# Systems Engineering, Master of Science (M.S.)

**Thesis option:** 30 credits  
**Non-thesis option (scholarly paper):** 30 credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENSE621</td>
<td>Systems Concepts, Issues, and Processes</td>
<td>3</td>
</tr>
<tr>
<td>ENSE622</td>
<td>Systems Requirements, Design and Trade-Off Analysis</td>
<td>3</td>
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<tr>
<td>ENSE623</td>
<td>Systems Projects, Validation and Verification</td>
<td>3</td>
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<tr>
<td>ENSE624</td>
<td>Human Factors in Systems Engineering</td>
<td>3</td>
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<tr>
<td>ENSE626</td>
<td>System Life Cycle Analysis and Risk Management</td>
<td>3</td>
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<tr>
<td>ENSE627</td>
<td>Systems Quality and Robustness Analysis</td>
<td>3</td>
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**Thesis or Non-Thesis Requirements**

Select one of the following options: 12 credits

- **Thesis:**
  - Select two additional electives from one specialization area
- **ENSE799** Systems Engineering Thesis

- **Non-Thesis:**
  - Select four additional electives from no more than two specialization areas
  - Complete a scholarly paper

**Specialization Requirements**

Select from the following specialization areas:

- Communication and Networking Systems
- Computer and Software Systems
- Control Systems
- Manufacturing Systems
- Operations Research
- Process Systems
- Robotics
- Signal Processing Systems
- Cybersecurity
- Transportation Systems

Total Credits: 30

General requirements for the master's thesis and non-thesis options are those of the University of Maryland Graduate School. All requirements must be completed within 5 years. The thesis option requires each student to obtain a total of 30 credit hours: 24 hours of coursework and six (6) hours for the thesis project to complete the program. The coursework includes 18 credits for the six core courses (four courses from the systems engineering core and two courses from the management core), and two (2) elective courses. The elective courses must be taken from one specialization area. The master’s thesis project demonstrates the practical implications of systems engineering principles. The thesis project may be related to a practical industrial system, and must be supervised by the academic advisor.

The non-thesis option requires each student to obtain a total of 30 credit hours of coursework to complete the program (four courses from the systems engineering core, two courses from the management core, and four elective courses). The elective courses must be taken from not more than two specialization areas. In addition, students must complete a scholarly paper. Expectations of the scholarly paper: While less detailed and complex than the thesis, the scholarly paper also contributes to systems engineering research. For example, a student might choose to write a literature review, identify and propose a solution to a systems problem encountered on the job, or prepare a systems case study. The scholarly paper is prepared under the supervision of the student’s academic advisor. It also must be read by at least one additional ISR faculty member, and approved by the ENSE graduate director. No specific format is required by the Graduate School.