

# ROBOTICS AND AUTOMATION GRADUATE ACADEMIC CERTIFICATE

This certificate will produce students that have a deep understanding of the Robotics stack from the lower level motors and controllers through PLC controllers and into higher level cognitive processes including using modern AI techniques. It is designed to encourage research in robotics by M.S. and Ph.D. graduate students.

All required coursework must be completed with a grade of B or better (O-10-b (<https://catalog.uidaho.edu/general-requirements-academic-procedures/o-miscellaneous/>)).

Code	Title	Hours
CS 5553	Robotic Systems Engineering I	3
CS 5554	Robotic Systems Engineering II	3
Any two of the following:		6
CS 5543	Embedded Systems	
CS 5440	Supervisory Control and Critical Infrastructure Systems	
CS 5502	Real-Time Operating Systems	
CS 5885	Machine Vision	
CS 5556	PLC Programming for Automation	
CS 5701	Artificial Intelligence	
CS 5731	Evolutionary Computation	
CS 5715	Deep Learning	
CS 5712	Machine Learning	
CS 5771	Python for Machine Learning	
ME 5640	Robotic Dynamics, Simulation, and Control	
<b>Total Hours</b>		<b>12</b>

## Courses to total 12 credits for this certificate

Industrial automation in manufacturing is key to improving productivity and maintaining competitiveness both domestically and internationally. This certificate will produce students that have a deep understanding of the Robotics stack from the lower level motors and controllers, through PLC controllers and into higher level cognitive processes including using modern AI techniques. This certificate is also designed to encourage research in robotics by MS and PhD students.

## Learning Outcomes

- An ability to understand and apply engineering principles to software, hardware, safety and environmental aspects of robotic systems.
- An ability to understand the entire robotic stack from control software down to the level of embedded systems and motors.
- An ability to incorporate modern software paradigms, involving options such as embedded systems, artificial intelligence and machine learning.
- An ability to understand professional responsibilities and make informed judgements in practices based on legal and ethical principles as they relate to modern robotic systems.