



## **WATER-ENERGY NEXUS CERTIFICATE PROGRAM**

According to a recent report from the US Department of Energy (DOE), better understanding of the relationship between water availability and energy production (water-energy nexus) and its susceptibility to climate change is a matter of national security. This report was issued after severe droughts affected more than 1/3 of the US and the loss of available water constrained the ability of many power plants to function.

It is hard to image not having access to clean water or power – growing population, urbanization, shrinking resources, and increasing standards of living are threatening these indispensable assets even within developed countries. While clean water is the most important factor, access to power is an imperative component of having a safe, productive, and comfortable society. The goal of this certificate program is to understand the critical interaction between water and energy along with related topics including biological and physical-chemical treatment processes, carbon and energy footprint analysis, and sustainable energy systems in order to guide future improvements and technical innovations to mitigate future issues with these critical resources.

## WHO SHOULD ENROLL

This program is designed for professionals already employed in the workforce and those new to the subject matter who wish to expand their career opportunities and grow professionally by increasing their knowledge of the water-energy nexus and preparing them to make a difference as the world struggles with these key issues.

Professionals in the field of water and wastewater engineering who are interested in the energy intensity, usage, efficiency, and waste of the water treatment processes would benefit from this program including:

- Consultants who are or are planning to work on energy-related projects and want to deepen their knowledge of theoretical and practical aspects of energy efficiency and optimization in the water sector
- Utility personnel interested in understanding and curbing energy waste in water treatment and in a deeper understanding of energy-related aspects of their current processes and operation
- Researchers who want to extend their knowledge related to treatment energy consumption and power demand dynamics
- Regulators who intend to expand their knowledge of energy intensity and power demand efficiency of their treatment processes

To accommodate the busy schedules of these professionals, some courses in this program will be taught in the evenings.

## PROGRAM BENEFITS

- Gain insights into water and wastewater processes, industrial energy theory, energy tariff structures, and their practical implications on water and wastewater treatment operation and costs
- Understanding the impacts of water and wastewater treatment processes on energy and economics

- Understanding how process layout, plant operations, and process control can impact energy and treatment economics
- Quantify the energy and carbon footprint of water and wastewater treatment processes

## CERTIFICATE ELIGIBILITY AND REQUIREMENTS

A certificate is awarded upon completion of 4 required courses, 15 units (150 hours), with a grade of "B" or higher in each course. Students may enter the program at any time. However, some courses may require prerequisites. All requirements must be completed within 5 years after the student enrolls in his/her first course. Students not pursuing a certificate are welcome to take as many individual courses as they wish, space providing.

## PROGRAM FEES

Course fee for each 4 unit course is \$1,201.00 and a 3 unit course is \$715.00. Additional fees are required for textbooks. Please note course fees are subject to change. Those pursuing a certificate will pay a \$125 Candidacy Fee.

## TO ENROLL

Visit [ce.uci.edu/water-energy](http://ce.uci.edu/water-energy) for full course descriptions, instructor biographies, and enrollment information.

## FOR MORE INFORMATION:

Jennifer Mortensen  
(949) 824-9722  
[j.mortensen@uci.edu](mailto:j.mortensen@uci.edu)

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COURSE #	REQUIRED COURSES (15 units)	UNITS
ENGRCEE X499	Applied Dynamic Modeling for Wastewater Treatment Plant Efficiency	3
ENGRCEE 265	Physical-Chemical Treatment Processes	4
ENGRMAE 218	Sustainable Energy Systems	4
ENGRCEE 264	Carbon and Energy Footprint Analysis	4

## ADVISORY COMMITTEE

**Sunny Jiang**, Ph.D., Professor Civil and Environmental Engineering; Professor (Joint Appointment) Ecology and Evolutionary Biology, UC Irvine School of Engineering

**Lory Larson**, Consulting Engineer, Southern California Edison

**Jim Mihelcic**, Ph.D., Professor of Civil and Environmental Engineering, University of South Florida College of Engineering

**Coenraad Pretorius**, Senior Environmental Engineer at CDM Smith

**Diego Rosso**, Ph.D., Associate Professor, Civil and Environmental Engineering; Associate Professor (Joint Appointment), Chemical Engineering and Materials Science; Director, Water-Energy Nexus Center, UC Irvine School of Engineering

**Stephanie Shamblin Gray**, Water Engineer at HDR

**Reza Sobhani**, Ph.D., Consultant, Orange County Sanitation District

**Mike Stenstrom**, Ph.D., Distinguished Professor in the Civil and Environmental Engineering Department, UCLA