

EE 160 Programming for Engineers

Designation: Required

Catalog Description:

EE 160 Programming for Engineers (4) (3 Lec, 1 3-hr Lab) Introductory course on computer programming and modern computing environments with an emphasis on algorithm and program design, implementation and debugging. Includes a hands-on laboratory to develop and practice programming skills. Restricted to engineering freshmen and sophomores. A-F only. Pre: Math 241 (or concurrent) or consent.

Credits: 4

Pre- and Co-requisites: Pre-requisites: Math 241 (or concurrent) or consent.

Class/Lab Schedule: 3 lecture hours per week, 1 3-hr lab per week.

Topics Covered:

1. Computers as a tool in developing computer solutions to problems. (2 hrs)
2. Working in teams (1 hr)
3. A design process for writing programs to solve problems (5 hrs)
4. C program organization, simple program constructs and sources of errors (2 hrs)
5. Variables, data types, declarations and assignments (3 hrs)
6. Reading and printing data (1 hrs)
7. Using functions as an abstraction and modular programming (3 hrs)
8. Looping and branching constructs (4 hrs)
9. Character processing (3 hrs)
10. Examples and limitations of numeric processing (3 hrs)
11. Use of Pointers (4 hrs)
12. Use of Arrays, 1D and 2D (4 hrs)
13. Use of Strings (2 hrs)
14. Standard C library and interaction with the operating system (3 hrs)
15. Use of Structures (1 hrs)

Textbook and Other Required Materials:

“Programming in C”, B. Kinariwala and T. Dobry (unpublished textbook).
Course website <http://ee.hawaii.edu/~tep/EE160>.

Course Objectives and Relationship to Program Objectives:

A student should understand (i) the basic design process in going from a specification, developing an algorithm, implementing the algorithm in C, and testing and verifying programs of small to medium size, (ii) the fundamental programming constructs including variables, scalar and compound data types, functions, and looping and branching, and (iii) the use of library

functions and interaction with the operating system. Students should be able to work in teams to meet learning objectives and complete assignments. [Program Objectives this course addresses: 1, 2 and 4.]

Course Outcomes and Their Relationship to Program Outcomes

- Write an algorithm to solve a problem.[3,5]
- Design modular programs.[3,5]
- Declare variables of an appropriate type and write expressions to perform computation.[3,11]
- Define functions to perform subtasks and pass parameters.[3,5,11]
- Use scalar and compound data types as appropriate for the application.[3,5,11]
- Use Standard C library functions for I/O and computation.[3,9,11]
- Write programs using characters and strings.[3,11]
- Compile, troubleshoot and debug C programs.[11]
- Work in effective teams to solve complex problems.[4,9]

Contribution of Course to Meeting the Professional Component

Engineering topics: 100%

Computer Usage:

There is extensive computer usage as this is a programming course. Students are introduced to and explore the Unix operating system and use it to submit all assignments for grading and return. All course related material is provided on-line.

Design Credits and Features:

This is an introductory programming course and carries no design credits. Students are exposed to the engineering design process as it applies to software engineering and are given an opportunity in homeworks and labs to practice the process in developing computer solutions to problems.

Instructor(s): T. Dobry, D. Yun

Person(s) Preparing Syllabus and Date: T. Dobry, 12 Feb. 2009