

COURSE OUTLINE

ENES-150

Intermediate Programming Concepts for Engineers

3 Credits

HOWARD COMMUNITY COLLEGE

Description

This course will introduce students to intermediate principles of software development and will include high level languages, abstract Data Types, documentation, data structures, graphs and dynamic memory allocation. Students will work in software development teams on projects in electrical and computer engineering fields. The programming language C will be used in a version control environment to design and test code. Software development projects will involve relevant engineering topics, such as modeling, robotics, cryptography, bioinformatics, embedded software, game programming, image processing, and wireless sensor networks. Prerequisite: ENES-104 or appropriate score on placement test; Co-requisite: MATH-181. (2 hours lecture, 2 hours lab)

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Develop robust and extensible software through effective software engineering practices.
2. Apply object oriented design and use complex data structures and abstract data types.
3. Demonstrate an ability to learn new languages, libraries and software development concepts in the future.
4. Create test suites and periodic builds, as a member of a team, using version control.
5. Demonstrate an ability to use AGU and Common Public license tools such as GCC.
6. Demonstrate an ability to model objects using the standardized specification UML.

Major Topics

- I. Advanced programming concepts: coding conventions and style, unit testing, separate compilation and makefiles
- II. Pointers
- III. Dynamic memory allocation
- IV. Structures
- V. Variable Arrays
- VI. Linked list
- VII. Estimating performance
- VIII. Unit tests and test driven development
- IX. Graphs and applications
- X. Other dynamic data structures
- XI. Team-Based software projects: Version control systems, Test suites, Periodic builds, Pair programming

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member. Grades will be based on homework, tests, projects, and class participation.

Other Course Information

This course is required in the Engineering AA Degree Program and for the Electrical Engineering ASE Degree Program.