

Assembly Language and Computer Organization

CSCE 2610, Section 003

Spring 2024

Course Instructor: Dr. Pradhumna Shrestha

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- Include CSCE 2610.003 in subject line
- Always use your official UNT email address

Class Location/Time: MoWe 4:00 PM - 5:20 PM, Discovery Park E265

Office Hours (In-person/Zoom): MoWe 2:30 PM-3:30 PM @F265 or via appointment

Office Hours Zoom Link: <https://unt.zoom.us/j/3251832551>

Teaching/Instructional Assistants:

Justin Garrigus, Email: justingarrigus@my.unt.edu

Office Hours: Monday from 12:00pm to 1:00pm in NTDP E247, cubicle J.

Wednesday from 10:30am to 11:30am in NTDP E247, cubicle J.

Alruwaili, Fawaz, Email: fawazalruwaili@my.unt.edu

Office Hours: Monday 12:00pm - 2:00pm in NTDP E247 Cubicle A

Huang, Ruixiao, ruixiaohuang@my.unt.edu

Office Hours: Monday 2:00pm-4:00pm in NTDP E247 cubicle A

Peer Mentor:

Thong Nguyen, Email: thongnguyen4@my.unt.edu

Office Hours: Monday: 11:30 am - 3:30 pm in NTDP E247 Cubicle A

Wednesday: 1:30 pm - 5:00 pm in NTDP E247 Cubicle A

Course Webpage: All the course related material will be posted on the course webpage which is available through Canvas (<https://unt.instructure.com/>)

Course Outcomes:

- Understand the role of the different classes and components in a computer system and the interface between software and hardware in a computer system.
- Apply metrics to evaluate performance of a computer system using clock rate and clock cycles per instruction (CPI). Understand the different aspects of execution times reported when program complete their execution.
- Understand instruction set choices and write assembly language programs for simple C code and codes that include procedures.
- Perform integer and floating-point calculations using computer arithmetic algorithms.
- Describe the organization of a simple processor with data path and control path for simple instructions.
- Describe the requirement of memory hierarchy and evaluate the performance of different cache organizations.

Program Outcome Mapping:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Text: *Computer Organization and Design: The Hardware Software Interface: ARM Edition* by Patterson and Hennessy, Morgan Kaufmann, ISBN-13: 978-0128017333

Catalog Description: Prerequisite: CSCE 2100, EENG 2710 or 2720. Principles of computer systems organization, instruction sets, computer arithmetic, data and control paths, memory hierarchies, and assembly language.

Topics:

- Computer Abstractions and Technology
- Instructions: Language of the Computer
- Arithmetic for Computers
- The Processor
- Large and Fast: Exploiting Memory Hierarchy

Grading:

Class Attendance/Activity	5%
Homework	15%
Programming Assignments	20%
Midterm Exam	25%
Final Exam	35%

Class Activity and Attendance: Class attendance is regarded as an obligation as well as a privilege. All students are therefore expected to attend each class meeting. A student who misses class is still responsible to find out what was discussed and to learn the material that was covered and obtain the homework that was assigned on the missed day. The instructor is not responsible for re-teaching material missed by a student who did not attend class. Therefore, each student is accountable for and will be evaluated on all material covered in this course, regardless of attendance.

Attendance/Participation grades will be based on attendance, contribution to in-class discussions, and assessment of any in-class work. Disruptive behavior and unexcused absences deemed excessive will result in a lower attendance/participation grade.

Homework: Homework will be in the form of problem sets with a due date one week after it is assigned, with some exceptions. Homework must be done individually (you will learn the most from this). Any evidence of group participation or direct copying from sources like previous year's solutions, textbook, solutions, Wikipedia, websites, and other sources will be interpreted as academic dishonesty. Using AI (Artificial Intelligence) assisted websites to generate or auto generate solutions will also be interpreted as academic dishonesty. There will be five to six homework assignments.

Programming Assignments: The programming assignments are an integral part of the course and are intended to provide experience in the application of the concepts discussed in lecture. There will be four

to five programming assignments assigned. Programming assignments must be done individually and can be done on your own PC or using the server. Any evidence of group participation will be interpreted as academic dishonesty. Using AI (Artificial Intelligence) assisted websites to generate or auto generate solutions will also be interpreted as academic dishonesty.

Recitations: There will be recitations throughout the week. The TA will be available at that time to help you with the programming assignments. There will be demonstrations on how to use the DS-5 simulator during the recitation.

Exams: There will be a midterm exam and a final exam. The exams are closed books and closed internet. Mobiles phones are not permitted and browsing the internet is not allowed. Exams will include material from the modules, the readings, homework, and programming assignments and should be taken individually and not as a team.

- **Midterm Exam:** Wednesday, March 6th, 2024, 4:00 PM – 5:20 PM, E265 (Tentative)
- **Final Exam:** Saturday, May 4th, 2024, 1:30 PM – 3:30 PM, E265

Late Submission: Homework and programming assignments can be submitted up to 24 hours late. I will deduct 50% of the grade for the assignments that have been submitted late. Note that Canvas shows you both **Due Date** and **Available Until Date for submission**. You must submit before the **Due Date** to avoid penalties. No submissions will be accepted after the **Available Until Date**.

Missing Classes/Assignments/Exams: Attendance at all exams, and class activities is mandatory. Throughout the semester, a student may miss classes, assignments, quizzes, or exams due to many reasons. Assignments and/or exams can be made-up only under extraordinary circumstances and only when notification is given to me before the assignment/exam is administered.

Disputing Grades: If you have a dispute with how an assignment, quiz, or exam is graded, you should get the solution to the assignment, quiz, or exam off the course web site and examine it. If you really believe that your answer is correct (matches the answer given in the solution), contact the grader and discuss it with him. The grader will listen to your concern, and act on it, at their discretion. In any case, they will regrade the assignment and will communicate with you. The solutions for programming assignments will not be posted, so contact the grader for discussing the grade if you have met all the requirements of the programming assignment and you have lost points. Note that instructor or grader addition errors should follow the above procedure. Assignments, quiz, exam, and homework grades are disputable for **one week** from the day the grades were assigned on Canvas.

Student Responsibility: Students are responsible for submitting the *correct* assignments (i.e., uploading the proper files) for each applicable assignment submission on Canvas. When an incorrect assignment is submitted to Canvas, students wanting to resubmit with the correct file(s) *after the due date has passed* will have their assignment assessed a 30% reduction penalty. Proof must be given (i.e., timestamp for the file on the CSE machines) that the assignment was completed on time. If you have any questions or concerns about your submission, please work with your instructor or TA/IA for this course to ensure the correct file(s) is/are submitted.

ADA Statement: The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the

semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information, see the Office of Disability Accommodation website at <http://disability.unt.edu>. You may also contact them by phone at (940) 565-4323.

Acceptable Student Behavior: Student behavior that interferes with an instructor’s ability to conduct a class or other students’ opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student’s conduct violated the Code of Student Conduct. The university’s expectations for student conduct apply to all instructional forums, including university and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at <http://deanofstudents.unt.edu>.

Academic Dishonesty: This course follows the Department of Computer Science and Engineering *Cheating Policy*. Specifically, students caught cheating or plagiarizing will receive a “0” for that particular assignment or exam for the first offense. Additionally, the incident may be reported to the Dean of Students, who may impose a further penalty. A second instance of cheating in this class will result in a grade of F in the class, and referral to the Department Chairperson and Dean of Engineering, whereby a dismissal hearing may be initiated by the Dean of Engineering.

Students are responsible for being familiar with the university standard for academic integrity. In the case that the above description or any in-class discussion of appropriate and inappropriate collaboration do not answer all of your questions, please meet with your instructor and look at the university Student Rights and Responsibilities web page.

Syllabus Revisions: This syllabus may be modified as the course progresses should the instructor deem it necessary. Notice of changes to the syllabus shall be made through Canvas and/or class announcement.

Tentative Course Schedule:

Week	Lecture	Assignments Due
01/15 – 01/19	Computer Abstractions and Technology	
01/22 – 01/26	Computer Abstractions and Technology	
01/29 – 02/02	Instruction set	Homework 1
02/05 – 02/09	Instruction set	Programming Assignment 1
02/12 – 02/16	Instruction set	Homework 2
02/19 – 02/23	Instruction set	Programming Assignment 2
02/26 – 03/01	Arithmetic for Computers/Review	Homework 3
03/04 – 03/08	Arithmetic for Computers/Midterm Exam	Midterm Exam
03/11 – 03/15	Spring Break	
03/18 – 03/22	Arithmetic for Computers	
03/25 – 03/29	Processor design	Programming Assignment 3
04/01 – 04/05	Processor design	Homework 4
04/08 – 04/12	Processor design	Programming Assignment 4
04/15 – 04/19	Processor design	Homework 5
04/22 – 04/26	Memory Hierarchy	Programming Assignment 5

04/29 – 05/03	Memory Hierarchy/Review	Homework 6
05/04 – 05/10	Final Exam	Final Exam