

# 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):

#### Foundational Courses: 9

Select from the courses listed below:

ME 349	Engineering Analysis
ME 360	Contrl Instrumnt Components
ME 372	Dynamic Systems
ME 450	Dynamic Machine Components
AEM 360	Astronautics
AEM 368	Flight Mechanics
ECE 333	Electronics II
ECE 370	Signals And Systems
ECE 380	Digital Logic
ECE 383	Microcomputers
CS 301	Database Management Systems
CS 302	Database Applications
MATH 343	Appl Diff Equations II

MATH 355	Theory Of Probability
MATH 371	Advanced Linear Algebra
PH 301	Mechanics I
PH 302	Intermediate Mechanics
PH 331	Elect & Magnetism I
PH 332	Elect & Magnetism II

#### Advanced Courses: 9

Select from the courses listed below:

ME 448	Biomechanics of Human Movement
ME 456	Mechatronics
ME 470	Mechanical Vibrations
ME 472	Intro to Robotic Kinematics
ME 475	Control Systems Analysis
ECE 475	Control Systems Analysis
ECE 479	Digital Control Systems
ECE 486	Embedded Systems
ECE 487	Embedded Systems Laboratory
CS 460	Intro to Autonomous Robotics
CS 465	Artificial Intelligence

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