**Basic Course Information:** CS 5210

Course Title: Robotics

Units: 3 units

CS number: C-2

Component: Lecture

Instructional Mode: Face-to-Face and web-assisted

Grading Basis: Graded only

Repeated Basis: May be taken only once

Cross listed Course:

Dual-listed Course: N/A

Major course/Service course/GE course: Major course

Date Prepared: Apr. 1, 2015

Prepared by: Daisy Tang

# I. Catalog Description

Software for intelligent robotics. Robot control paradigms. Robotic behaviors. Sensing. Navigation, planning, localization, and mapping.

**II. Required Coursework and Background**

Pre-requisite(s): CS 2560 and CS 3310, or consent of instructor.

# III. Expected Outcomes

On successful completion of this course, students will be able to:

* Recognize challenges of designing software for a single robot control.
* Compare and contrast different control paradigms.
* Gain proficiency in programming robotic behaviors.
* Gain knowledge of sensing.
* Gain experience in navigation, planning, localization and mapping.
* Be familiar with robot simulators.

Outcomes of this course will build student capacity in each of the following areas as defined by programmatic objectives for the computer science major.

P-SLO 3. An ability to build applications, either individually or in a team, that are robust, reliable, and maintainable.

P-SLO 4. A breadth of advanced knowledge and skills in applied areas of computer science.

# IV. Instructional Materials

**Required text**:

Introduction to AI Robotics, by Robin Murphy, MIT Press, 2000.

**Reference**:

Probabilistic Robotics, by Thrun, Burgard, and Fox, MIT Press.

# V. Minimum Student Material

Textbook and class handouts

# VI. Minimum College Facilities

A classroom with a projection system, whiteboard, and a computer lab

# VII. Course Outline

* Introduction to software issues for intelligent robots
* History of robotics
* Three robotic control paradigms
* Robot behaviors
* Reactive and behavior-based paradigms
* Design behavior-based system
* Sensing
* Navigation
* Localization and mapping

# VIII. Instructional Methods

Lecture

Problem-solving/Discussion

In-class exercises

Small group activities

Programming projects

# IX. Evaluation of Outcomes

A. Student Assessment

1. Homework/Project assignments

2. Midterm exam

3. Final exam

4. Project demo and presentation

B. Meaningful Writing Assignment

Students are required to write project reports.

C. A Matrix of Course Student Learning Outcomes vs Methods of Assessment

If the course is being evaluated for accreditation purposes, approved department accreditation assessment tools will additionally be utilized.

|  |  |  |  |
| --- | --- | --- | --- |
| Course Learning Outcomes | Methods of Assessment | | |
| In Class Exercises | Programming Projects | Exams |
| Recognize challenges of designing software for a single robot control. | X | x | x |
| Compare and contrast different control paradigms. | X |  | X |
| Gain proficiency in programming robotic behaviors. | X | X | X |
| Gain knowledge of sensing. | X | X | X |
| Gain experience in navigation, planning, localization and mapping. | X | X | x |
| Be familiar with robot simulators. | x | x | x |