Systems Engineering, Certificate

Executive Director: Jeffrey Starke, Ph.D.
Master's Across Boundaries Certificates Programs webpage (https://www.marquette.edu/engineering/graduate-degrees.php#Certificate)

DEGREE OFFERED
Certificate

PROGRAM DESCRIPTION
This interdisciplinary engineering certificate responds to the push for innovation, preparing practicing engineers to assess and manage risk, striking a balance among competing objectives. By completing this certificate, students develop the skills and knowledge required to solve complex systems engineering problems in a variety of domains using current tools and approaches.

Systems engineers provide value to communities and society at large by leading interdisciplinary engineering analysis, design and deployment of a system to ensure that it efficiently satisfies stakeholder needs, fulfills its intended operation and has a long and useful operating life.

Faculty Sponsor: Mark Federle, PH.D., P.E., CPC

Systems Engineering Certificate

The graduate certificate in systems engineering (SYEN) is intended to develop the capabilities required to apply current tools and approaches to solve complex systems engineering problems in a variety of application domains. Students are able to apply mathematical and scientific principles to the interdisciplinary engineering design, development and operation of systems that efficiently satisfy stakeholder needs, fulfill the intended operation and have a long and useful operating life. In this integrative and leadership role, systems engineers find success by being able to leverage their technical expertise and experiences while integrating multiple disciplinary perspectives, assessing and managing risks, and inspiring and guiding valuable solutions.

The certificate in systems engineering requires four courses for a total of 12 credit hours. The 12 credits of course work are proposed by a student in consultation with the program director or academic adviser. All certificate programs meet the requirements in the Graduate School Bulletin, including any course prerequisite requirements. Any deviations from the approved courses in the Graduate School Bulletin or course substitutions must be approved by the Certificate Faculty Sponsor and the associate dean for academic affairs in the Opus College of Engineering. This certificate is designed for practicing professionals. As such, it is anticipated that only the part-time option is likely to be pursued.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>GEEN 5820</td>
<td>Systems Engineering Principles and Practice</td>
<td>3</td>
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<tr>
<td>GEEN 5830</td>
<td>Engineering Risk Analysis</td>
<td>3</td>
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<tr>
<td>Elective Courses - Choose two from the following:</td>
<td></td>
<td>6</td>
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<tr>
<td>BIEN 5320</td>
<td>Biomedical Instrumentation Design</td>
<td></td>
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<tr>
<td>BIEN 5510</td>
<td>Image Processing for the Biomedical Sciences</td>
<td></td>
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<tr>
<td>BIEN 5700</td>
<td>Systems Physiology</td>
<td></td>
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<tr>
<td>CEEN 5640</td>
<td>Traffic Characteristics and Design</td>
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<tr>
<td>CEEN 5715</td>
<td>Sustainable Engineering</td>
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<tr>
<td>COSC 5360</td>
<td>Software and System Security</td>
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<tr>
<td>COSC 5600</td>
<td>Fundamentals of Artificial Intelligence</td>
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<tr>
<td>EECE 5210</td>
<td>Design and Analysis of Electric Motor-Drive Systems</td>
<td></td>
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<td>EECE 5390</td>
<td>Developments in Control</td>
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<tr>
<td>EECE 5460</td>
<td>Sensor Devices: Theory, Design and Applications</td>
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<tr>
<td>EECE 5630</td>
<td>Software Testing</td>
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<tr>
<td>EECE 5650</td>
<td>Introduction to Algorithms</td>
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<tr>
<td>EECE 5850</td>
<td>Introduction to Intelligent Systems</td>
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<td>EECE 6310</td>
<td>Modern Control Theory</td>
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<tr>
<td>GEEN 5810</td>
<td>Industrial Ecology and Sustainable Design</td>
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<tr>
<td>GEEN 5840</td>
<td>Model-Based Systems Engineering</td>
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<td>MEEN 5270</td>
<td>Physical Systems Modeling</td>
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<tr>
<td>MEEN 5410</td>
<td>Experimental Design</td>
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</table>
Systems Engineering, Certificate

<table>
<thead>
<tr>
<th>PSYC 5330</th>
<th>Human Factors Engineering</th>
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<tbody>
<tr>
<td>Other courses as approved by the Certificate Faculty Sponsor and the associate dean for academic affairs in the Opus College of Engineering.</td>
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</tbody>
</table>

Total Credit Hours: 12

University Policies

- Academic Censure - Graduate School (https://bulletin.marquette.edu/policies/academic-censure/graduate/)
- Academic Integrity (https://bulletin.marquette.edu/policies/academic-integrity/)
- Academic Misconduct (https://bulletin.marquette.edu/policies/academic-misconduct-policy/)
- Academic Program Definitions (https://bulletin.marquette.edu/policies/academic-programs-defined/)
- Accelerated Degree Programs (https://bulletin.marquette.edu/policies/accelerated-degree-programs/)
- Attendance - Graduate School (https://bulletin.marquette.edu/policies/attendance/graduate/)
- Awarding Diplomas and Certificates (https://bulletin.marquette.edu/policies/awarding-diplomas-certificates/)
- Background Checks, Drug Testing (https://bulletin.marquette.edu/policies/background-checks-drug-testing/)
- Class Rank (https://bulletin.marquette.edu/policies/class-rank/)
- Commencement (https://bulletin.marquette.edu/policies/commencement/)
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- Credit Load - Graduate School (https://bulletin.marquette.edu/policies/credit-load/graduate/)
- Faculty Grading (https://bulletin.marquette.edu/policies/faculty-grading/)
- Family Education Rights and Privacy Act-FERPA (https://bulletin.marquette.edu/policies/ferpa/)
- Grade Appeals (https://bulletin.marquette.edu/policies/grade-appeals/)
- Grading System - Graduate School and Graduate School of Management (https://bulletin.marquette.edu/policies/grading-system/graduate-management/)
- Graduation - Graduate School (https://bulletin.marquette.edu/policies/graduation/graduate/)
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- Last Date of Attendance/Activity (https://bulletin.marquette.edu/policies/last-dateof-attendance-activity/)
- Military Call to Active Duty or Training (https://bulletin.marquette.edu/policies/militarycall-active-duty-training/)
- Registration - Graduate School (https://bulletin.marquette.edu/policies/registration/graduate/)
- Repeated Courses - Graduate School (https://bulletin.marquette.edu/policies/Repeated-courses/graduate/)
- Student Data Use and Privacy (https://bulletin.marquette.edu/policies/student-data-use-privacy/)
- Transcripts-Official (https://bulletin.marquette.edu/policies/transcripts-official/)
- Transfer Course Credit - Graduate School (https://bulletin.marquette.edu/policies/transfers-course-credit-policy/graduate/)
- Withdrawal - Graduate School (https://bulletin.marquette.edu/policies/withdrawals/graduate/)

Graduate School Policies

- Academic Performance (https://bulletin.marquette.edu/graduate/policies/academic-performance/)
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- Advising (https://bulletin.marquette.edu/graduate/policies/advising/)
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- Certificate Concurrent Enrollment (https://bulletin.marquette.edu/graduate/policies/certificate-concurrent-enrollment/)
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• Time Limitations (https://bulletin.marquette.edu/graduate/policies/time-limitations/)
• Working with Minors (https://bulletin.marquette.edu/graduate/policies/working-minors/)

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• Environmental Engineering, Certificate (https://bulletin.marquette.edu/graduate/environmental-engineering-certificate/)
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• Renewable Energy Technology and Integration, Certificate (https://bulletin.marquette.edu/graduate/renewable-energy-technology-integration-certificate/)
• Systems Engineering, Certificate (p. 1)