

## MAE 9 C/C++ Programming

**Designation:** Required course.

**Catalog Data:**

MAE 9 C/C++ Programming (4)

C/C++ computer programming under the UNIX environment with applications to numerical problems fundamental to computational mechanics. Arithmetic operations, branches, arrays, data structures, and use of pointers are introduced. In addition, programming ethics are discussed.

**Prerequisites:** None.

Priority enrollment is given to engineering majors.

**Textbook:** H. Murakami, Introduction to C Programming for Engineers and Scientists, UCSD Student Soft Reserve, 1998.

**Prerequisites by topics:** Vectors and dot products

**Class/Laboratory Schedule:** 4 lecture hours per week

**Course Topics:**

1. Introduction to the UNIX system and vi editor
2. Programming ethics
3. Program structure, constants, and variables
4. Printf() and scanf() functions
5. For-loops and if/else statements
6. File I/O by using fscanf(), fgets(), and fprintf()
7. Functions
8. Arrays and pointers
9. Structures

**Course Objectives:**

(Numbers in parentheses refer to the Program Outcome of Mechanical and Aerospace Engineering Programs.)

Objective 1: To teach students basic programming skills under the UNIX environment (11k)

Objective 2: To teach students basic programming skills to compute inner array product and matrix multiplication (5e, 11k)

Objective 3: To teach students modular programming skills (11k)

Objective 4: To teach students processing data files (1a, 11k)

Objective 5: To teach students locating resources on engineering ethics (5e)

**Methods of Evaluation:**

1. Homework assignments
2. Quizzes in a computer laboratory
3. Final examination

**Performance Criteria:**

(Numbers in parentheses refer to the Program Outcomes of the Mechanical and Aerospace Engineering Programs.)

Objective 1

Students successfully develop programs by using ANSI C or C++ compiler under the UNIX environment. (1, 2)

Objective 2

Students develop programs in homework and quizzes to compute inner products of two one-dimensional arrays and multiplication of matrices stored in two-dimensional arrays. (1, 2, 3)

Objective 3

Students develop programs with various functions. (1, 2, 3)

Objective 4

Students process a large ASCII input data files, analyze them, and make output files. (1, 2, 3)

Objective 5

Students locate available resources on engineering ethics by using Google. (1)

**Prepared by:** H. Murakami, March 2000

**Revised by:** H. Murakami and V Lubarda, April 2008 via Teaching Work Group meeting