**ROBOTICS, MINOR**

The Department of Mechanical Engineering has a strong Dynamics, Systems and Controls (DSC) group that is research active with wide expertise in Robotics including rehabilitation robotics, soft robotics, medical robotics, industrial robotics and automated manufacturing, biomedical robotics and field robotics. This Robotics minor will educate students in the DSC domain of Robotics and will be accessible to non-ME students, e.g., Electrical Engineering, Computer Science, Chemical Engineering, Aerospace Engineering, Mathematics and Physics to just name a few. Students going through this minor will be prepared to enter a diverse and globally competitive workforce with interdisciplinary knowledge that can meet next-generation challenges relating to robotics and mechatronics.

Robots today are making a considerable impact on many aspects of modern life, from industrial manufacturing to healthcare, transportation, and exploration of the deep space and sea. Robotics is an interdisciplinary field that goes beyond engineering into fields like physics, mathematics, biology, chemistry and psychology. Tomorrow, robots will be as pervasive and personal as today's personal computers. While Mechanical Engineering has a critical contribution to the interdisciplinary field of robotics, the future Mechanical Engineer needs to be well-versed in the interdisciplinary concepts of robotics.

The contribution of Mechanical Engineering to this field can be viewed as a duality of (a) wide exposure to multiple domains at the freshman and sophomore level, and (b) focus on interdisciplinary engineering education in DSC at both junior and senior levels. In recent times, the perception of the industry, students and parents has dramatically changed as the field of robotics is starting to play a critical role in our daily lives. Surveys have shown that given the interdisciplinary nature of the field, a minor in Robotics will strengthen students’ education and their job prospects post-graduation. This minor is open to all students interested in robotics and mechatronics engineering. However, some of the required courses in the minor do have a number of prerequisites.

**Minor in Robotics (18 hours minimum)**

The Minor comprises of 18 credit hours split into two categories of courses: Foundational Courses and Advanced Courses. Student must take a minimum of 9 credit hours from each category.

### Requirements for a Minor in Robotics (18 hours minimum):

<table>
<thead>
<tr>
<th>Foundational Courses:</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Select from the courses listed below:</td>
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<tr>
<td>ME 349 Engineering Analysis</td>
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<td>ME 360 Ctrl Instrumnt Components</td>
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<td>ME 372 Dynamic Systems</td>
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<td>ME 450 Dynamic Machine Components</td>
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<td>AEM 360 Astronautics</td>
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<td>AEM 368 Flight Mechanics</td>
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<td>ECE 333 Electronics II</td>
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<td>ECE 370 Signals And Systems</td>
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<td>ECE 380 Digital Logic</td>
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<td>ECE 383 Microcomputers</td>
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<td>CS 301 Database Management Systems</td>
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<td>CS 302 Database Applications</td>
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<td>MATH 343 Appl Diff Equations II</td>
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<td>MATH 355 Theory Of Probability</td>
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<td>MATH 371 Advanced Linear Algebra</td>
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<td>PH 301 Mechanics I</td>
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<td>PH 302 Intermediate Mechanics</td>
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<td>PH 331 Elect &amp; Magnetism I</td>
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<td>PH 332 Elect &amp; Magnetism II</td>
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<td>ME 448 Biomechanics of Human Movement</td>
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<td>ME 456 Mechatronics</td>
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<td>ME 470 Mechanical Vibrations</td>
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<td>ME 472 Intro to Robot Kinematics</td>
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<td>ME 475 Control Systems Analysis</td>
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<td>ECE 475 Control Robotic Kinematics</td>
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<td>ECE 479 Digital Control Systems</td>
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<td>ECE 486 Embedded Systems</td>
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<td>ECE 487 Embedded Systems Laboratory</td>
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<td>CS 460 Intro to Autonomous Robotics</td>
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<td>CS 465 Artificial Intelligence</td>
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Additional courses may be added to the list of approved courses as appropriate with faculty approval, e.g., new electives relating to the manufacturing program.

**Total Hours** 18