SYSTEMS ENGINEERING, MASTER OF SCIENCE

Our Master of Science in Systems Engineering **(**https://engineering.jhu.edu/case/graduate-programs/masters-program/**)Program along with our Master of Science in Engineering in Civil Engineering develop a sound understanding of the scientific principles upon which engineering research and practice are based.** The world needs strategic experts with deep understanding of its complex sociotechnical systems who can develop interventions that make a positive difference on the life of the population.

The hands-on experience and cutting-edge curriculum of the MS in Systems Engineering (MS-SE) degree provides students with a world-class education in both qualitative and quantitative understanding which underlies systems engineering research and practice. Students graduate with a deep understanding of the complex processes that underlie societies, they are familiar with advanced modeling tools, and are at a vantage point to tackle the many problems that societies face.

Students in the MS-SE program learn from world-renowned faculty who are expanding the boundaries of their fields and leading global projects and are given ample opportunities through seminars and internships to connect with key players in public agencies and private firms, both at the national and international level.

If you are looking to advance your career, interact with top faculty, create a network that includes government, multilaterals, and top companies, and be part of the worldwide network of JHU alumni, the MS-SE is the program for you.

Students pursuing this degree can take courses on topics that include network modeling, system dynamics, probabilistic simulations, optimization, risk modeling, analysis of complex infrastructure systems, public health, urban resilience, and more.

The MS in Systems Engineering **(**https://engineering.jhu.edu/case/graduate-programs/masters-program/m-s-e-systems-engineering/**) focuses on network modeling, mathematical modeling, optimization, analysis of complex infrastructure systems, public health, urban resilience.**

Typically only limited financial support is available for M.S. students. Funding decisions will be made on an individual basis by the Department of Civil and Systems Engineering and will be communicated during the admissions process.

Program Requirements (Systems Engineering (https://engineering.jhu.edu/case/graduate-programs/masters-program/m-s-e-systems-engineering/))

Master of Science in Systems Engineering program must take a total of eight courses that have been approved by their advisor. Three of these must be selected from the below list of required courses. (Other courses may be substituted at the advisor's discretion.) The remaining five courses can be chosen from the list of electives (https://engineering.jhu.edu/case/elective-courses/), and must be advisor-approved. One of the eight courses can be a professional development class, such as those offered by the Center for Leadership Education.

Master's students are offered two options (different combination of courses, seminars, optional internship, and research) to earn their degree. There is also a bachelor's/master's program available (https://engineering.jhu.edu/case/academics/combined-bs-ms/) as well as a Civil Engineering M.S.E. degree (https://engineering.jhu.edu/case/academics/masters-program/mse-civil-engineering/).

Course-Only M.S. Requirements

The most common path for M.S. graduate students is to complete the degree through coursework alone. The M.S. degree requirements are as follows*:

1. Minimum course requirements: 8 courses** at the 600-level or above:
   - 3 of which must be from the following list (Substitute courses can be considered at the advisor's discretion):
     - EN.560.653 An Introduction to Network Modeling
     - EN.560.618 Probabilistic Methods in Civil Engineering and Mechanics
     - EN.560.657 System Dynamics
     - EN.520.698 Networks Meet Machine Learning: Methods and Applications
     - EN.553.613 Applied Statistics & Data Analysis I
     - EN.553.636 Introduction to Data Science
     - EN.553.761 Nonlinear Optimization I
     - EN.601.633 Intro Algorithms
     - EN.601.675 Machine Learning
   - 5 of which are elective
     - Examples of Elective Courses (https://engineering.jhu.edu/case/elective-courses/)
2. Required courses, but not counted towards minimum course requirements:
   - Two semesters of CaSE graduate seminar courses (Fall semester –EN.560.691 CaSE Graduate Seminar and/or Spring Semester - EN.560.692 Civil Engineering and Systems Engineering Graduate Seminar)
   - EN.500.603 Graduate Academic Ethics
   - AS.360.624 Responsible Conduct of Research (Online)
3. Acceptable grades: B- and above. Only one course with a grade lower than B- is allowed toward the degree requirements. No grade lower than a C- may be counted toward the course requirements.
4. It is expected that the degree will be completed in one year with the student enrolling in 4 courses per semester, although in select cases students may require a third semester of study. In such cases, the first three semesters must be full-time, while a student enrolling in a fourth semester can be part-time under certain conditions.***
5. CPT internship credits for international students do not count toward the completion of a M.S. degree
6. Transfer credits typically are not permitted

*Students must comply with all requirements stipulated by the Whiting School of Engineering Academic Policies and Procedures (https://engineering.jhu.edu/education/graduate-studies/graduate-academic-policies-procedures/).

**Academic advisors, in consultation with the faculty in the department, will determine whether the 8 courses (24 credits) leading to this degree are appropriate and if they have been completed satisfactorily.

***See the department Academic Program Administrator or Director of Graduate Studies to determine if you are eligible for part-time status.

M.S. with Thesis Requirements

The M.S. with thesis option is intended for students interested in pursuing a Ph.D. The M.S. degree requirements are as follows*:

1. Minimum course requirements: 7 courses** at the 600-level or above:
   - 3 of which must be from the following list (Substitute courses can be considered at the advisor's discretion):
     - EN.560.653 An Introduction to Network Modeling
     - EN.560.618 Probabilistic Methods in Civil Engineering and Mechanics
     - EN.560.657 System Dynamics
     - EN.520.698 Networks Meet Machine Learning: Methods and Applications
     - EN.553.613 Applied Statistics & Data Analysis I
     - EN.553.636 Introduction to Data Science
     - EN.553.761 Nonlinear Optimization I
     - EN.601.633 Intro Algorithms
     - EN.601.675 Machine Learning
   - 4 of which are elective
     - Examples of Elective Courses (https://engineering.jhu.edu/case/elective-courses/)
2. Required courses, but do not count towards minimum course requirements:
   - Research course with the research advisor – Fall semester
   - Research course with the research advisor – Spring semester (a two-semester research sequence)
   - Two semesters of CaSE graduate seminar courses (Fall semester –EN.560.691 CaSE Graduate Seminar and/or Spring Semester - EN.560.692 Civil Engineering and Systems Engineering Graduate Seminar)
   - EN.500.603 Graduate Academic Ethics
   - AS.360.625 Responsible Conduct of Research
3. Acceptable grades: B- and above. Only one course with a grade lower than B- is allowed toward the degree requirements. No grade lower than a C- may be counted toward the course requirements.
4. Final essay that is approved by the research advisor and one additional reader who is required to be a full-time departmental faculty member. Any external reader must be approved by the Department Head
5. Research presentation in a public forum attended by two members of the WSE faculty or other faculty approved by the Department Head
6. The M.S. with thesis program is expected to be completed in 3-4 semesters with the student enrolled in 2-3 courses per semester in addition to research. Summer research is typical but not necessary and is left to the discretion of the student and advisor. All semesters must be full-time.
7. CPT internship credits for international students do not count toward the completion of the M.S. degree
8. Transfer credits typically are not permitted

*Students must comply with all requirements stipulated by the Whiting School of Engineering Academic Policies and Procedures (https://engineering.jhu.edu/education/graduate-studies/graduate-academic-policies-procedures/).

**Academic advisors, in consultation with the faculty in the department, will determine whether the 7 courses leading to this degree are appropriate and if they have been completed satisfactorily.

Combined Bachelor's/Master's Program

All Combined Bachelor's/Master's students must meet the requirements stipulated above for the respective M.S. program (course-only or thesis program) with the following exception:

- The Department of Civil and Systems Engineering will accept one course from JHU undergraduate studies used for the B.S. degree at the 400-level or above toward the course requirements listed above.

Notes:

1. Required seminars, EN.500.603 Graduate Orientation and Academic Ethics and AS.360.624 Responsible Conduct of Research (Online)/AS.360.625 Responsible Conduct of Research courses are less than 3 credits each and not counted towards minimum course requirements.
2. Students are expected to maintain a GPA of 2.6 each semester or be placed on probation. See the Probation Policy for master's students (https://engineering.jhu.edu/civil/graduate-programs/masters-program/policies-and-procedures/) for more details.

Requirements:

1. Online Application (https://applygrad.jhu.edu/apply/?sr=3e5b4d9d-8b0a-4f96-9579-b577c78080f1) in the Slate application system
2. Three Letters of Recommendation

Obtain your recommenders' email addresses and enter them in your online application to request electronic letters of recommendation. The Slate application system will contact your recommender directly via email and will be given instructions about how to proceed. Please use the Slate system and do not have letters of recommendation mailed to the school.

3. Statement of Purpose

The statement (1-3 pages) should outline your background and interests in civil or systems engineering, reasons why you are seeking to pursue a graduate degree, why you believe JHU is a good fit for you, specific career goals, events, or places that have inspired you, etc.

4. CV/Resume

5. Transcripts

Official copies of transcripts are not required for application review purposes. Applicants are asked to upload unofficial transcripts in the Academic History portion of this application. If you receive an offer and choose to accept it, you must contact your institution to have your official

academic transcripts sent directly to the Office of Engineering Graduate Admissions.

****For international students****

For all foreign academic work, we strongly recommend that you submit a professional credential evaluation from World Education Services (WES) (https://www.wes.org/) or SpanTran (https://spantran.com/). (https://www.wes.org/) Credential evaluations allow the departments to better assess your academic records. These evaluations do not replace the transcript, you are still required to upload these documents as instructed.

6. TOEFL/IELTS scores or English Language Proficiency Test Waiver (https://engineering.jhu.edu/admissions/graduate-admissions/full-time-programs/how-to-apply/international-students/) (For international students only)

Visit Information for International Students (https://engineering.jhu.edu/graduate-admissions/international-students/) to read our English Language Proficiency Policy (https://engineering.jhu.edu/admissions/graduate-admissions/full-time-programs/how-to-apply/international-students/) for detailed information, including preferred minimum test scores. You may request an English Language Proficiency Test Waiver by contacting the Engineering Graduate Admissions Office by emailing WSEGrad-Admissions@jhu.edu. Applications require a self-reported score for review. Many applicants see their official scores arrive after the application submission deadline.

8. Application Fee – $0.

Optional:

- GRE Scores
- Personal Statement
- Sample of Work

Visit General Application Requirements (https://engineering.jhu.edu/admissions/graduate-admissions/full-time-programs/how-to-apply/) to answer many of your questions.