COMP 264: Introduction to Computer Systems (Section 001)
Spring 2023 Course Information & Syllabus

Instructor: R. I. Greenberg

Mailing Address: Comp. Sci. Dept., Loyola U., 1052 W. Loyola Ave., Chicago, IL

Office Hours: In Doyle Center Room 216: MWF 12:30–2:00. These are guaranteed times to find me except as announced in advance or at http://bit.ly/RIGcal. You should also feel free to look for me at other times or make appointments.

Phone: (773)508-3782
Email: rig@cs.luc.edu Home page: http://rig.cs.luc.edu/~rig

Departmental tutoring schedule: See http://www.luc.edu/cs/schedules/tutoringhours.

Lectures: Monday/Wednesday/Friday 11:30am – 12:20pm in Cuneo 117. Lecture notes and handouts are generally available on the course web site. The handouts are numbered sequentially, starting with handout 1.

Course Objectives: This course is designed to provide students with an understanding of the hierarchy of abstractions and implementations that comprise a modern computer system. The course is particularly geared towards topics of interest to a programmer, i.e., topics that affect the performance, correctness, or utility of user-level programs. Since this investigation is best carried out using the C programming language, the course will include some instruction in C for programmers familiar with Java.

Prerequisites: COMP 170. (It is also helpful to have taken COMP 150 and/or 163.)


Course Requirements: There will be several assignments, several in-class quizzes, two 50 minute in-class tests, and a 120 minute final exam. The weightings within the semester grade will be: Assignments: 20%, Quizzes 10%, Tests 1–2: 20% each, and Final exam 30%.

Homework: Only homework turned in by the due date is guaranteed to be graded. Any special circumstances that cause difficulty in meeting the deadlines should be brought to the attention of the instructor in advance. Homework must be handed in by the start of class on any due date, since solutions may be discussed in the same class on occasion. Homework will generally be submitted through a specified online mechanism.

Exams: The midterm exams, tentatively scheduled for week 6 and week 12, are 50 minutes long. The final exam is scheduled for 1:00–3:00pm Monday, May 1.

Collaboration: No collaboration is permitted on exams. Collaboration on homework is acceptable, but copying is not! (Safeguard your files and printouts.) You may discuss solution techniques with other students, but you must write up your solutions independently. If you obtain a solution through research, e.g., in the library or online, cite your source completely and write up the solution in your own words. Students should keep in mind the University’s Academic Integrity policy: https://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml
Tentative Course Outline and Approximate Schedule:

(Note the University’s academic calendar at http://www.luc.edu/academics/schedules.)

Recommended sections of the text to read are shown in brackets. (When selected sections or subsections are listed, it is assumed that you will include the introduction of the corresponding chapter or section.)

1. (1/18) Administrivia.
   Overview of big ideas.

2. (1/23) Computer representation of information [1.1]. Program translation [1.2–1.3].
   Additional overview [1.4–1.8].
   Chap. 1 remainder (esp. Amdahl’s Law) [1.9–1.10].

3. (1/30) Quiz 1 (1/30) through “Memory Hierarchy” section of notes in Administrivia/Intro unit in Sakai.
   Information representation, boolean algebra, bit and logical operations [2.1].

4. (2/6) Quiz 2 (2/6) on “Information Storage” unit in Sakai. Integer representation [2.2].
   Integer arithmetic [2.3].

5. (2/13) Quiz 3 (2/15) on integer representations and arithmetic. Floating point representation [2.4.1–2.4.3].
   Floating point operations and rounding, etc. [2.4.4–2.5].
   Quiz 4 (2/17) on floating-point representation. Chap. 2 practice problems (like 2.1,3,4,8,14,16).

6. (2/20) Review of sample exam, etc. for Exam 1.
   Exam 1 (2/22) on Chapters 1–2.

   Chap. 3 practice problems (like 3.6).

   Chap. 3 practice problems (like 3.1 and 3.8).

   Sakai “Machine-Level Rep. of Programs Part 4”: heterogeneous data structures [3.9].

    Quiz 6 (3/29) on “Machine-Level Programs” Parts 2–4 as covered so far.
    Chap. 3 practice problems (like 3.44). Chapter 3 review.

    Example program and optimizations [5.3–6].

    Instruction scheduling and pipelining [5.7].

13. (4/17) Quiz 7 (4/17) on optimization so far.
    More on performance optimization [5.8–15].
    Storage technologies [6.1]. Locality, memory hierarchy, cache memories [6.2–4].

14. (4/24) Quiz 8 (4/24) on optimization remainder and memory hierarchy so far.
    Locality, memory hierarchy, cache memories continued [6.2–4].
    Cache-friendly code [6.5].
    Virtual memory [9.1–6].
    Catchup/review.