Lecture: Monday, Wednesday & Friday, 9:25-10:15, DeBartolo Hall 141

Labs (CSE 21212): You are required to attend the lab section you are registered for.
• Section 1: Monday 4:00-4:50 pm in Fitzpatrick B019
• Section 2: Tuesday 5:00-5:50 pm in Fitzpatrick B019
• Section 3: Wednesday 3:00-3:50 pm in Fitzpatrick B019
• Section 4: Wednesday 4:00-4:50 pm in Fitzpatrick B019

An Invitation

It is our goal for you to learn data structures and enjoy this course! We would like to balance us having a positive experience with developing real, applied skills that will be highly useful to you in interviews, this summer, and beyond. Remember the TAs and we are here at every step to help. With this in mind we will have both active learning experiences and in-class presentations. I will also try to attend each lab briefly to answer questions one-on-one.

Team Fund II:

• Dr. Scott Emrich
  • Office: 211B Cushing Hall; 631-0353
  • Electronic contact: semrich@nd.edu; IM/Skype: semrichnd; Google: scott.emrich
  • Tentative office hours: See Doodle poll email at start of semester; by appointment
  • If my office door is open, you are welcome to come in and ask questions; office visits, however, are best arranged via email.

• Dr. Shreya Kumar
  • Office: 378 Fitzpatrick Hall; Electronic contact: shreya.kumar@nd.edu
  • Office hours: Tuesday/Friday 3.00 pm – 4.30 pm and by appointment.

• See Piazza and course page for our undergraduate Teaching Assistants (TAs)

Our textbooks:

• Deitel, C++ How to Program, Pearson/Prentice-Hall; 7th or later edition is fine
• Main and Savitch, Data Structures and Other Objects Using C++ (former DS text)
• Other material will be posted online from open access and other web resources as needed

Course Outcomes: To successfully complete the course, students must be able to:

1. Demonstrate understanding of, and proficiency in use of C++/object-oriented concepts including data hiding, inheritance, templates, and design patterns. Assessed via exam and programming assignments.
2. Analyze the performance of data structures in order to select the right one for each situation, as well as create or extend data structures to fit new situations. Assessed in exams and in programming assignments.

3. Combine data structures to solve real world problems, employing abstractions to make them work together cleanly and safely. Assessed through the final project.

**Major Topics:**

1. Review of C++ basics (2.5 hours)
2. Object-oriented programming (overloading, inheritance, polymorphism) (3.5 hours)
3. Templates including arrays and lists (4 hours)
4. Stack and queue data structures (5 hours)
5. Runtime analysis (1 hour)
6. Basic software design principles/case studies (4 hours)
7. Sorting (2 hours)
8. Binary search trees (3 hours)
9. Balanced search trees (3 hours)
10. Maps, sets, and hash tables (3 hours)
11. Graphs (3 hours)
12. In-class examples of object-oriented programming: OOP week! (4 hours)
13. Collaborative reviews and midterm (3 hours)

**Grading:** Your letter grade will be computed from a course percentage that is a weighted sum of the fraction of points received in five groups of graded work plus participation:

- 40%: Programming assignments (labs)
- 25%: Final project
- 15%: midterm exam (Monday, February 22, in class)
- 15%: final exam (TBA)
- 5%: class participation

**Late labs will not be accepted.** However, we will accept one assignment for re-grading without penalty (amnesty) at the end of the semester. Dates will be announced on the course website.

Course percentage will be translated into letter grades as follows: A: 95% and up; A-: 92-95%; B+: 89-92%; B: 85-89%; B-: 82-85%; C+: 79-82%; C: 75-79%; C-: 72-75%; D: 65-72%; F: 0-65%. Requests for regrading of any item must be communicated, **in writing** (including e-mail), to Prof. Emrich (not a TA), within one week of the day the items were returned to you. Note that failure to participate in the final project results in a maximum grade of C (75%) and failure to complete labs results in a maximum grade of F (60%).

Absences from lab or lecture are only excused in accordance with University policy (see *du Lac*).

**Project:** A programming project will be due at the end of the semester. Groups must consist of two to four students (solo projects won’t be allowed). Two weeks of lab will be devoted to project support. The last set of projects will be demonstrated at an end-of-semester pizza party!

**ADA statement:** Any student who would need an accommodation based on a disability on file with the University can contact Prof. Emrich privately. Full accommodation will be provided.
**Academic Code of Honor:** Entering Notre Dame you were required to study the on-line edition of the Academic Code of Honor, to pass a quiz on it, and to sign a pledge to abide by it. The full Code and a Student Guide to the Academic code of Honor are available at: http://www.nd.edu/~hnrcode/docs/handbook.htm. Perhaps the most fundamental sentence is the beginning of section IV-B:

The pledge to uphold the Academic Code of Honor includes an understanding that a student’s submitted work, graded or ungraded – examinations, draft copies, papers, homework assignments, extra credit work, etc. - must be his or her own.

You are encouraged to study and discuss course material with classmates, but assessed material must derive from your head to your fingers to your text editor. In other -words, no “copy and pasting” of code from group or other settings. Because any instance of academic dishonesty will be reported, please see Prof. Emrich if you are ever in doubt on what is allowed.

**Attendance and Time Management**

No matter how you look at it programming is a time-intensive activity that is best done throughout the week (and not the night before it is due). To be fair to all, labs will be one hour before ** your ** the next lab session. For example, if a student has lab on Wed, 2/5 that starts at 4:00pm, the assignment will be due 2/12 at 3:00pm (roughly one week after lab). **By default no labs will be accepted late!** Please submit partial work into your drop box as instructed in the lab submission guideline and we will provide partial credit along with constructive feedback.

Students are expected to attend and contribute regularly in class. This means answering questions, participating in discussions and activities, and helping other students.

Class participation will be assessed as follows:

0.5 points – Show up at your scheduled lab on time as TAs will take attendance (once per week)
1 point – Participate in a lab either by checking out or staying the entire time (once per week.)
1 point – Stop by Prof. Emrich’s office hours during the semester. (max one point)
0.5 points – Participate in a classroom exercise during lecture. (max seven points.)

Your class participation grade will be calculated as (points earned / 20), so you can earn a few extra credit points by participating in lectures throughout the semester.

Because the instructor realizes that sometimes the most recent version may not have been submitted, concepts can be mastered later, or things just happen, the instructor will accept a single lab for regrading without penalty (lab amnesty) at the end of the semester.

**Advanced Coding Challenges:**

For the past few years, the instructor piloted offering an optional problem for extra credit. These assignments had little effect on the final grades but provided another avenue to express creativity.

Rather than give explicit extra credit points, however, we will give out what we will call “Coder Dollars” that can be exchanged for extra credit points. The co-instructor will be our project manager, will meet with you as needed in lab, and will determine coder dollars for all contributions.
Classroom Recording / Active Learning Platform Notification (directly from OIT)

Notre Dame has implemented an Echo360 classroom recording system. This system allows us to record and distribute lectures to you in a secure environment. You can watch these recordings on your computer, tablet, or smartphone. The recordings can be accessed within Sakai. Look for the tool labeled "Echo360 ALP" on the left hand side of the course.

Because we will be recording in the classroom and/or using an active learning environment, your questions and comments may be recorded. (Video recordings typically only capture the front of the classroom.) If you have any concerns about your voice or image being recorded, please speak to me to determine an alternative means of participating. No content will be shared with individuals outside of your course without your permission except for faculty and staff that need access for support or specific academic purposes.

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