

SYSTEMS ENGINEERING, MASTER OF SCIENCE*

**Effective Spring 2024, due to accreditation compliance requirements, the residential MSE (Master of Science in Engineering) in Systems Engineering has been renamed as Master of Science (MS) in Systems Engineering. Please visit Systems Engineering (<https://engineering.jhu.edu/case/academics/masters-program/mse-systems-engineering/>) for additional information.*

Our Master of Science in Engineering (M.S.E.) (<https://engineering.jhu.edu/case/graduate-programs/masters-program/>) Programs develop a sound understanding of the scientific principles upon which engineering research and practice are based. Different aspects of learning are integrated through classroom, laboratory instruction, and independent study experiences. Graduates of the programs possess critical thinking skills, the ability for both independent and team problem-solving, and a sense of the excitement of engineering creativity and design. The programs also develop communication skills necessary for the graduates to function in teams and to deal with other professions in public and private arenas. Their progressive education furthers student understanding of the context in which engineering is practiced in modern society. Our Master's programs combine fundamental training with real-world experience. Thus, the programs educate leaders for tomorrow, providing the tools and perspectives for a lifetime of learning, opportunities, and professional advancement. Build your knowledge base with coursework in systems, mechanics, structures, computational methods, and uncertainty quantification. Apply that knowledge in our externship program while you network with professional engineers and gain valuable experience with your dream employer.

CaSE currently offers two M.S.E. degree options*:

- Civil Engineering (<https://engineering.jhu.edu/case/academics/masters-program/mse-civil-engineering/>) – focus on mechanics of materials, probabilistic methods, fire engineering, earthquake engineering, structural design, infrastructure design for resilience
- Systems Engineering (<https://engineering.jhu.edu/case/graduate-programs/masters-program/m-s-e-systems-engineering/>) – focus on network modeling, mathematical modeling, optimization, analysis of complex infrastructure systems, public health, urban resilience

Typically limited financial support is available for M.S.E. 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 Engineering (M.S.E.) students within the 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://livejohnshopkins-my.sharepoint.com/:b/g/personal/jader2_jh_edu/Ec8GdrK7ggRDtSvbdQsu9F4BxWNIA-IE2dGiT0iFU-cwgw/?e=NkNaih), 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 externship (<https://engineering.jhu.edu/case/academics/masters-program/externship-program/>), 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 MSE Requirements

The most common path for M.S.E. graduate students is to complete the degree through coursework alone. The M.S.E. 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.553.613 Applied Statistics and Data Analysis
 - 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://e-catalogue.jhu.edu/engineering/full-time-residential-programs/degree-programs/civil-engineering/systems-engineering-mse/Systems-MSE-Elective-Options-Jul20.pdf>)
2. Required courses, but not counted towards minimum course requirements:
 - EN.560.691 Graduate Seminar – Fall semester
 - EN.560.692 Civil Engineering and Systems Engineering Graduate Seminar – Spring semester
 - EN.500.603 Graduate Orientation and Academic Ethics
 - AS.360.624 Responsible Conduct of Research (Online) or 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. 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.E. degree
6. Transfer credits are not permitted

*Students must comply with all requirements stipulated by the Whiting School of Engineering Academic Policies and Procedures as outlined

at <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 leading to this degree are appropriate and if they have been completed satisfactorily.

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

M.S.E. with Thesis Requirements

The M.S.E. with thesis option is intended for students interested in pursuing a Ph.D. The M.S.E. 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.553.613 Applied Statistics and Data Analysis
 - 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://e-catalogue.jhu.edu/engineering/full-time-residential-programs/degree-programs/civil-engineering/systems-engineering-mse/Systems-MSE-Elective-Options-Jul20.pdf>)
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)
 - EN.560.691 Graduate Seminar– Fall semester
 - EN.560.692 Civil Engineering and Systems Engineering Graduate Seminar– Spring semester
 - EN.500.603 Graduate Orientation and Academic Ethics
 - AS.360.624 Responsible Conduct of Research (Online) or 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 Chair
5. Research presentation in a public forum attended by two members of the WSE faculty or other faculty approved by the Department Chair
6. The M.S.E. 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. The first three

semesters must be full-time, while the fourth semester can be part-time under certain conditions.***

7. CPT internship credits for international students do not count toward the completion of the M.S.E. degree
8. Transfer credits are not permitted

*Students must comply with all requirements stipulated by the Whiting School of Engineering Academic Policies and Procedures as outlined at <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.

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

Combined Bachelor's/Master's Program

All Combined Bachelor's/Master's students must meet the requirements stipulated above for the respective M.S.E. 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=9aceddc1-d563-4a68-a7b8-a023986c3cb7>) 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. GRE scores

6. 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/>) 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.

7. TOEFL/IELTS scores or English Language Proficiency Test

Waiver (https://livejohnshopkins-my.sharepoint.com/:w:/g/personal/avanhor3_jh_edu/EbMorU0ALe1El4qtqifhgUBc6GW9F-VhkmCBYy4GbiQsQ/?e=Xl1TJZ) (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://livejohnshopkins-my.sharepoint.com/:w:/g/personal/avanhor3_jh_edu/EbMorU0ALe1El4qtqifhgUBc6GW9F-VhkmCBYy4GbiQsQ/?e=Xl1TJZ) 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. Admissions Fee – \$25. Please see the application fee waiver policy (<https://engineering.jhu.edu/admissions/graduate-admissions/full-time-programs/how-to-apply/general-application-requirements/>)

Optional:

- Personal Statement
- Sample of Work