

CIVIL ENGINEERING, M.S.E.

The Master of Science in Civil Engineering program aims to position working professionals and graduates with science and engineering backgrounds interested in earning an advanced degree to gain a deeper understanding of principles required to solve 21st century environmental problems and sustainably manage our water and infrastructure resources for future generations. In our career-advancing evening master's program, students can specialize in:

- **Environmental Engineering**, with a focus on the most advanced, proven, and sustainable approaches to protect and improve water quality in urban and natural settings through effective management of pollution sources
- **Water Resources Engineering**, centered on the sustainable management, theory, and modeling of hydrological processes in natural systems and water conveyance, storage, and flood protection in urban systems

Students in the program can benefit from:

- **Strong Industry Ties:** Our modern and professionally relevant courses are taught by faculty distinguished in industry and academia.
- **Science to Engineering Pathway:** Students with non-engineering undergraduate degrees can earn a degree in civil engineering by passing the Fundamentals of Engineering Examination and completing the required coursework.
- **Evening Program:** Courses are offered in the evening to accommodate both full-time students and working professionals.

Program Educational Objectives

The Civil Engineering graduate program has established the following program educational objectives that are consistent with the mission of the University and that describe the expected accomplishments of graduates during the first several years following graduation. Graduates in the Civil Engineering (environmental engineering and water resources engineering) program will:

1. Apply critical thinking and problem-solving skills in their professions to work towards solving society's 21st century engineering issues and challenges;
2. Demonstrate and apply ethical, socially equitable, and sustainable practices and principles to issues in their profession; and
3. Advance in their careers by staying current in the field, working on interdisciplinary teams, and/or obtaining professional registration or other professional certifications.

To accomplish these program educational objectives, analysis and design courses in the fields of water resources, hydraulics, environmental engineering and environmental science with an emphasis on sustainability are offered. Additional opportunities are available to broaden the educational experience through courses in other departments, independent study and directed research resulting in a thesis with director consent. A broad base of theory and design is provided integrating current issues and professional practices.

Program Learning Outcomes

The Civil Engineering graduate program has established the following student outcomes:

1. Apply scientific, mathematical, and sustainability principles to analyze and develop solutions to problems in environmental science and engineering.
2. Critically assess, evaluate, and understand sustainability, ethics, and social justice in environmental science and engineering.
3. Effectively communicate scientific and engineering principles related to the environment and sustainability.

Admission Requirements

All applicants must hold a Bachelor of Science or higher-level degree and have successfully completed the following courses:

- Calculus, at least one year of college-level
- General Chemistry, at least one year of college-level
- Life and Physical Science, totaling at least four college-level courses, which could include Biology, Chemistry, Environmental Science, or Physics.

Applicants with a bachelor's or postgraduate degree in a non-Engineering, Life Science, or Physical Science field may be considered if the applicant has completed the above coursework prior to applying. The department may also require applicants who lack an adequate background in mathematics, chemistry, and/or science to successfully complete additional courses prior to being admitted into the program or continuing in the program.

Applicants holding a non-engineering bachelor's or postgraduate degree may apply and enroll into one of the Civil Engineering program tracks but are not eligible for the Master of Science degree until passing the Fundamentals of Engineering exam (<https://ncees.org/exams/fe-exam/>) and meeting all of the program requirements.

All applicants are required to submit:

- A completed application form (<https://graduatestudies.lmu.edu/apply/>) and \$50 application fee
- Official Transcripts of all colleges and universities attended
- A letter of intent (approximately 1.5 pages) describing the candidate's background, career goals, and interest in the program
- Two letters of recommendation attesting to the candidate's ability to succeed in the graduate program based on previous academic and/or professional performance

The GRE is not required for admission into the Civil Engineering Master's Program. International applicants should submit the items listed above plus the additional items required by LMU Graduate Admission (<https://graduate.lmu.edu/apply/internationalstudents/>).

Program Requirements

(30 Semester Hours)

Students enrolled in this program must successfully complete the following:

- 30 semester hours with a cumulative grade point average of 3.0 ("B")
- CIVL 690 Comprehensive Oral Exam or CIVL 696 Thesis Defense or ENV5 696 Thesis Defense
- 500-level courses with grade of B (3.0) or higher
- All core and elective requirements for the Water Resources Engineering or the Environmental Engineering emphasis.

To be awarded a Master of Science in Civil Engineering (either track), all students must either possess a bachelor's degree in engineering or have passed the Engineer-in-Training/Fundamentals of Engineering (EIT/FE) examination (<https://ncees.org/exams/fe-exam/>) administered by the National Council of Examiners for Engineering and Surveying (NCEES). Students who do not meet this condition will receive a Master of Science degree in Environmental Science.

Optional Thesis

Preparation of a master's thesis under the guidance of a faculty member is optional in both the Civil Engineering and Environmental Science Master's programs. Students electing to perform a master's thesis must pass CIVL 696 Thesis Defense or ENVS 696 Thesis Defense in the semester they expect to complete their thesis. The defense is in the form of a written thesis and an oral presentation. A thesis committee, selected by the student and primary research advisor, determines if the student has mastered the subject matter of the thesis, understands the work done by others, and can critically assess that work and his/her own work. No later than two weeks prior to the thesis defense presentation, the student must provide their written thesis to their thesis committee for review. Students who elect to prepare a master's thesis are not required to take the CIVL 690 Comprehensive Oral Exam. Formal requirements may be obtained from the program director. Please see our research page (<https://cse.lmu.edu/graduateprograms/msce/research/>) for further information on research opportunities.

Thesis students also have the option to enroll in a 3-semester-hour master's thesis Independent Study (CIVL 695 Master Thesis or ENVS 695 Master Thesis) in any term with director and thesis advisor consent. The master's thesis Independent Study can satisfy a Global Perspectives Elective requirement, may be taken a maximum of two times, and may be taken only once in a semester.

Change of Emphasis (Environmental Engineering or Water Resources Engineering)

Civil Engineering graduate students can choose an emphasis in one of two areas: Environmental Engineering or Water Resources Engineering. Students have the option to switch from the Water Resources Engineering emphasis to the Environmental Engineering emphasis and vice versa or to Environmental Science any time before graduation. Prior to changing emphasis, the student's plan should be discussed with and approved by the Program Director.

Required courses for each field of study

M.S.E. in Civil Engineering with emphasis in Environmental Engineering

Code	Title	Semester Hours
Core Requirements		
CIVL 601	Sustainable Water Quality and Resources	3
CIVL 605	Aquatic Chemistry	3
ENVS 606	Applied Environmental Microbiology	3
CIVL 617	Water Treatment Processes	3
CIVL 625	Applied Fluid Mechanics ¹	3
Select one of the following:		0
CIVL 690	Comprehensive Oral Exam	
CIVL 696	Thesis Defense	
ENVS 696	Thesis Defense	
Subtotal		15

Technical Electives

Select three of the following:		9
ENVS 607	Environmental Engineering and Science Lab	
CIVL 608	Contaminant Fate, Transport, and Remediation	
CIVL 618	Water Reuse and Desalination	
CIVL 619	Advanced Integrated Water Treatment Systems	
CIVL 626	Surface Water Hydrology	
CIVL 627	Urban Water Systems and Stormwater Management	
CIVL 628	Groundwater Hydrology and Sustainable Management	
CIVL 629	Groundwater Contaminant Transport and Remediation	
CIVL 647	Dams and Levees	
ENVS 652	Spatial Data Analysis and Geographical Information Systems	
CIVL 651	Remote Sensing with Civil Engineering and Environmental Science Applications	
CIVL 653	Modeling Environmental and Water Resources Systems	
Subtotal		9

Global Perspectives Electives

Select two of the following:		6
CIVL 671	Air Quality, Control, and Management	
CIVL 672	Sustainable Waste Management	
CIVL 673	Economics of Water and the Environment	
CIVL 674	Sustainable Engineering	
ENVS 680	Engineering Geology	
ENVS 681	Ecosystem Services in Urban Landscapes	
ENVS 682	Urban Coasts: Habitats, Stressors, and Resilience	
ENVS 683	Environmental Toxicology and Health Risk	
ENVS 684	Climate Change and Impacts	
ENVS 686	Climate Change Mitigation	
ENVS 687	Climate Change Adaptation and Resilience	
ENVS 688	Environmental Health	
ENVS 689	Sustainability, Health, and Equity	
CIVL/ENVS 699	Independent Studies ²	
CIVL 695	Master Thesis ³	
Up to one 500- or 600-level course in another graduate program with director consent		
Subtotal		6

Total Semester Hours

1	Students who have previously passed an upper division undergraduate- or graduate-level fluid mechanics course may substitute CIVL 625 Applied Fluid Mechanics with a Technical or Global Perspectives elective.
2	up to one with director consent
3	up to two with director consent
30	

M.S.E. in Civil Engineering with emphasis in Water Resources Engineering

Code	Title	Semester Hours
Core Requirements		
CIVL 601	Sustainable Water Quality and Resources	3
CIVL 625	Applied Fluid Mechanics	3
CIVL 626	Surface Water Hydrology ¹	3
CIVL 627	Urban Water Systems and Stormwater Management	3
CIVL 628	Groundwater Hydrology and Sustainable Management	3
CIVL 653	Modeling Environmental and Water Resources Systems	3
Select one of the following:		0
CIVL 690	Comprehensive Oral Exam (Non-thesis students)	
CIVL 696	Thesis Defense (Thesis students)	
ENVS 696	Thesis Defense (Thesis students)	
Subtotal		18
Technical Electives		
Select three of the following:		9
ENVS 606	Applied Environmental Microbiology	
ENVS 607	Environmental Engineering and Science Lab	
CIVL 605	Aquatic Chemistry	
CIVL 608	Contaminant Fate, Transport, and Remediation	
CIVL 617	Water Treatment Processes	
CIVL 618	Water Reuse and Desalination	
CIVL 619	Advanced Integrated Water Treatment Systems	
CIVL 629	Groundwater Contaminant Transport and Remediation	
CIVL 647	Dams and Levees	
CIVL 651	Remote Sensing with Civil Engineering and Environmental Science Applications	
ENVS 652	Spatial Data Analysis and Geographical Information Systems	
Subtotal		9
Global Perspectives Electives		
Select two of the following:		6
CIVL 671	Air Quality, Control, and Management	
CIVL 672	Sustainable Waste Management	
CIVL 673	Economics of Water and the Environment	
CIVL 674	Sustainable Engineering	
ENVS 680	Engineering Geology	
ENVS 681	Ecosystem Services in Urban Landscapes	
ENVS 682	Urban Coasts: Habitats, Stressors, and Resilience	
ENVS 683	Environmental Toxicology and Health Risk	
ENVS 684	Climate Change and Impacts	
ENVS 686	Climate Change Mitigation	
ENVS 687	Climate Change Adaptation and Resilience	
ENVS 688	Environmental Health	
ENVS 689	Sustainability, Health, and Equity	
CIVL 699 and ENVS 699	Independent Studies and Independent Studies ²	
CIVL 695	Master Thesis ³	

Up to one 500- or 600-level course in another graduate program with director consent	6
Subtotal	6
Total Semester Hours	33

¹

Students who have previously passed an upper division undergraduate- or graduate-level fluid mechanics course may substitute CIVL 625 Applied Fluid Mechanics with a Technical or Global Perspectives elective.

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up to one with director consent

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up to two with director consent