

ECE 1125 – C Programming for Electrical and
Computer Engineering
Spring 2016
The George Washington University

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1 Introduction

This course introduces undergraduate students to computer programming and solving engineering problems using the C programming language. Students will learn to analyze, decompose, and translate real-world problems into computational problems. Special emphasis will be on writing clear well-structured code.

Topics include basic programming concepts, including algorithmic thinking and structured programming, control flow, data types, pointers, functions, algorithms, I/Os, threads, and performance evaluation and optimization. Advanced topics include concurrency and multicore programming using threads, processes as well as parallel C programming paradigms, and controlling hardware devices and fine control via interfacing with assembly language.

Students are required to honor the GWU Code of Academic Integrity when completing all assignments, projects, and examinations.

1.1 Textbooks

Stephen G. Kochan, *Programming in C* (4th Edition).

Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language* (2nd Edition).

1.2 Office Hours

The instructor's office hours are Tuesdays and Thursdays 9:30am - 10:30am in SEH 5750, and by appointment.

2 Grading

Participation (Including Lab Attendance)	10%
Homeworks and Lab Assignments	25%
Projects (One or Two Major Projects)	20%
Midterm	20%
Final Exam	25%

2.1 Policies

- **Participation:** Each student must be willing to participate fully in the class. It is necessary, but not sufficient to just show up to class.
- **Assignments:** You will be assigned homework and lab assignments to complete under guidance from the teaching assistant.
- **Projects:** There will be one or two major projects during the semester, each requiring a significant amount of time to finish. You are strongly encouraged to talk to the instructors often and seek help as soon as possible.
- **Late Penalty:** Note that there is a **20% per day penalty for each day an assignment is late.**

2.2 Course Contents

2.2.1 Introduction to Computer Systems

- Engineering problems as computational problems
- Overview of computer systems
- Software design

2.2.2 Introduction to C

- Code build process (editing, compiling, linking, executing)
- Elements of a C program; preprocessor directives; statements and expressions; functions; coding formatting style
- Simple data types; constants and variables; conversion between different data types; binary arithmetic representations
- The integrated development environment (IDE)

2.2.3 Program Flow Control

- Conditions; relational operators; logical operators; precedence rules; selection structures
- Repetition and loop statements; while statements; for statements; increment and decrement operators; loop termination; nested loops; do-while statements
- Debugging

2.2.4 Modular Programming

- User functions; library functions; function declaration and definition; function calls; pass by value; scope rules; programs with multiple functions
- Pointers and addresses; pass by reference; pointer arithmetic
- File input/output

2.2.5 Simple data structures

- Arrays; declaration and initialization; multi-dimensional arrays; searching and sorting arrays; pointers and arrays
- String arrays; string library functions; substrings; concatenation; strings vs. characters
- Engineering applications; matrix algebra; numerical integration and differentiation; quadratic equations
- Recursion
- Structures; structures and functions; arrays of structures; dynamic data structures