ROBOTICS (ROBO)

Courses

ROBO 320 - Robot Modeling and Dynamics **Credits 3**
This course covers the theoretical fundamentals and simulation tools for the kinematic and dynamic modeling of robotic manipulators. Topics include coordinate frames and transformations, forward and inverse positional kinematics, velocities and Jocobians of linkages, dynamics, path planning, collision avoidance, and trajectory optimization. **Grade Mode:** A.
Prerequisite(s): MATH 334, PHSC 132, PHSC 134.
Restriction(s): Must be Undergraduate Level.

ROBO 322 - Embedded Systems **Credits 3**
An introduction to embedded systems programming. Relevant theory and design practices covering discrete devices, application specific integrated circuits, and programmable logic devices. Both lecture and laboratory sessions will be integrated into the class meeting times as required. **Lecture/Lab Hours:** Two hours lecture; three hours laboratory, weekly. **Grade Mode:** A.
Prerequisite(s): CSCI 105, PHSC 233, PHSC 237.
Restriction(s): Must be Undergraduate Level.
Course Fee: $115.

ROBO 410 - Artificial Intelligence **Credits 3**
Concepts and techniques of artificial intelligence, representation, search strategies, control, communication and perception, and applications. **Grade Mode:** A.
Prerequisite(s): CSCI 106.
Restriction(s): Must be Undergraduate Level.

ROBO 420 - Programming of Autonomous Mobile Robots **Credits 3**
An introduction to mobile robots and mobile robot programming. Topics covered include mobile robot modeling and kinematics, sensing, control, localization, motion planning and navigation. The course will offer both a theoretical and experimental treatment of those topics through student involvement in programming of autonomous robots. **Lecture/Lab Hours:** Two hours lecture, three hours laboratory. **Grade Mode:** A.
Prerequisite(s): CSCI 106, MATH 320, MATH 334.
Restriction(s): Must be Undergraduate Level.
Additional Fee(s): May involve lab fees of up to $115.

ROBO 430 - Control Systems **Credits 3**
An introduction to basic principles and tools of feedback and control. Topics include input/output response, stability and feedback, modeling and model reduction, local and global behavior, and linear vs. nonlinear models. **Grade Mode:** A.
Prerequisite(s): MATH 291 and MATH 335; or MATH 334.
Restriction(s): Must be Undergraduate Level.

ROBO 465 - Special Topics in Robotics **Credits 1-4**
Various topics in robotics. **Note(s):** May be taken multiple times for credit with different content; course may have a lecture and lab component (for example, 2 credit lecture; 1 credit lab). **Grade Mode:** A.
Restriction(s): Must be Junior Class, or Senior Class; and Undergraduate Level.
Repeat Limit (after first attempt): 8.

ROBO 471 - Robotics Capstone **Credits 3**
This course explores advanced topics in robotics. As part of a team, students will work on a semester long project that will allow them to demonstrate and build on the skills and knowledge acquired in the robotics field. **Note(s):** May involve lab fees of up to $115. **Grade Mode:** A.
Prerequisite(s): ROBO 420.
Restriction(s): Must be Junior Class, or Senior Class; and Undergraduate Level.

ROBO 480 - Internship in Robotics **Credits 1-3**
Professionally supervised participation in pre-approved research or a project at an off-campus site. Documentation of the time spent and the activities performed as well as a written paper or presentation explaining the experience are required. **Note(s):** Special approval required; each credit of Internship requires 45 hours of internship activity. **Grade Mode:** A.
Restriction(s): Must be Undergraduate Level.
Repeat Limit (total number of credits): 6.

ROBO 490 - Directed Research **Credits 1-3**
Research activity under the supervision of the primary researcher or self-directed research under the supervision of the instructor of record. **Note(s):** Special approval required; each credit of Directed Research requires a minimum of 3 hours of research activity per week. **Grade Mode:** A.
Restriction(s): Must be Undergraduate Level.
Repeat Limit (total number of credits): 8.
Additional Fee(s): May involve lab fees of up to $115.