

**MIDWESTERN STATE UNIVERSITY**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**CMPS 2084: Introduction to Computer Architecture**

*Spring semester 2022*

Instructor: Ben Diekhoff  
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Office Hours: T 8:00 - 11:00 am  
R 8:00 - 10:00 am  
Class Hours: T, TR 12:30 - 1:50 pm, BO 100  
W 1:00 - 2:50 pm, 3:00 - 4:50pm - BO 103 (lab)

**Course Description:**

Study of the functions and logical relationships of digital computer components, including the central processing unit, different levels of memory, control signals, bus systems, data channels, input/output devices, instruction set architecture and Assembly programming language. Also discussed are memory addressing techniques, data representation and more advanced topics as pipelined, superscalar, and RISC processors.

**Prerequisites:**

Minimum grade of C in CMPS 1044

**Text books:**

**Zybook (required):**

1. Sign in or create an account at [learn.zybooks.com](http://learn.zybooks.com)
2. Enter zyBook code: MWSUCMPS2084PassosSpring2022
3. Subscribe

A subscription is \$72. Students may begin subscribing on Dec 26, 2021 and the cutoff to subscribe is Apr 22, 2022. Subscriptions will last until May 21, 2022.

**Optional:**

Computer Organization and Architecture, by Stallings (8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup> or 11<sup>th</sup> edition).

**Grading:**

Tests and Final Exam	20 % (each, include lecture and lab material)
Homework Assignments	10 %
Lab Assignments	10 %
Mini Projects	15 %
Class Participation	5 %

Final grading letter:

90 to 100 pts = A, 80 to 89.99 pts = B, 70 to 79.99 pts = C, 60 to 69.99 pts = D, other = F

**Additional and important information:**

*All students should refer to the current MSU Students Handbook and Activities Calendar for university policies related to class attendance, academic dishonesty, student's responsibilities, rights and activities.*

COVID: Students are encouraged to wear masks. Any vulnerable or unvaccinated person should wear an N95 or equivalent, if they want to protect themselves from others. Students may also meet with a professor via Zoom by appointment. Covid vaccinations are provided free of charge – and may be obtained on campus on designated vaccine clinic days or by appointment at the Vinson Health Center, or by local pharmacies.

Disability needs: Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible. Students should present appropriate verification from Disability Support Office during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification has been provided. For additional information, contact the Disability Support Office in Clark Student Center 168 - Phone: (940) 397-4140

Cell phones, etc.: Students are to assist in maintaining a classroom environment that is conducive to learning. This means that the presence of electronic devices other than your calculator are not to be seen, heard, or implied, ever. Questions are encouraged and discussion is acceptable, provided it is pertinent and does not distract from the lesson.

Student drops: If you wish to drop this course you must first contact your instructor. All students-initiated drops must be processed by **March 21, 2022**.

Attendance: **Students are expected to attend all meetings of the classes in which they are enrolled.** Attendance is rewarded by the participation points in the grading criteria.

Midterm Progress Report: In order to help students keep track of their progress toward course objectives, the instructor for this class will provide a Midterm Progress Report for all students in the course through each student's WebWorld account. Midterm grades will not be reported on the students' transcript; nor will they be calculated in the cumulative GPA. They simply give students an idea of where they stand at the midpoint of the semester. Students earning below a C at the midway point should a) schedule a meeting with the professor and b) Seek out tutoring

Campus Carry: Senate Bill 11 passed by the 84th Texas Legislature allows licensed handgun holders to carry *concealed* handguns on campus, effective August 1, 2016. Please note, open carry of handguns, whether licensed or not, and the carrying of all other firearms, whether open or concealed, are prohibited on campus. Areas excluded from concealed carry are appropriately marked, in accordance with state law. For more information regarding campus carry, please refer to the University's webpage at [MSU Campus Carry Policy https://msutexas.edu/campus-carry/rules-policies](https://msutexas.edu/campus-carry/rules-policies). If you have questions or concerns, please contact MSU Chief of Police Patrick Coggins at [patrick.coggins@msutexas.edu](mailto:patrick.coggins@msutexas.edu).

Opt-out for Digital Course Materials: Required digital materials for this course are part of the Courseware Access and Affordability Program at MSU Texas. Students are charged for required course materials on their student account with the Business Office. Any students who wish to opt-out of the Program and purchase the required course materials on their own must do so prior to 01/27/21. Opt-out instructions are sent to students' official my.msutexas.edu email address after the first day of class. Please contact the MSU Bookstore if you have any questions about the opt-out process.

Make Up Work/Exams/Quizzes: For planned excused absences, exams may be taken early by prior arrangement.

Assignments: Assignments will be made as scheduled and are expected to be completed by the specified due date. Grades will be given to the assignments handed in on time. Late assignments will be accepted until one class past the due date (except for online assignments), however will have their maximum grade reduced by twenty points. Any assignment turned in after that period or not done will be graded zero points. Students in this course must demonstrate their competency in fundamental math skills through assignments and tests.

Assistance: Please contact your instructor for extra help during this course. This includes class material clarification, expected absences from class due to any personal problem, etc.

### Testing Process

The Department of Computer Science has adopted the following policy related to testing:

- All bags, purses, electronics (turned off), books, etc. will be placed in the front of the room during exams, or in an area designated by the instructor.
- Unless otherwise announced by the instructor, nothing is allowed on the desk but pen/pencil/eraser and test papers.
- No student is allowed to leave the room during an exam and return

RECORDING OF CLASS LECTURES: Permission must be requested in writing & obtained from the instructor before recording of class lectures. If permission is granted, the recording may only be used by the student making the recording. Recordings may NOT be posted on any internet source without written permission of the instructor. Failure to adhere to the policy may result in removal from the course with a grade of F or other appropriate punishment.

Computer Science Tutoring: Tutoring is available in **Bolin Room 119 & the Office of Tutoring and Academic Support Programs (TASP)** in Moffett Library. A tutor may assist with programs and homework for computer science classes. The tutor will not do your work.

Academic Misconduct Policy & Procedures: Cheating, collusion, and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). The Department of Computer Science has adopted the following policy related to cheating (academic misconduct). The policy will be applied to all instances of cheating on assignments and exams as determined by the instructor of the course. (See below for link to MSU definitions.)

- 1st instance of cheating in a course: The student will be assigned a non-replaceable grade of zero for the assignment, project or exam. *If the resulting grade does not result in a letter grade reduction, the student will receive a one letter grade reduction in course.*
- 2nd instance of cheating in a course: The student will receive a grade of F in course & immediately be removed from course.
- All instances of cheating will be reported to the Department Chair and, in the case of graduate students, to the Department Graduate Coordinator.

**Note: Letting a student look at your work is collusion and is academic misconduct!**

See Also: [MSU Student Handbook](https://msutexas.edu/student-life/assets/files/handbook.pdf): Appendix E: Academic Misconduct Policy & Procedures  
<https://msutexas.edu/student-life/assets/files/handbook.pdf>.

**Important Dates:** Visit <https://msutexas.edu/registrar/assets/files/pdfs/spring22front.pdf>

## Tentative agenda:

Jan 11	Introduction – binary numbers
Jan 12	<b>LAB 1 – C++ programming</b>
Jan 13	Number systems - conversion
Jan 18	Negative numbers
Jan 19	<b>LAB 2 – Number systems</b>
Jan 20	Negative numbers
Jan 25	Fractions – hexadecimal system
Jan 26	<b>LAB 3 - Negative numbers</b>
Jan 27	Computer architecture basics, pipeline, cache
Feb 1	Computer evolution
Feb 2	<b>LAB 4 – CPU registers, debug</b>
Feb 3	Computer performance, families
	Homework Assignment # 1
Feb 8	Instruction set overview
Feb 9	<b>LAB 5 – Assembly programming</b>
Feb 10	Addressing modes
	Homework Assignment # 2
Feb 15	Arithmetic and branch instructions
Feb 16	<b>LAB 6 - Conditional jumps</b>
Feb 17	ARM/Intel instructions, Logical operations and decisions
	Homework Assignment # 3
Feb 22	Procedures
Feb 23	<b>LAB 6a - review</b>
Feb 24	<b>Test # 1</b>
Mar 1	Compilation and execution
Mar 2	<b>LAB 7 - Procedures</b>
Mar 3	Instruction cycle, Interrupts
Mar 8	Introduction to memory/storage
Mar 9	<b>LAB 8 - Procedures and stacks</b>
Mar 10	Cache memory, address mapping
	Homework Assignment # 4
<b>Mar 14 - 19</b>	<b>Spring Break</b>
Mar 22	Associative mapping
Mar 23	<b>LAB 9 - Boolean operations</b>
Mar 24	Write policies – Replacement algorithms
Mar 29	Error correction introduction
Mar 30	<b>LAB 10 - Bit manipulation</b>
Mar 31	Error correction Hamming code
Apr 5	Disk technology
Apr 6	<b>LAB 11a - Arrays and strings</b>
Apr 7	RAID
	Homework Assignment # 5
Apr 12	Memory management
Apr 13	<b>LAB 11b - Arrays and strings</b>
<b>Apr 14 - 17</b>	<b>Holiday Break</b>
Apr 19	<b>Test # 2</b>
Apr 20	<b>LAB 11c- review</b>
Apr 21	Paging
Apr 26	Segmentation
Apr 27	Translation Lookaside Buffer
May 5	<b>Finals (Thursday, 10:30 am - 12:30 pm)</b>