CS341L: Introduction to Computer Architecture and Organization
Fall 2020 - Remote Schedule Modality
Syllabus[1]

Instructor:
Soraya Abad Mota   email: soraya@cs.unm.edu
                         Office: Farris Engineering Center 2040.
                         Virtual Office hours: Tuesday and Thursday 3:30 - 4:30 pm
                         (zoom link provided on Learn on the left panel)
Teaching Assistant:
Alyshia Bustos   email: abustos2436@unm.edu, virtual office hours during labs and
                         additional if necessary

Class meets synchronous remote for
Lectures:
>   Monday and Wednesday, 1:00 - 2:15 pm
>   zoom link on left panel on Learn page, students register the first time.

Teaching assistant provides virtual office hours for the
Labs:
>   Sections 01 and 02, Friday 11:00 - 11:50 am,
>   Sections 03 and 04, Tuesday 10:00 - 10:50 am,

1   Course Description

This course provides a: "Survey of various levels of computer architecture and design: microprogramming and processor architecture, advanced assembly language programming, operating system concepts and input/output via the operating system." (from the UNM catalog).

The course is an introduction to Computer Systems, a sophomore/junior level class in computer hardware and software systems, particularly the essential interfaces and interactions between the hardware, assembly language, programming systems, and operating systems. It is also designed to increase student's understanding of C, programming in C, and program performance through programming assignments.

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[1]Parts of this syllabus were borrowed from Prof. Bridges' syllabus for the fall 2016 semester and have been evolving. Maybe today they don't have much left from that, but I still acknowledge him.

The class covers a wide range of introductory topics in modern computer organization and computer systems, including but not limited to those in the list below.

- Basic computer hardware components

- Computer representation of complex data and control structures (e.g. floating point numbers, structures, strings, and functions)

- Basic x86 assembly language concepts

- Machine level representation of programs

- Basic processor architecture

- Basic performance optimization

- Basic memory system architecture (e.g. caching and virtual memory hardware)

- Running programs on a system

- Basic operating systems goals (system level I/O, network programming, concurrency)

Because of the wide range of topics that will be covered, students will be expected to read ahead in the textbook (cited below), so that the class can move along at the necessary pace. In a separate document we provide a tentative calendar with a distribution of the topics on the lecture days. The calendar is not final and it is subject to changes along the semester.

At the end of the term, the student should be able to:

- Use the acquired foundational background in key computer systems topics, to reason about and discuss/understand new systems. Examples of these topics are: mapping higher-level languages to assembly language, data and control structures, program performance, role of programming language and OS tools such as linkers, loaders, libraries, and kernels in executing real programs.

- Demostrate experience in writing, debugging, and analyzing C and assembly programs.

Textbook: (mandatory)
"Computer Systems: A Programmer's Perspective" Randal Bryant and David O'Hallaron. 3rd edition. Pearson 2016. It has a student companion website. The text is offered through the inclusive access program of the UNM Bookstore in electronic form.

2 Prerequisites and expected background

CS241L and ECE 238L, or equivalent classes, are the prerequisites for this course. In particular, knowledge of C/C++ programming in the UNIX environment, basic computer data structures (arrays, structures, and linked data structures), integer data representation, binary data operations (bitwise AND, OR, NOT, and two's complement arithmetic), and basic math is required. Prerequisites courses may be waived with instructor permission, but students will be expected to know and will be held responsible for the material in these classes.

3 Assessments

Grades will be determined through the following types of evaluations.

Exams (40%): **Midterm exam (20%):** Wednesday, **October 14th** (Week 9)
Second Exam (20%): We must define a date for this one,
alternatives are:
Wednesday, Dec. 2 , Monday Dec 7 or Wed. Dec. 9,
we want to avoid students from having more than two exams the same day
and they should not coincide in time, if we do it during finals week.

Assignments (60%): Overall grades for this portion are broken down as follows:
Homeworks: 8%
Class participation and active learning activities: 7%
Projects (3): 45%

The homework assignments are to help the students keep up to date with the material covered in the lectures.

Grading: The final grade will be calculated by weighing each exam and assignment score obtained by the student, according to the percentages described above. This numeric final grade (in a scale of 100) is converted into a letter final grade (A+,A,A-,B+,B, etc.). Since the conversion process (from number to letter) is left to the instructor to decide, the student should not compute their letter grade according to their own or other faculty's conversion table.

I do not use a fixed scale; this is too rigid. An approximation to scales that I have used in the past is the following: below 40 is an F, less than 50 is the D range, 50 and up is the C range, 70 and up is the B range, 85 and up is the A range. I use the average and standard deviation to determine the borders around C to find the C- and C+ ranges, around B to find the B- and B+ ranges, and around A to find the ranges for A- and A+.

4   UNM learn platform

For all announcements and submissions of assignments we will use UNM learn available with your Net ID at learn.unm.edu. When you register for this class your UNM id is automatically included in the course platform list and this will allow you access to all the course materials. There will be no other formal website for this class. Students should be up to date with the announcements and material published in this platform. The programming assignments will be submitted through Learn. Communication with the instructor and the teaching assistant will be done via email with the protocol specified below in section 5. For technical questions and comments the use of the discussion board in Learn is highly encouraged. Some of the class participation will be registered in the discussion threads.

5   Course and UNM Policies

This section contains the most important policies students are expected to comply with.

5.1   Specific Course Policies

1. Communication with instructor and TA will always be respectful. The instructor requires that you use one of the email addresses `soraya@cs.unm.edu` or `soraya@unm.edu` and **to get a timely response add CS341 to the subject line and an appropriate subject phrase**. If you forget the CS341 your message might go unanswered.

2. Assignments will be handed out and collected using UNM Learn; assignments should only be submitted through learn, not email or other means. If you are unable to submit assignments on Learn due to technical difficulties, please email me the submission on time and we will coordinate later submission through Learn once the technical difficulties are resolved.

3. Students are responsible for turning in assignments on time. Unexcused late assignments will only be accepted by prior arrangement with the instructor before the due date/time, with signicant penalties determined by this instructor. Late assignments will be accepted without penalty only in the case of documented extraordinary circumstances that make prior arrangement impossible. If you know that you will be unable to make a turn-in date due to circumstances outside of your control (e.g. illness, death in the family, etc.), please make arrangements with me either in person, by email, or by phone as soon as possible for an extension.

4. No make-up or extra credit assignments or tests will be given. In general, the dates of the exams and the due dates for assignments have been determined and announced in this syllabus and the calendar since day one. If you must miss an exam, your grade for the exan you take will count for that exam grade as well.

5. Requests for regrades of assignments must be made within two weeks from when the assignment is returned. Assignments will not be regraded after that point.

6. Assignments and tests for which a regrade is sought will be regraded in their entirety. Therefore the new grade could be lower or higher than the original grade (before regrading).

7. This course falls under all UNM policies for last day to drop courses, as described at http://www.unm.edu/studentinfo.html and in the UNM Course Catalog. Please see the UNM academic calendar for course dates, the last day to drop courses without penalty, and for financial disenrollment dates.

8. Any requests to drop the class or change grade mode (e.g. audit, CR/NC) with instructor permission must be made on or before the last regular class/lab meeting. Such request made after this date will not be approved except in the case of documented, extraordinary circumstances. This policy might be modified depending on what UNM decides for this semester.

5.2   Academic Honesty

The university policy on academic honesty is contained in the Pathfinder; you should review this policy if you are unfamiliar with it. Any academic dishonesty will result in an automatic F for the entire semester and will be referred to the UNM Dean of Students for further disciplinary action as they deem appropriate. There will be no second chances or extra warnings.

As a general rule, any work you hand in for this class must be your own original work. Do not, under any circumstances, share source code, writings, or assignments with your classmates without my explicit prior approval. Students can, however, verbally discuss assigned readings, written and lab assignments, and programming assignments outside of class, or using online mechanisms (email, Piazza, etc) that are the general equivalent of verbal communication. For example, feel free to describe verbally over email generally how you attacked a particular problem in a programming assignment. Any conversation or sharing of information that moves beyond simple verbal discussion and begins discussing or sharing specifics of source code or mathematical operations, however, is potentially a violation of academic honesty requirements. If you are unsure about whether or not you can share a particular piece of information, please consult with Prof. Abad-Mota prior to sharing it.

As examples, the following, are clearly not acceptable and will be considered cheating: copying another person's code; co-developing code with someone else; mailing your code to another person; using the Internet (e.g. StackOverflow) to find a solution to the problem; making your files readable so another person can copy them; reading another person's files; using another person's listing (taken from the trash, for example); having another person write a portion of your code for you.

If you do use ideas or anything that is not your original work, you must cite the source and write down the full reference to that source in your submission, failure to do this will be considered plagiarism.

5.3   Respect the UNM Community by Preserving Health

You have the ability to prevent the spread of COVID-19 and to preserve the health of fellow students, your instructor, staff and the community by following UNM health protocols. The UNM Provost Administrative Directive on Mandatory Student Face Covering and Symptom Reporting of July 9, 2020 requires that all students on UNM-Main and UNM branch campuses wear face masks in the face-to-face classroom and on campus unless they have a specific mask accommodation (confidentially documented with the Accessibility Resource Center). UNM Provost Administrative Directive is consistent with Governor Lujan Grisham?s Public Health Emergency Order, as amended, and the Public Health Order of the New Mexico Health Secretary. It also requires daily participation in symptom screening through covidscreen, which will be sent via UNM e-mail. Please check Learn regularly for updates about our class and please check `https://bringbackthepack.unm.edu` regularly for general UNM updates.

5.4   Copyright issues

All materials in this course fall under copyright laws and should not be downloaded, distributed, or used by students for any purpose outside this course.

5.5   Title IX

Our classroom and our university should always be spaces of mutual respect, kindness, and support, without fear of discrimination, harassment, or violence. Should you ever need assistance or have concerns about incidents that violate this principle, please access the resources available to you on campus, especially the LoboRESPECT Advocacy Center and the support services listed on its website (http://loborespect.unm.edu/). Please note that, because UNM faculty, TAs, and GAs are considered "responsible employees" by the Department of Education, any disclosure of gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member, TA, or GA must be reported by that faculty member, TA, or GA to the university's Title IX coordinator. For more information on the campus policy regarding sexual misconduct, please see: https://policy.unm.edu/university-policies/2000/2740.html.

5.6   ADA

In accordance with University Policy 2310 and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor?s attention, as I am not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow. Contact Accessibility Resource Center at 277-3506 for additional information.