CSIS 3740: Computer Organization

CRN: CSIS.3740.40842.2025.Fall (4 Credit Hours)
Fall Semester 2025; August 25 – December 13
Modality: In-Person
Meeting Times: MW: 12:00pm – 13:50pm
Location: DeBartolo Hall | Room 132

Contact Information

Professor: Hailong Jiang
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Office Hours: 12:00 – 14:00 Friday, or by appointment.

Catalog Description

Basic hardware components, structure, and implementation of computer systems. Assembly language and instruction set architecture. Combinational and sequential digital logic. CPU and control unit design. Prerequisites: CSIS 2605 or CSIS 2610.

Course Materials

- Textbook: Essentials of Computer Organization and Architecture, 6th Edition, Jones & Barlett Learning, by Null. ISBN-13: 978-1284259438. ISBN-10: 1284259439
- See Computer lab locations on campus.

Course Learning Outcomes/Objectives

Upon completion of a one-semester course using this textbook, students should be able to:

1. Explain how the various data types are represented in binary form and how they can be used to provide reliability in data transmission and recording.
2. 2. Perform binary arithmetic operations, including addition, subtraction, multiplication, and division.
3. 3. Identify the fundamental building blocks of computer circuits, understand the role and operation of the basic component modules, and describe how they can be combined to create the essential components necessary to build a functioning computer system.
4. Describe the organization and design of a basic digital computer.
5. Understand the underlying concepts of program execution, including the function and operation of the CPU and the operation of the instruction cycle, and identify those architectural attributes that have a direct impact on the logical execution of a program.
6. Differentiate among cache, primary memory, and secondary memory, and explain how each function
7. Understand the various concepts of input/output (I/O), including bus architecture and storage methods, and how these concepts relate to performance.
8. Describe the interaction between system software and the hardware architecture.

ABET Computer Science Student Outcomes Addressed by this Course

1. CS1: Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions
2. CS2: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline

Attendance Expectations

Attendance is required; with few exceptions, those who do best in courses are those who attend regularly. You are allowed three unexcused absences; additional unexcused absences will result in a **5% deduction from your overall grade**. Late arrivals and early departures (10 minutes or more) count as an unexcused absence.

See YSU Attendance Policy which addresses excused absences for participation in university-sponsored events, government-related activities, religious observances, death of a family member, and documented personal illness.

Assignments/Assessments

You will be given 7 project-type assignments, a midterm, and a final exam. These assignments are due by the end of the day (midnight) on the due date as indicated in the assignment.

Late Work

An assignment is late if it is not submitted by the end of the day (2400h) on the due date as indicated on the assignment. You must allocate enough time to complete the assignment on time. For each calendar day late, **10% of the assignment's possible score will be deducted**.

In case of illness or abnormal circumstances, please consult with the instructor in advance if possible to make alternate arrangements. You must formally inform the instructor in writing and present proper supporting documents.

Grading and Grading Scale

Letter grades will be based on the weighted average score according to the following scale:

- 7 Assignments (9% each): 63%
- Midterm exam: 14%
- Final exam: 23%

Grades are normally assigned using the traditional 90% – 80% – 70% – 60% cutoffs as included below. I reserve the right to lower these thresholds, but not to raise them.

Weighted Average	**Letter Grade**
90%-100%	A
80%-89%	B
70%-79%	C
60%-69%	D
< 59%	F

Please see the YSU Grading System, which includes information about grading options, withdrawals, and repetition of courses.

University Policies

You are welcome to copy and paste required university policies into your syllabus. However, you may consider using the language below and linking to policies. Linking will allow you to not have to update your syllabus should policies change. **Note: Only link to policies if you are sharing your syllabus in an online format.**

University policies can be found online and provide you guidance on your rights as a student in this course. The links below take you directly to a specific policy. Should you have any questions about a policy, please do not hesitate to contact me using the information at the top of the syllabus.

- Statement of Non-Discrimination from the University
- Academic Integrity/Honesty
- Student Accessibility
- Incomplete Grade Policy
- YSU Attendance Policy

Generative AI Usage Policy

Generative AI tools (e.g., ChatGPT, GitHub Copilot, Google Gemini) may be used in this course **only under the following conditions**:

1. **Transparency** – If you use a generative AI tool to assist with code, writing, or problem-solving, you must clearly indicate which tool you used, what prompts you provided, and how you used the generated output in your submission.
2. **Academic Integrity** – You remain fully responsible for the correctness, originality, and academic integrity of all work submitted. Copying AI-generated content without understanding or attribution will be treated as plagiarism.
3. **Learning Priority** – Generative AI should supplement, not replace, your own understanding. Over-reliance on AI tools may negatively impact your performance on exams and practical assessments.
4. **Prohibited Uses** – Generative AI may not be used during exams or for any assignments explicitly designated as "AI-free" by the instructor.

Tentative Course Schedule

The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.

Week	Dates	Topic	Textbook Readings	Notes
1	Aug 25, 2025 - Aug 31, 2025	Introduction, History, Concepts, Overview	Preface to Student, Chapter 1	
2	Sep 01, 2025 - Sep 07, 2025	Data Representation, Part I	Chapter 2	Labor Day, Project 1 (Data Representation I)
3	Sep 08, 2025 - Sep 14, 2025	Data Representation, Part II	Chapter 2	
4	Sep 15, 2025 - Sep 21, 2025	Boolean Algebra	Chapter 3	Project 2 (Boolean Algebra & Digital Circuits)
5	Sep 22, 2025 - Sep 28, 2025	Digital Circuits	Chapter 3	
6	Sep 29, 2025 - Oct 05, 2025	Basic Machine Organization	Chapter 4	Project 3 (Basic Machine Organization)
7	Oct 06, 2025 - Oct 12, 2025	MARIE Architecture	Chapter 4	
8	Oct 13, 2025 - Oct 19, 2025	Exam 1	Covers Chapters 1, 2, and part of 3 and related lecture.	

9	Oct 20, 2025 - Oct 26, 2025	Assembly Language Programming	Chapter 4	Project 4 (Assembly Language Programming)
10	Oct 27, 2025 - Nov 02, 2025	Instruction Set Architectures, Part I	Chapter 5	
11	Nov 03, 2025 - Nov 09, 2025	Instruction Set Architectures, Part II	Chapter 5	Project 5 (Instruction Set Architectures II)
12	Nov 10, 2025 - Nov 16, 2025	Memory Hierarchy and Organization, Part I	Chapter 6	
13	Nov 17, 2025 - Nov 23, 2025	Memory Hierarchy and Organization, Part II	Chapter 6	Project 6 (Memory Hierarchy II)
14	Nov 24, 2025 - Nov 30, 2025	Input/Output	Chapter 7	Thanksgiving, Thanksgiving Break
15	Dec 01, 2025 - Dec 07, 2025	Alternative Architectures	Chapter 9	Project 7 (Alternative Architectures)
16	Dec 08, 2025 - Dec 14, 2025	Exam 2	Covers Chapters 4, 5, 6, 7, and 9 and related lecture material.	