CSE 20311 - Fundamentals of Computing

Spring 2020

Instructor: Corey Pennycuff
Email: cpennycu@nd.edu
Office Hours: See Course Website
382 Fitzpatrick, or by appointment

Class Meeting: MWF 10:30 - 11:20
Nieuwland Science Hall 123
TA Office Hours: TBA

Course Description

This course is the first semester in the Fundamentals of Computing and Data Structures sequence for Computer Science and Computer Engineering majors. In this course, students will learn how to apply basic problem solving strategies, formulate algorithms, and apply techniques to different problem domains.

We will focus on the fundamentals of programming in the C and C++ programming languages and how these programming languages relate to the underlying computer hardware. Homework assignments will focus on practical, programming-based problems. The course lectures give the information necessary for students to be able to understand the requisite programming theory as well as the interaction of code with the underlying hardware. As with any any skill, practice is required to develop competence and skill in computer programming. As such, this course will provide assignments and challenges for the purpose of exercising and strengthening programming ability.

Organization

Course content is taught through in-class lectures, programming labs, and through online supplementary materials that may be provided from time to time. This class will also utilize online forums when necessary, to provide for inter-student communication, peer help, and other announcements.

Course Objectives

1. Demonstrate basic proficiency in the C++ programming language.
2. Formulate algorithms to solve basic computational problems.
3. Develop a strong understanding or Object-Oriented Programming.
4. Construct larger programs by identifying and solving sub-problems.
5. Efficiently use existing classes and libraries.
6. Apply basic concepts of software engineering.
7. Apply pointers, arrays, and data structures correctly.
8. Apply dynamic memory allocation correctly.
9. Apply basic I/O operations to read and write data files.
10. Understand the basic concepts of algorithmic complexity.
11. Apply basic architectural concepts to program design.

**General Course Topics**

1. Command Line Skills
2. C/C++ Introduction
3. Variables and Variable Types
4. Control Flow Structures
5. Functions and Recursion
6. C-strings and Arrays
7. Structs and Objects
8. Pointers
9. STL structures
10. Iterators, Ranged-For Syntax, and other C11, C14, and C17 features
11. Project organization and 3rd-party library integration

**Text and Required Supplies/Resources**

- Online resources such as [http://www.cplusplus.net](http://www.cplusplus.net) should be referenced as needed.
- Resources will be updated at [https://nd.edu/~cpennycu](https://nd.edu/~cpennycu).
- Command Line introduction videos at [https://goo.gl/NQcLwt](https://goo.gl/NQcLwt)

**Grading Plan**

- Grade composition:
  - Homework — 40%
  - Exams — 40%
  - End-of-term Project — 15%
  - Participation — 5%

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- Extra Credit may be assigned from time to time at the discretion of the Instructor.
Classroom Rules of Conduct

1. Use of electronics are permitted during lectures, providing that their use is related to the lecture subject and that it is not distracting to other students.

2. Homework is due at the beginning of class on the stated due date, unless otherwise indicated.

3. No late homework will be accepted. No excuses are accepted.

4. All work that a student submits must be his or her own, original solution to the problem or assignment. Any exceptions to this rule will be explicitly stated.

5. All work must conform to the CSE specific application of the Honor Code (https://cse.nd.edu/undergraduates/honor-code).

6. Any and all plagiarism, cheating, unauthorized answer-sharing, or any other form of academic dishonesty will be strictly dealt with in accordance with the Notre Dame Academic Code of Honor (http://honorcode.nd.edu/).

Classroom Recording Notification

This course may or may not be recorded using Panopto. This system allows us to automatically record and distribute lectures to you in a secure environment. You can watch these recordings on your computer, tablet, or smartphone. In the course in Sakai, look for the “Panopto” tool on the left hand side of the course.

Because we may be recording in the classroom, your questions and comments may also be recorded. Recordings typically only capture the front of the classroom, but if you have any concerns about your voice or image being recorded please speak to me to discuss your concerns. Except for faculty and staff who require access, no content will be shared with individuals outside of your course without your permission.

These recordings are jointly copyrighted by the University of Notre Dame and your instructor. Posting them to other websites (including YouTube, Facebook, SnapChat, etc.) or elsewhere without express, written permission may result in disciplinary action and possible civil prosecution.