

ET375P

C Programming in Linux

[Onsite]

Course Description:

Students will have the opportunity to program in the C language running in the Linux operating environment. Emphasis is on problem solving, structured programming style and documentation. Instruction on the use of debugging techniques is also included.

Prerequisite(s) and/or Corequisite(s):

Prerequisite: An introduction to computer programming course or a microprocessors and industrial applications course or equivalent

Credit hours: 4

Contact hours: 66 (46 Theory Hours, 20 Lab Hours)

STUDENT SYLLABUS: C PROGRAMMING IN LINUX

Instructor: _____

Office hours: _____

Class hours: _____

Major Instructional Areas

Unit 1

Chapter 0: Introduction to Linux and C Programming

- Introduction to the Linux Environment: commands needed and file operations
- Need for Data Types
- Classical Program Structures

Unit 2

Chapter 1: An Overview of C

- Components of a C Program
- Character sets
- Functions in C
- Compiling a C program
- More information on Linux: editing and compiling

Unit 3

Chapter 2: Understanding Lexical Elements, Operators, and the C System

- Need for Simple Data Types
- Integer Data Type

Unit 4

Chapter 3: The Fundamental Data Types

- Character Data Type
 - Input and output of integers and characters
 - Floating Point Data Type
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Unit 5

Chapter 4: Flow Control

- Conditional Execution
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Unit 6

Chapter 5: Functions

- Iteration
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Unit 7

Chapter 6.1 to 6.9: Arrays, Pointers, and Strings

- User-defined functions
 - Recursive functions in C
 - Scope of variables in C functions
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Unit 8

Chapters 6 and 7: Pointers

- Pointers
 - Pointer declarations
 - Working with pointers
 - Pointers and functions
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Unit 9

Chapters 9.1 - 9.7 and 10.1 - 10.5: Structures, Unions, and List Processing

- Need for Arrays and structures
- Arrays in C and their relation to structures in C

- Unions and intersections
- List Processing

Unit 10

Chapter 11: Input/Output Need for persistent storage

- Opening and closing a data file
- Formatted file I/O operations
- Error Handling
- Character I/O operations

Unit 11

Final Examination

- Review session
- Final examination

Course Objectives

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

1. Identify the need for structured programming.
2. List the features of a structured programming language.
3. Use the Linux environment needed for C programming
4. Define the functions used in a C program.
5. Use the standard C library in a program.
6. Identify the use of logical operators in a program.
7. Identify the use of the input and output data types in a program.
8. Define the character constants in a C program.
9. List the functions of floating point constants.
10. Identify the use of conditional executions in a program.

11. Identify the use of iterations in a program.
12. Describe the user-defined functions.
13. Define a pointer.
14. Identify the role of pointer operations.
15. List the various storage classes.

Student Textbook

- Kelley, AI and Ira Pohl. A Book on C, from 4th ed., Pearson Custom Publishing, 2004.

Course Schedule

| Unit | Topic (Lecture Period) | Lab and Other Coverage |
|------|--|-------------------------|
| 1 | Starting from Zero Linux commands and file operations | |
| 2 | An Overview of C Linux text editor and C compiler | Lab, Homework Exercises |
| 3 | Lexical Elements, Operators, and the C System | Lab, Homework Exercises |
| 4 | The Fundamental Data Types | Lab, Homework Exercises |
| 5 | Flow of Control | Lab, Homework Exercises |
| 6 | Functions | Lab, Homework Exercises |
| 7 | Arrays and Pointers | Lab, Homework Exercises |
| 8 | Strings and Bitwise Operators and Enumeration Types | Lab, Homework Exercises |

| | | |
|----|------------------------|--|
| 9 | Structures and Unions | Lab, Homework Exercises, Project |
| 10 | Input/Output | Lab, Homework Exercises, Project |
| 11 | Final Term Examination | Review session: The final examination will be based on the content covered in Units 1 through 10. |

Evaluation Criteria and Grade Weights

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|---------------------|-----|
| Homework Exercises: | 25% |
| Lab Exercises: | 30% |
| Final exam: | 25% |
| Project and Quiz: | 20% |

Final grades will be calculated from the percentages earned in class as follows:

| | | |
|----|-----------|-----|
| A | 90 - 100% | 4.0 |
| B+ | 85 - 89% | 3.5 |
| B | 80 - 84% | 3.0 |
| C+ | 75 - 79% | 2.5 |
| C | 70 - 74% | 2.0 |
| D+ | 65 - 69% | 1.5 |
| D | 60 - 64% | 1.0 |
| F | <60% | 0.0 |