## ENVIRONMENTAL AND SUSTAINABILITY ENGINEERING (M.S.)

The Master of Science in Environmental and Sustainability Engineering aims to advance environmental engineering and sustainability to enhance human well-being through the development, application, and dissemination of relevant knowledge. The curriculum is arranged into four themes:

- Systems & Resources topics within this area vary in scale and include: modeling of groundwater, surface water, and air systems; engineered systems such as drinking water distributions systems; and interactions between the environment and urban systems (e.g. stormwater management).
- Treatment & Sensing Technologies topics within this area focus on the mitigation and quantification of pollutants loads to the environment, including humans, within all media (air, water, soils).
- Bio-chemical-physical Processes topics within this area focus on fundamental process that control the fate and transport of pollutants, including remediation techniques.
- 4. Environmental Exposure and Risk topics within this area focus on identifying, quantifying and reducing risk.

## **Admission Requirements**

Admission to this program is contingent upon admission to the Graduate School (http://bulletins.wayne.edu/graduate/general-information/ admission/).

The M.S. in Environmental and Sustainability Engineering will admit students with bachelor's degrees or the equivalent in engineering and other qualified science programs if there is a demonstrated aptitude for quantitative analysis. The degree program is suitable for new or recent graduates, as well as experienced professionals. Students will be required to have significant mathematics-based science capabilities. Students should have an overall grade point average (g.p.a.) of 3.2 for regular admission. Qualified or probationary admission may be granted with a lower g.p.a. As noted above, field/professional experience will be viewed positively in the application review process.

## **Program Requirements**

The M.S. in Environmental and Sustainability Engineering requires a minimum of thirty credits under one of two degree plans approved by the James and Patricia Anderson College of Engineering:

**Plan A:** consists of a minimum of twenty-four credit hours of course-work in combination with a minimum of six credits of thesis.

Plan C: consists of a minimum of thirty credits of course-work.

MS students may take a maximum of three credits of CE 7990 and a maximum of three credits of CE 7996. Registration in CE 7990 and/or CE 7996 must be approved by a faculty advisor and the graduate program director.

The program is designed to provide graduates a core of systems, treatment, process, and exposure/risk skills in research and applied situations.

## Code

Title

Credits

Students must take at least one course from each of the four foundational areas described below. Other courses may satisfy foundational area requirements if approved by Graduate Program Director.

CE 6130Open Channel HydraulicsCE 6150Hydrologic Analysis and DesignCE 6190GroundwaterChemistry Foundational Area:CE 5220Environmental ChemistryCE 6160Principles of Atmospheric Chemistry and ApplicationsCE 7160Advanced Principles of Atmospheric Chemistry and ApplicationsBiology Foundational Area:CE 7280Applied Environmental MicrobiologyStatistics Foundational Area:CE 7070Risk and Reliability in Civil EngineeringCE 7070Risk and Reliability in Civil EngineeringCE 7070Risk and Reliability in Civil EngineeringCE 7270Big Data Applications in Environmental EngineeringCE 5230Water Supply and Wastewater EngineeringCE 5510Geotechnical Engineering ICE 5520Geotechnical Engineering ICE 5520Geotechnical Engineering ICE 5520Geotechnical Engineering ICE 5520Geotechnical Engineering ICE 6580Geonevironmental Engineering ICE 6580Geonevironmental Engineering ICE 6580Geonevironmental Engineering ICE 6580Geonevironmental Engineering ICE 7170Advanced Aire Assessment and Restoration ICE 7180Advanced Aire Assessment and Restoration ICE 7190Groundwater ModelingCE 7190Groundwater ModelingCE 7280Advanced Aire Pollution Engineering IICE 7580Environmental RemediationCE 7190Directed Study	Water Resources	Foundational Area:	
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	BIO 5100	Aquatic Ecology	
	MAT 5070	Elementary Analysis	
MAT 5770 Mathematical Models in Operations Research	MAT 5770	Mathematical Models in Operations Research	
MAT 5870 Methods of Optimization	MAT 5870	Methods of Optimization	

The graduation requirement is completion of the M.S. courses with an overall GPA of 3.00 or higher. All core classes in the program must be completed with a 3.00 score or better. And all course work must be completed in accordance with the regulations of the Graduate School (http://bulletins.wayne.edu/graduate/general-information/ academic-regulations/) and the James and Patricia Anderson College of Engineering (http://bulletins.wayne.edu/graduate/college-engineering/ academic-regulations/).