Environmental Science

It may sound surprising, but the environment is much cleaner today that it used to be 50 years ago. Thick smog is gone from the air and the rivers do not catch fire anymore. How did the co-existence of continuous economic development and cleaner environment become possible? The Graduate Certificate in Environmental Science will help students to develop an understanding of real-world environmental issues from an integrated science-technology-regulatory practice prospective. The program includes in depth understanding of local, regional, and global events, ranging from lead contamination of the Flint, MI water supply, to the environmental implications of climate change and stratospheric ozone depletion. Methods of gaining scientific understanding of the causes of these problems and developing policy regulations for their amelioration are described. Furthermore, examples are given of how the successful science-policy-technology approach can be applied to resolve other outstanding problems that the world is facing today, such as the unprecedented climate change caused by the release of carbon dioxide from combustion of fossil fuels. The curriculum provides an in depth understanding of environmental chemistry, pollution issues, toxicity of pollutants, methods for waste treatment and environmental law.

Who would be suited to take this program?

This program is designed for professionals, particularly of Chemistry, Environmental Science, Biology, or Engineering-based backgrounds, in the areas of Water Quality, Marine, Environmental Health, Air Pollution Control, Natural Resource Conservation, Waste Treatment or Environmental Health. Example occupations may include Environmental Consultants, Environmental Health and Safety Professional, Chemical and Pharmaceutical Industry Professionals, Health Practitioners, Estate Managers, Landscape Architect, Town Planners, Toxicologists, and Transportation Planners.

What will I learn?

- ***Environmental Chemical Science* -** Principles of physical, inorganic and organic chemistry are applied to understanding the origins of environmental pollutants, their transport, distribution and decomposition pathways.
- ***Environmental Analysis*** - The analysis of environmental samples is studied from the acquisition of representative samples, through sample handling, chain of custody, sample storage, analytical method selection, analysis, and data treatment.
- ***Environmental Problem Solving*** - Solutions for current environmental problems. Students are asked to respond to an imaginary Request for Proposal (RFP) in writing and before a team of technical experts at an oral presentation. Solutions proposed in student RFPs must reflect knowledge of environmental science and technology in current use.
- ***Global Environmental Problems*** - Relationships of the earth's temperature balance, global air circulation patterns, global energy needs, and control and remediation technologies.
- ***Toxicology*** - The assessment of acute, sub-acute and chronic effects of hazardous and toxic chemicals. Qualitative and quantitative measures of toxicity and testing protocols are addressed. The role of toxicology in risk assessment and risk management is discussed.
- ***Environmental Microbiology* -** 1) basic microbiology: biochemical principles, cell structure organization, microbial nutrition and growth, 2) the important microbes involved in environmental microbiology and address the environments where they are found, and 3) how they are detected and monitored, and their effects on humans, and the environment.
- ***Energy and Sustainability* -** Energy fundamentals including the basic principles necessary to understand energy systems. The technological and engineered systems for processing and using different energy non-renewable and renewable sources. The social and environmental consequences of energy production, distribution, and use, including a comparison of socioeconomic models of global energy applications.
- ***Legal Aspects in Environmental Engineering* -** Control of air, water, and solid waste pollution by federal, state, and local government statutes and international law. Preparation of environmental impact statements and the right of private citizens to bring suit under federal clean air and water pollution legislation are discussed, as well as limitations on these rights.
- ***Sustainable Politics and Policy* -** Sustainability development and institutional efforts to implement strategies at various geopolitical scales: international, national, regional, and local. The course introduces tools to measure progress toward sustainability through the use of metrics such as ecological footprint analysis and life-cycle analysis.

Why study Environmental Science at NJIT?

Not only do these courses help students to earn credits toward a Master's Degree in Environmental Science at NJIT, but they enable students to quickly engage in research in this field. From this academic department, Distinguished Professor Dr. Somenath Mitra is one of NJIT's most decorated faculty after receiving the 2017 Benedetti Pichler Award following his research on carbon nanotube water filtration in the desalination process, earning NJIT a patent. Students in this program may be able to work with him directly.

Into what industries might holders of this program find employment?

- Federal/State/Local Department of Environmental Protection (e.g., USDEP, NJDEP)
- Private consulting company conducting audits/reviews in environmental science

- Medical Centers

Prerequisites

Applicants should have a bachelor's degree from an accredited institution with some undergraduate background in a related field (biology, chemistry, environmental science, environmental engineering, mathematics, etc.).

Related Degree Programs

The Graduate Certificate in Environmental Science relates entirely to the NJIT MS in Environmental Science (https://catalog.njit.edu/graduate/science-liberal-arts/chemistry-environmental-science/environmental-science-ms/).

What are the Required Courses?

Code	Title	Credits
Core Courses		**12**
Select four (4) of the following:		
EVSC 610 (http://catalog.njit.edu/search/?P=EVSC%20610)	Environmental Chemical Science	
EVSC 612 (http://catalog.njit.edu/search/?P=EVSC%20612)	Environmental Analysis	
EVSC 613 (http://catalog.njit.edu/search/?P=EVSC%20613)	Environmental Problem Solving	
EVSC 615 (http://catalog.njit.edu/search/?P=EVSC%20615)	Global Environmental Problems	
EVSC 616 (http://catalog.njit.edu/search/?P=EVSC%20616)	Toxicology	
EVSC 627 (http://catalog.njit.edu/search/?P=EVSC%20627)	Environmental Microbiology	
EVSC 715 (http://catalog.njit.edu/search/?P=EVSC%20715)	Energy and Sustainability	
EM 631 (http://catalog.njit.edu/search/?P=EM%20631)	Legal Aspects in Environmental Engineering	
EPS 622 (http://catalog.njit.edu/search/?P=EPS%20622)	Sustainable Politics and Policy	