COSC 30203 055 - Computer Organization

Dr. Michael Scherger

Spring 2025

Note for students: The syllabus is your first course reading. It provides an orientation to, overview of the flow, and expectations of the course. You should turn to the syllabus for details on assignments and course policies.

1 Course and Instructor Information

1.1 Course Information

- Course Title, Prefix, Number, Section: COSC 30253 055 - Computer Organization
- Semester and Year: Spring 20XX
- Number of Credits: 3
- Course Component Type: In person lecture
-

1.2 Instructor Contact Information

1.3 Final Evaluative Exercise and Important Dates

- Spring Break: 22:00 on Friday, March 14 through 8:00 on March 24.
- Last Day to Drop: Tuesday, April 1, 2025
- P/NC Date: Monday, April 21, 2025
- Final Exam: Tuesday, May 6 from 14:00 - 16:30
- Final Exam Details: According to the Faculty/Staff Handbook "Final Evaluative Exercise Policy" TCU requires a "final evaluative exercise in all classes" during the designated finals period.
- Final Exam Rescheduling Policy: According to the Faculty/Staff Handbook "Rescheduling of Finals" section, rescheduling a final exercise must be made one week prior to the last day of classes. Rescheduling of finals is permitted 1) for meeting the 24-hour rule or 2) for graduating

seniors whose faculty members must submit final grades by Wednesday 5pm of finals week. Unless the student is graduating, the exam must be taken during final examination week.

- POLICY STATEMENT: If the published final examination schedule would require a student to take more than two final examinations in a 24-hour period, the student can arrange to take one of the exams at another time. The student shall determine which final examination is to be rescheduled. The rescheduled exam shall be given at a time mutually agreeable to the student and the faculty member. A final exam may not be rescheduled so as to violate the 24-hour rule. Rescheduling arrangements must be made one week prior to the last day of classes. Unless the student is graduating, the exam must be taken during the final exam week.
- EXCEPTION TO FINAL EXAMINATION AND STUDY DAY POLICIES FOR GRADUATING STUDENTS. Grades for graduating students must be submitted to the Registrar at least 72 hours prior to commencement exercises. In any term in which commencement is scheduled, study days and Saturdays will be available for faculty to reschedule final examinations for graduating students. Final examinations originally scheduled the last two days of final exam week may be rescheduled on the corresponding study days and Saturday as required at the same time of day as originally scheduled.

1.4 Student Resources and Policy Information

Click or scan QR code for resources to support you as a TCU student. Please note section on Student Access and Accommodation and Academic Conduct & Course Materials Policies.

2 Course Description

2.1 Catalog Description

Treatment of sequential and combinatorial circuits including flip-flops, multiplexers, decoders, adders, registers, counters. Design of functional components, of a computer including memory, ALU, control unit, busses. The tradeoffs of alternative architectural features such as word size, instruction sets, addressing modes.

2.2 Prerequisites and Concurrent Enrollment

COSC Prerequistites: Successful completion of COSC 20803 (Data Structures) and MATH 20123 (Discrete Math I). ENGR Prerequisites: ENGR 30444 (Electronics I).

3 Course Materials

3.1 Required Materials

[1] Linda Null. *The Essentials of Computer Organization and Architecture*. Jones and Bartlett Learning, 6th edition, 2024.

[2] Larry D. Pyeatt and William Ughetta. *ARM 64-Bit Assembly Language*. Newnes, 2020.

4 Learning Outcomes

4.1 Course Learning Outcomes

1. Explain digital logic and its use in digital systems.
2. Understand machine level representation of data.
3. Understand assembly level machine organization.
4. Describe the functional organization of a processor datapath and performance enhancements.
5. Describe memory system organization and architecture.
6. Describe interfacing and communication.
7. Analyze a computer system's expected performance.

Course outcomes will be measured by using homework assignments, programming projects, and exams.

5 Course Requirements

5.1 Assignments

- **Lecture Quizzes**: There will be regular (1 or 2 per week) lecture quizzes given at the end of the lecture. These will be open note quizzes intended to assess your comprehension of the days material.
- **Chapter Quizzes**: There will be end-of-chapter quizzes available on TCU Online. To prepare for these quizzes, students must read and comprehend the chapter material and practice completing the example problems and end-of-chapter problems.
- **Homework and Programming Projects**: At the conclusion of each chapter/topic covered in lecture, a problem set homework will be assigned. Students will have one week to complete the homework assignment. The homework will be made available as a PDF on TCU Online. Students will submit their homework to Gradescope for grading. Grades will be posted in TCU Online. Later in the course, students will be programming assembly language. Those homework assignments will be made available using GitHub Classroom. Programming projects are submitted to GitHub Classroom by the due date/time.
- **Exams**: There will be three equally weighted exams (100 points each) on approximately the 5^{th}, 10^{th}, and finals week.
  - Proper exam etiquette will be enforced (no talking, no cheating/copying answers, no leaving the exam room to use the restroom or get a drink of water, etc).
  - Make-up exams are not available unless there is a documented, University excused absence.

5.2 Grading Philosophy and Policy

- **Late Work**
  - Late quizzes, homework, and programming assignments are not accepted unless there is a documented, University excused absence.
  - If your program is on time and has compiler (assembler) errors or warnings, then your score is an automatic 20% with no resubmission.
- **Participation, Engagement, and Attendance**: Formal attendance will not be taken, however...

– **you are expected to attend lecture during our regularly scheduled class times**.

You will be considered responsible for all material presented during the lectures. Due to the nature of this course, this course will require that your mind and body show up to every lecture. As the semester progresses, I will begin to recognize students attending (or not attending) lecture. At times, lectures will cover a mathematical or theoretical analysis of algorithms. Other times lectures will cover more applied "how-to's" and high level concepts. In addition to simply being in class, you should come prepared to ask questions about the material being covered that day.

Your participation in the course will involve the following forms of activity:

1. Attending the lectures.
2. Reading the textbook(s) and other assigned articles.
3. Completing the homework. quizzes, and projects.
4. Taking the exams.

Because it is considered an infringement on student privacy for me to have access to student medical records, I cannot accept medical documentation to justify absences. If you have a legitimate reason for your absence and want to provide verification, please access the Absence Documentation Form here.

Distinction between Excused Absences and Verified Absences: Excused Absences or Official University Absences are absences described in the Official University Absence Policy and include the following: Title IX related issues, military leave, holy days, and university related absences. As faculty we may not penalize students for these absences and must allow for the completion of assignments and exams within a reasonable amount of time after the absences. Beyond these, faculty retain all discretion for consideration of a student's absence, including verified absences.

- **Grading Concerns**: Requests for re-evaluation of points on exams, assignments, and projects ***must be returned to the instructor within one week***, and accompanied by a brief written description of the grading error you believe was made. After this time, grades are final. Re-evaluations will not be done in the classroom, before, during or after class. Resubmission for re-evaluation subjects the entire assignment for review. This means that if an error was made in your favor, you may lose points when re-submitting.

5.3 Course Assignments and Final Grade

Type	Weight
Lecture Quizzes	5%
Chapter Quizzes	10%
Homework	25%
Exams	60%

Undergraduate Grading Scale Final course grades are rounded to the nearest integer prior to assigning a letter grade.

≥93	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	<60
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

5.4 Course Policies

- **Artificial intelligence**: AI and other unapproved assignment-help tools MAY NOT be used for course assignments except as explicitly authorized by the instructor. Specific examples of prohibited activities include, but are not limited to:
  - Submitting all or any part of an assignment statement to an AI or unapproved assignment-help tool;
  - Incorporating any part of an AI-generated response in an assignment;
  - Using AI to brainstorm, formulate arguments, or template ideas for assignments;
  - Using AI to summarize or contextualize source materials;
  - Submitting your own work for this class to an AI or unapproved assignment-help tool for iteration or improvement.

  If you are in doubt as to what constitutes AI, or whether an assignment-help tool is suitable for use in this class, then it is your responsibility to discuss your situation with the instructor.

6 Course Schedule and Topics (always subject to change)

WEEK	DATES	TOPIC	
1	1/14	Chapter 1: Introduction	
	1/16	Chapter 1: Introduction	
2	1/21	Chapter 2: Data Representation in Computer Systems	
	1/23	Chapter 2: Data Representation in Computer Systems	
3	1/28	Chapter 2: Data Representation in Computer Systems	
	1/30	Chapter 3: Boolean Algebra and Digital Logic	
4	2/4	Chapter 3: Boolean Algebra and Digital Logic	
	2/6	Chapter 3: Boolean Algebra and Digital Logic	
5	2/11	TBA / Review	
	2/13	Exam 1	
6	2/18	Chapter 4: MARIE: An Introduction to a Simple Computer	
	2/20	Chapter 4: MARIE: An Introduction to a Simple Computer	
7	2/25	Chapter 4: MARIE: An Introduction to a Simple Computer	
	2/27	Chapter 4: MARIE: An Introduction to a Simple Computer	
8	3/4	Chapter 5: A Closer Look at Instruction Set Architectures	
	3/6	ARM Assembly Language Programming	
9	3/11	ARM Assembly Language Programming	
	3/13	ARM Assembly Language Programming	
	3/18	No Lecture	Spring Break
	3/20	No Lecture	Spring Break

10	3/25	TBA / Review	
	3/27	Exam 2	
11	4/1	ARM Assembly Language Programming	
	4/3	ARM Assembly Language Programming	
12	4/8	Chapter 6: Memory	
	4/10	Chapter 6: Memory	
13	4/15	Chapter 9: Alternative Architectures	
	4/17	Chapter 9: Alternative Architectures	
14	4/22	Chapter 10: Performance Measurement and Analysis	
	4/24	Chapter 10: Performance Measurement and Analysis	
15	4/29	TBA / Review	
	5/1	No Lecture	Study Day
16	5/6	Exam 3	14:00 - 16.30

7 TCU Mission Statement

To educate individuals to think and act as ethical leaders and responsible citizens in the global community.

Course syllabi are intended to provide students with basic information concerning the course. The syllabus can be viewed as a 'blueprint' for the course; changes in the syllabus can be made and students will be informed of any substantive changes concerning examination, the grading or attendance policies and changes in project assignments.