

# EN.665 (ROBOTICS AND AUTONOMOUS SYSTEMS)

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## Courses

### **EN.665.645. Artificial Intelligence for Robotics. 3 Credits.**

This course provides an in-depth exploration of artificial intelligence (AI) techniques applied to robotics. Students will gain a comprehensive understanding of the intersection between AI and robotics, covering topics such as perception, planning, control, learning algorithms including deep learning and generative models, and co-operation (swarms). Practical applications of AI in robotics will be emphasized, and students will have hands-on experience with implementing AI algorithms for robotic systems.

### **EN.665.681. Application of Sensing Systems. 3 Credits.**

This course will cover the core concepts and applications of sensing systems. These include problem identification, communication, process control, types of sensors and how they work, sensor data collection techniques, data acquisition protocols, signal processing, system design (low power and mobile), machine learning, and applications including but not limited to smart health, gesture interaction, robotics, and automotive. The course is geared towards giving students direct experience in building sensing systems to act and respond (using machine learning) to information in the environment and solving programming and analytical challenges with data collected from multiple sensors. The course emphasizes an understanding of both data (using systems theory, probability, and simulation), algorithms (using synthetic and real data sets) and hardware (using IoT devices). The assignments weigh conceptual (assessments, readings, discussions, and projects) and practical (labs, problem sets) understanding equally. Prerequisites (AS.110.109 Calculus II, EN.605.206. Introduction to Programming Using Python, and some knowledge of databases and circuits)

### **EN.665.801. Independent Study in Robotics & Autonomous Systems I. 3 Credits.**

This course permits graduate students in robotics and autonomous systems to work with a faculty mentor to explore a topic in depth or conduct research in selected areas. Requirements for completion include submission of a significant paper or project. Prerequisite(s): Seven program-applicable graduate courses including the four core courses, at least one focus area courses, and two 700-level courses. Students must also have permission of a faculty mentor, the student's academic advisor, and the program chair

### **EN.665.802. Independent Study in Robotics & Autonomous Systems II. 3 Credits.**

Students wishing to take a second independent study in robotics and autonomous systems should sign up for this course. Prerequisite(s): EN.665.801 Independent Study in Robotics and Autonomous Systems I and permission of a faculty mentor, the student's academic advisor, and the program chair.