AUTONOMY AND ROBOTICS CGS

All students must meet the Requirements for Certificate of Graduate Study.

OVERVIEW

Autonomy and robotics are reshaping the modern world. From advanced manufacturing and intelligent transportation systems to robotic surgery, precision agriculture, energy infrastructure, and next-generation defense technologies, these rapidly evolving fields are driving innovation, strengthening economies, and improving quality of life across industries.

Autonomous systems combine tools and concepts from control systems, signal processing, computer programming, and artificial intelligence to enable engineered systems to perceive, decide, and act independently. Robotics integrates mechanical design, actuator and sensor systems, mathematical modeling, and embedded programming to create machines capable of performing complex, real-world tasks. Together, autonomy and robotics form the technological backbone of many of today's most transformative advancements.

The 12 credit Certificate of Graduate Study in Autonomy and Robotics (CGS-AR) provides a rigorous foundation in autonomous systems, robotics, and artificial intelligence. Designed to formally recognize advanced training in these areas, the program equips students with the interdisciplinary knowledge and technical skills required to lead in this rapidly growing field. While particularly well-suited for graduate students in Electrical Engineering, Mechanical Engineering, and Computer Science, the certificate is open to students across related disciplines seeking expertise at the forefront of intelligent systems.

SPECIFIC REQUIREMENTS

MINIMUM DEGREE REQUIREMENTS

The 12 credit CGS-AR program consists of four courses from the list below.

Requirement Description		Credits
At least 1 of these 3 courses must be taken:		
EE 5550	Autonomy: Control & Planning	3
EE 5560	Autonomy: Robot Perception	3
ME 5320	Fundamentals of Robotics	4
The remaining courses can be selected from the following:		
EE 5503	Modern Signal Processing	
EE 5540	Real-Time Control Systems	
EE 5550	Autonomy: Control & Planning	
EE 5560	Autonomy: Robot Perception	
EE 6130	Convex Optimization	
EE 6520	Nonlinear System Theory	
ME 5320	Fundamentals of Robotics	
ME 6120	Advanced Dynamics	
CS 5540	Advanced Machine Learning	
or CS 5611	Machine Learning for Engineers	
or CMPE 5611	Machine Learning for Engineers	
CS 5060	Advanced Evolutionary Robotics	
CS 6020	Modeling Complex Systems I	
CS 6540	Deep Learning	
CS 5909	Natural Language Processing	
EE 6991	Internship	
or ME 6991	Internship	
or CS 6991	Internship	
EE 6993	Independent Study	
or ME 6993	Independent Study	
or CS 6993	Independent Study	
EE 6995	Graduate Independent Research	
or ME 6995	Graduate Independent Research	
or CS 6995	Graduate Independent Research	