Master of Engineering: 30 Credits / 10 Courses

Students pursuing this option must successfully complete 4 core courses, at least 2 ENPM Robotics specific electives and up to 4 technical electives from the approved list of courses. Students should consult with their advisor prior to registering and have pre-approval for all technical electives. There is no research or thesis required for this degree.

**Robotics Core Courses (take four): recommended for your first year of study**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENPM661</td>
<td>Planning for Autonomous Robots</td>
<td>(every spring)</td>
</tr>
<tr>
<td>ENPM662</td>
<td>Introduction to Robot Modeling*</td>
<td>(every fall)</td>
</tr>
<tr>
<td>ENPM667</td>
<td>Control of Robotic Systems*</td>
<td>(every fall)</td>
</tr>
<tr>
<td>ENPM673</td>
<td>Perception for Autonomous Robots</td>
<td>(every spring)</td>
</tr>
</tbody>
</table>

**ENPM Robotics Electives (choose at least two): recommended for your first year of study**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ENPM690</td>
<td>Robot Learning</td>
<td>(every spring)</td>
</tr>
<tr>
<td>ENPM640</td>
<td>Rehabilitation Robotics</td>
<td>(every fall)</td>
</tr>
<tr>
<td>ENPM645</td>
<td>Human Robot Interaction</td>
<td>(every fall)</td>
</tr>
<tr>
<td>ENPM809Y</td>
<td>Introductory Robot Programming</td>
<td></td>
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<tr>
<td>ENPM692</td>
<td>Manufacturing and Automation</td>
<td>(every spring)</td>
</tr>
<tr>
<td>ENPM808X</td>
<td>Software Development for Robotics [ENPM809Y]</td>
<td>(every fall)</td>
</tr>
<tr>
<td>ENPM809B</td>
<td>Building a Manufacturing Robot Software System</td>
<td>(every spring)</td>
</tr>
<tr>
<td>ENPM809T</td>
<td>Autonomous Robots</td>
<td>(Summer 2019)</td>
</tr>
</tbody>
</table>

**Robotics Pre-approved Technical Electives (choose up to four): recommended for consideration in your second year of study**

**Additional ENPM Robotics Electives can also be counted as Technical Electives**

**Vision and Perception**
- CMSC733 Computer Processing of Pictorial Information
- CMSC734 Information Visualization
- ENEE631 Digital Image and Video Processing
- ENEE633 Statistical Pattern Recognition
- ENEE731 Image Understanding

**Performance Analysis and Design Methods**
- ENME600 Engineering Design Methods
- ENME695 Failure Mechanisms and Reliability
- ENAE697 Space Human Factors and Life Support
- ENSE621 Systems Engineering Concepts and Processes: A Model-Based Approach

**Optimization and Algorithms**
- CMSC 651 Analysis of Algorithms
- CMSC712 Distributed Algorithms and Verification
- CMSC722 Artificial Intelligence Planning
- ENAE681 / ENME610 Engineering Optimization
- ENME607 Engineering Decision Making
- ENEE662 Convex Optimization

**Modeling, Systems and Control**
- ENME605 Advanced Systems Control
- ENME664 Dynamics
- ENEE661 System Theory
- ENEE661 Nonlinear Control Systems
- ENEE664 Optimal Control
- ENEE765 Adaptive Control
- ENAE646 Advanced Dynamics
- ENE743 Applied Nonlinear Control

**Specialty**
- ENME489L Bio-Inspired Robotics
- ENME746 Medical Robotics
- ENSE698E Sensor Systems
- ENAE 692 Introduction to Space Robotics
- ENAE788X Planetary Surface Robots
- ENCE622 Construction Automation & Robotics
- ENPM808 (3 credits) Advanced Topics in Engineering

**NOTE:** Any courses not listed above must be approved by the Senior Academic Advisor PRIOR to registration.

- For non-ENPM courses, permission must be obtained from the professor before enrolling to confirm the student has the appropriate background to be successful in the course.
- OAE cannot guarantee a spot in a non-ENPM course. Students should have back-up courses prepared if they are interested in non-ENPM courses.
- CMSC426 Computer Vision covers content very similar to ENPM673 and will not be approved towards the M.Eng. degree.
- ENPM809Y is a pre-requisite for ENPM808X, and cannot be taken concurrently or subsequently.

**KEY**

<table>
<thead>
<tr>
<th>Offering Information</th>
<th>(offering information)</th>
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</thead>
<tbody>
<tr>
<td>[Prerequisite course]</td>
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</table>