

Assembly Language and Computer Organization

CSCE 2610, Section 001

Fall 2022

Class Timings: Tuesday and Thursday 10:00 AM – 11:20 AM, Discovery Park B185

Instructor: Robin Pottathuparambil, Email: rpottath@unt.edu, Office Hours: F263, Tuesday and Thursday, 1:30 PM – 3:30 PM or by appointment.

Teaching Assistants:

- Bharath Sai Kumar Nookala, Email: bharathsaikumarnookala@my.unt.edu, Help Hours: F232, Wednesday and Friday 2:30 PM – 4:30 PM (Homework Grading)
- Ahmad Alkhodair, Email: ahmadalkhodair@my.unt.edu, Help Hours: F270, Tuesday 2:30 PM – 3:30 PM, Thursday 2:30 PM – 3:30 PM, and Monday 5:30 PM – 6:30 PM (Recitations and Programming Assignment Grading)

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 Activity	5%
Homework	12%
Quizzes	12%
Programming Assignments	20%
Midterm Exam (10/18/2022)	21%
Comprehensive Final Exam (12/15/2022)	30%

Class Activity: There will be several class activities during the class session that will reinforce the concepts that we learned in the class. These class activities will be scheduled during the class timing.

Homework: Homework will be in the form of problem sets with a due date one week after it is assigned. Homework will be assigned on Tuesdays as per the schedule. **No late homework will be accepted.** 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. There will be five to six homework assignments.

Quizzes: There will be five to six pop quizzes given throughout the semester. The pop quizzes can be given any time during the class. These will be to reward students who consistently attend the class but will be more than just attendance points.

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. Programming assignments will be assigned on Thursdays as per the schedule and with a due date of two weeks after it is assigned. 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.

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. Final exam will be comprehensive.

- **Midterm Exam:** Tuesday, October 18th, 2022 10:00 AM – 11:20 AM
- **Comprehensive Final Exam:** Thursday, December 15th, 2022 8:00 AM – 10:00 AM

Missing Classes/Assignments/Exams: Attendance at all exams, quizzes, and class activities is mandatory. Throughout the semester, a student may miss classes, assignments, quizzes, or exams due to

many reasons. Most of the reasons will not be accepted as an "excused" absence. Assignments, quizzes, or exams can be made-up only under extraordinary circumstances and only when notification is given to me before the quiz or exam is administered. A no-show for a quiz or exam without prior notification and a verifiable excuse (appropriate official documentation) results in a grade of 0 for that quiz or exam.

COVID-19 Impact on Attendance: Students are expected to attend class meetings regularly and to abide by the attendance policy established for the course. It is important that you communicate with the professor and the instructional team prior to being absent, so you, the professor, and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals. Please inform the professor and instructional team if you are unable to attend class meetings because you are ill, in mindfulness of the health and safety of everyone in our community.

If you are experiencing any [symptoms of COVID-19](#) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Team at COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure.

Statement on Face Covering: UNT encourages everyone to wear a face covering when indoors, regardless of vaccination status, to protect yourself and others from COVID infection, as recommended by current CDC guidelines. Face covering guidelines could change based on community health conditions.

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. 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.

Syllabus Revisions: This syllabus may be modified as the course progresses. Notice of such changes will be by email or announcement in class.

Class Policies: Please note that portable phones, pagers, and late arrivals are disruptive to the instructor and to your peers. The use of cell phones, beepers, or communication devices is disruptive and is therefore absolutely prohibited during class and exams. Turn off your cell phone while in class and while taking exams. If I catch you using these devices in the class or during the exams, the penalty can range from a formal warning to an 'F' for the course and you will be asked to leave the class. Except in emergencies, students using such devices must leave the classroom for the remainder of the class period. I know that some of you may wish to take notes directly on your computer and I have no problem with that. If, however, you choose to access your email, search the web, play games, or instant messenger your friends during class, you will have 10% deducted from your final grade for each transgression. If I am late arriving to class, it will be because of circumstances beyond my control. You are expected to remain for 20 minutes past the scheduled class start time while I attempt to communicate my situation and relay instructions.

Course Policies: You are expected to spend at least 10 hours per week for this course. Keep all your graded assignments, quizzes, and tests for study and review. You should track your own progress on Canvas and be aware of current grades throughout the term. If you would like to look at the graded assignments, meet me during my office hours or setup an appointment. Final grading will be done as

follows. **A:** $\geq 90\%$, **B:** $\geq 80\%$ and $< 90\%$, **C:** $\geq 70\%$ and $< 80\%$, **D:** $\geq 60\%$ and $< 70\%$ and **F:** $< 60\%$. Grades will be curved if necessary. Grades cannot be changed after they have been electronically entered into the university's system except for instructor error. Any extenuating circumstances that may adversely affect your grade must be brought to my attention before the final course grades are recorded. To be considered, such circumstances must be unusual, unavoidable, and verifiable.

Disability Services/Special Needs: UNT complies with all federal and state laws and regulations regarding discrimination including the Americans with Disability Act of 1990 (ADA). If you have a disability and need a reasonable accommodation for equal access to education or services, please contact the Office of Disability Accommodation. Please initiate this process and inform me during the first two weeks of class.

Academic Dishonesty: All the provisions of the University code of academic integrity apply to this course. In addition, it is my understanding and expectation that your signature on any test or assignment means that you neither gave nor received unauthorized aid. For homework and programming assignments, while discussion is allowed, direct copying is not, and students must turn in individual submissions. All students are required to know, observe and help enforce the UNT Code of Student Academic Integrity. Academic dishonesty will result in disciplinary action according to UNT Policy 06.003. The penalty for a first offense can range from a formal warning to an 'F' for the course. Regardless of the penalty imposed, a record of the offense will be kept in the Office of the Dean of Students.

Student Perceptions of Teaching (SPOT): Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The short SPOT survey will be made available **November 21 – December 8** to provide you with an opportunity to evaluate how this course is taught.

Tentative Course Schedule:

Week	Lecture	Assignments Due
08/28 – 09/02	Computer Abstractions and Technology	
09/05 – 09/09	Computer Abstractions and Technology	
09/12 – 09/16	Instruction set	Homework 1
09/19 – 09/23	Instruction set	Programming Assignment 1
09/26 – 9/30	Instruction set	Homework 2
10/03 – 10/07	Instruction set	Programming Assignment 2
10/10 – 10/14	Arithmetic for Computers/Review	Homework 3
10/17 – 10/21	Arithmetic for Computers/Midterm Exam	Midterm Exam
10/24 – 10/28	Arithmetic for Computers	
10/31 – 11/04	Processor design	Programming Assignment 3
11/07 – 11/11	Processor design	Homework 4
11/14 – 11/18	Processor design	Programming Assignment 4
11/21 – 11/25	Processor design	Homework 5
11/28 – 12/02	Memory Hierarchy	Programming Assignment 5
12/05 – 12/09	Memory Hierarchy/Review	Homework 6
12/12 – 12/16	Comprehensive Final Exam	Final Exam