

CSC 461/661: Principles of Computer Architecture Spring '22

Syllabus

Lectures: Mondays and Wednesdays, 3:30-4:45 PM, Petty 227

Instructor: Jing Deng

Office: Petty Building 166

Office Hours: Wednesdays 10:00-12:00

E-mail: jing.deng@uncg.edu (preferred contact method)

Announcements: All announcements will be made on Canvas as well as in class.

Prerequisites: Grades of at least C (2.0) in CSC 261, CSC 330, and CSC 350, or permission of instructor.

Catalog Description: Hardware and software components of computer systems, their organization and operations. Topics: comparative instruction set architectures, microprogramming, memory management, processor management, I/O, interrupts, and emulation of processors.

Student Learning Outcomes: Upon successful completion of this course students will be able to

- understand computer instruction set architecture;
- explain how arithmetic computations are performed inside CPU;
- have a solid understanding of computer processor's functionalities and hardware support for these;
- understand computer memory hierarchy in details;
- differentiate the characteristics of various computer storages;
- understand how I/O devices and systems work;
- explain modern multi-core multi-processor systems.
- work on some simple logic design

Class Web Page: canvas.uncg.edu (you have to enroll before access is granted)

Textbook:

“Computer Organization and Design,” Patterson & Hennessy, 6th edition, Morgan Kaufmann, 2021. (required)

Other Reading: provided in class or through canvas system.

Teaching Methods and Assignments: The primary method of instruction will be two 75-minute periods per week for lecture and lots of group discussions, with students responsible for completing assigned readings, assignments, and preparing for exams outside of class. Assignments will be a mix of written analysis and applied programming. Written assignments should be turned in electronically. Handwritten submissions are strongly discouraged (if you feel typing equations is too tough, try to learn LaTeX or write on white papers and then submit a high-resolution snapshot of them before you insert them into your Word file).

- Prepare your submission as a single Word document.
- The use of Dropbox, Google Drive, or any similar methods, and sharing your document is not allowed.
- Please submit your files through Canvas' assignment. No comments should be added in the submission page because assignments will be downloaded to grade offline. Any thoughts/explanations should be added into the Word file that you are submitting.
- Keep in mind that instructor interface and student interface on Canvas could be different. Email questions to me if you can't find the submission link, or talk to your classmates.
- Avoid using unnecessary space or non-alphabetic characters in your filename. Suggested filenames are "Lastname1.docx", "Lastname2.docx", etc.
- If you need to submit multiple files, please put all files including your word file into a single folder, named "Lastname1" etc., and zip entire folder into a ".zip" file and submit the zip file, i.e., Lastname1.zip

Tentative Grading Policy

Pop quiz and group work	20%
Homework	30%
Mid-term exam	20%
Final exam	30%

Tentative Schedules (number of lectures in parenthesis)

- Course Introduction and Instruction Review (3)
- Instructions: Language of Computers (3)
- Arithmetic for Computers (3)
- The Processor – Simple Data Path (2)
- The Processor – Pipelining and Hazards (3)
- Memory Architecture (3)
- Parallel Processors (4)

Academic Integrity: Students are expected to be familiar with and abide by the UNCG Academic Integrity Policy, which is online at <http://academicintegrity.uncg.edu/> Assignments in this class are for individual work, unless explicitly stated otherwise. General concepts and material covered in the class may be discussed with other students or in study groups, but specific assignments should not be discussed and any submitted work should be entirely your own. It is expected that the class textbook will be used as a reference, but if any other reference materials, especially those from the Internet, are used in preparing homework solutions they should be clearly cited. Any incidents of academic dishonesty will be handled strictly, resulting in either a zero on the assignment or an "F" in the class, depending on the severity of the incident, and incidents will be reported to the appropriate UNCG office. By submitting your homework or exam answer sheet, you have implicitly signed the Academic Integrity Pledge, stating that "I have abided by the UNCG Academic Integrity Policy on this assignment or submission."

If it is found that your homework or program is the result of plagiarism from the Internet or your

classmate's work, you will be reported (so will be the classmate whose work has been plagiarized).

Students are expected to abide by the UNCG's Academic Integrity Policy and the Student Code of Conduct:

- Student Conduct: <http://sa.uncg.edu/handbook/student-code-of-conduct/>
- Academic Integrity Policy: <http://sa.uncg.edu/handbook/academic-integrity-policy/>

Attendance Policy: Attendance of lectures is mandatory unless you have legitimate reasons of not coming. Prior notification through email is required if you can't make it to a lecture. Use an email subject of "CSC 461/661 - absence". The email subject is extremely important due to the volume of emails that I am receiving. Pop quiz and group discussions will be performed to check your attendance and participation in class. No make-up quiz or discussion will be allowed. Note that some of these might be at the beginning of the lecture and if you are late, no make-up quiz will be allowed for you either. Student late arrivals to lectures are sources of distractions to everyone and are detrimental/disrespectful to everyone's time and effort in the class. If you are consistently late for lectures or always leave early, we reserve the right to **drop** you directly from this course because your schedule does not seem to fit. Also, be warned that the door might be closed or sometimes locked inadvertently from inside to block out hallway noises once our lecture starts (if so, please gently knock to let us know.) The university allows for a limited number of excused absences for religious observances - students who plan to take such an absence should notify the instructor at least two weeks in advance so that accommodations can be made (also see the late work policy later).

Laptop/Cellphone Policy: Laptops can be both a benefit and a distraction in classroom. While many students benefit from taking notes using a laptop, or having access to outside class-related resources during class, other students cannot resist the temptation of checking e-mail, social texting, or even playing games during class time. This class has a strict "no non-class related use" rule for laptops or cell phones — if you are found violating this policy, then your in-class laptop/phone privileges will be taken away. Cell phones are a distraction for everyone, and should be turned off or muted/vibrated during class.

COVID-19 update: laptops and tablets are strongly encouraged so that you can use them to work on and submit group discussions and pop-quiz.

E-cigarette: Please do not smoke e-cigarette in class.

Late Policy and Makeup Exams: Late submissions of homework are strongly discouraged, unless advanced permission is granted under rare occasions. 50% per day of late submission penalty will be charged. If a homework assignment has become too difficult or has major time-conflict with your other academic activities, speak out on Canvas forum to request a class-wide extension. Exams may be made up *only* if it was missed due to an extreme emergency or arrangements are made *before* the exam date. Exams may not be taken early or late due to personal travel plans.

On-line Lectures: Closure of university facilities and classrooms in response to flu outbreak or other emergency does not mean that this class is halted, and students should check Canvas for

announcements about how the class will proceed in the event of such an emergency. We may proceed with on-line chat or voice recording lectures in combination with slides.

Health and Wellness: Your health impacts your learning. Throughout your time in college, you may experience a range of health issues that can cause barriers to your learning. These might include physical ailments, illnesses, strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, or loss of motivation. Student Health Services and The Counseling Center can help with these or other issues you may be experiencing. You can learn about the free, confidential mental health services available on campus by calling 336-334-5874, visiting the website at <https://shs.uncg.edu/> or visiting the Anna M. Gove Student Health Center at 107 Gray Drive. Help is always available.

Academic Accommodations: UNC Greensboro respects and welcomes students of all backgrounds and abilities. If you feel you will encounter any barriers to full participation in this course due to the impact of a disability, please contact the Office of Accessibility Resources and Services (OARS). The OARS staff can meet with you to discuss the barriers you are experiencing and explain the eligibility process for establishing academic accommodations. You can learn more about OARS by visiting their website at <https://ods.uncg.edu/> or by calling 336-334-5440 or visiting them in Suite 215, EUC.

Related to COVID-19:

As we return for spring 2022, all students, faculty, and staff are required to uphold UNCG's culture of care by actively engaging in behaviors that limit the spread of COVID-19. These actions include, but are not limited to:

- [Following face-covering guidelines](#)
- Engaging in proper hand-washing hygiene
- Self-monitoring for symptoms of COVID-19
- Staying home when ill
- Complying with directions from health care providers or public health officials to quarantine or isolate if ill or exposed to someone who is ill
- Completing a [self-report](#) when experiencing COVID-19 symptoms, testing positive for COVID-19, or being identified as a close contact of someone who has tested positive
- Staying informed about the University's policies and announcements via the [COVID-19](#) website

Instructors will have seating charts for their classes. These are important for facilitating contact tracing should there be a confirmed case of COVID-19. Students must sit in their assigned seats at every class meeting. Students may move their chairs in class to facilitate group work, as long as instructors keep seating chart records. Students should not eat or drink during class time. A limited number of disposable masks will be available in classrooms for students who have forgotten theirs. Face coverings are also available for purchase in the UNCG Campus Bookstore. Students who do not follow masking requirements will be asked to put on a face covering or leave the classroom to retrieve one and only return when they follow the basic standards of safety and care for the UNCG community. Once students have a face covering, they are permitted to re-enter a class already in progress. Repeated issues may result in conduct action.

The course policies regarding attendance and academics remain in effect for partial or full absence from class due to lack of adherence with face covering and other requirements. For instances where the Office of Accessibility Resources and Services (OARS) has granted accommodations regarding wearing face coverings, students should contact their instructors to develop appropriate alternatives to class participation and/or activities as needed. Instructors or the student may also contact OARS (336.334.5440) who, in consultation with Student Health services, will review requests for accommodations.