained.
5. Solve advanced problems in engineering analysis and design through the use of mathematical analysis, differential equations, least square errors, and other numerical methods.
6. Proficiently use modern computer software for analysis and design of the systems and facilities identified in Learning Outcome 2 above.
7. Describe political, social, legal, and economic constraints inherent in the practice of water resources management and planning in present day California.
8. exhibit excellence in writing technical documents, research reports, and proposals.
9. exhibit excellence in oral and public presentations in front of technical and non-technical audiences.