

OHLONE COLLEGE
Ohlone Community College District
OFFICIAL COURSE OUTLINE

I. Description of Course:

1. **Department/Course:** CNET - 116
2. **Title:** Introduction to Programming Using Robotics
3. **Cross Reference:**
4. **Units:** 4
Lec Hrs: 3
Lab Hrs: 3
Tot Hrs: 108.00
5. **Repeatability:** No
6. **Grade Options:** Grade Only (GR)

7. **Degree/Applicability:**
Credit, Degree Applicable, Transferable
- CSU (T)

8. **General Education:**

9. **Field Trips:** Not Required

10. **Requisites:**

12. Catalog Description:

This course is designed to teach the beginning programmer how code programs using robots. Emphasis will be placed on basic Java programming concepts and skills. A "Create" robot from iRobot is used by the student to exercise their new programming skills. The student will have the opportunity to extend the mechanical functionality of the base robot and program sensors they attach to the robot.

13. Class Schedule Description:

An introduction to computer programming using robots and Java.

14. Counselor Information:

Students will learn the fundamentals of computer programming in a new and exciting way by using a robots-centered curriculum. We hope to have this course meet the requirements for an traditional introduction to Computer Science course.

II. Student Learning Outcomes

The student will:

1. Demonstrate the basics of programming design and implement solutions to problems by writing, running, and debugging computer programs.
2. Develop and select appropriate algorithms and data structures to solve problems.
3. Write interactive programs using and implementing commonly-used algorithms and data structures.
4. Code fluently in an object-oriented paradigm using the programming language Java.
5. Troubleshoot computer programs by testing code and identifying design flaws.
6. Program the robot for movement, environment detection, and decision making required by environmental input generated by bumpers and range sensors.

III. Course Outline:

- A. Introduction to Java Programming and Robotics
 - 1. Using Java and Robot API documentation
 - 2. coding guidelines
 - 3. Java statements and their structure
- B. Basic Java constructs
 - 1. Simple control statements
 - 2. Classes
 - 3. Strings
 - 4. Console input and output
 - 5. Data types
 - 6. Variables and constants
 - 7. Assigning values
 - 8. Numeric classes
 - a. MATH
 - b. INTEGER
 - c. RANDOM
 - 9. Documentation
 - a. In the code
 - b. javadocs
 - 10. Boolean expressions
 - 11. If/then/else and switch statements
 - 12. Time and dates
- C. Advanced Java constructs
 - 1. Loops
 - 2. break and continue
 - 3. static methods
 - 4. Packages
 - 5. Arrays
 - 6. Inheritance
 - 7. Exceptions and error handling
 - 8. Collections and linked lists
- D. Robotics
 - 1. The classes available in the robot API
 - 2. Using the Java Thread class
 - 3. Environment detection
 - a. Bumpers and events
 - b. Camera and picture analysis
 - c. Range sensing
 - 4. Robot locomotion
 - 5. Servos
- E. Graphics
 - 1. The Swing classes
 - 2. Event handling
 - 3. Using Jigloo to generate the graphic interface

IV. **Course Assignments:**

A. Reading Assignments

1. Textbook reading assignments

B. Projects, Activities, and other Assignments

1. Hands-on programming and lab assignments

C. Writing Assignments

1. Documentation of programming and lab assignments.

V. **Methods of Evaluation/Assessment:**

A. Objective exams

B. Skills-based assessments

VI. **Methods of Instruction:**

A. Lecture

B. Laboratory

C. Discussion

D. Demonstration

E. Collaborative Learning

VII. **Textbooks:**

Recommended

1. Joel Murach and Andrea Steelman *Murach's Java SE 6* 1st Edition, Murach Books, 2008
ISBN: 10: 1-890774-42

Supplemental

VIII. **Supplies:**

CID 3092