

MIDWESTERN STATE UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
CMPS 5443: Modern Processor Design
Summer semester 2021

Instructor: Dr. Nelson L. Passos
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Office Hours: MTWR 10:15 - 11:30 am
Class Hours: MTWR 8:00 - BO 320

Course Description:

Study of the advances in modern processor design, including superscalar aspects, branch prediction and hyper-threading, beginning with the fundamentals of logic design and how these principles are applied in the building of complex microprocessors. It also includes an introduction to VERILOG and VHDL hardware description languages.

Text book:

Digital Logic & Microprocessor Design with Interfacing, 2nd ed., by Enoch O. Hwang.

Grading:

Tests: 25 % (each)
Project: 25 %
Assignments: 20 %
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, students responsibilities, rights and activities.

Disability needs: Inform the instructor if you are a student with a disability and need accommodations for this class.

Cell phones, etc.: Use of any electronic device is not allowed in the classroom. Exceptions must be approved by the instructor.

Student drops: If you wish to drop this course you must first contact your instructor. All students-initiated drops must be processed by **July 22, 2021**.

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.

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. 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 <https://mwsu.edu/campus-carry/rules-policies>.

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, 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 fundamentals math skills through homework 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.

Academic Honesty: The Department of Computer Science had 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.

- 1st instance of cheating in a course: The student will be assigned a non-replaceable grade of zero for the assignment, project or exam. In addition, 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.

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.

Grades will not be posted! Grading system will be discussed in class.

Tentative agenda:

- Jul 5- Introduction to computer design – binary numbers review
- Jul 6- Logic gates and Boolean algebra
Assignment # 1
- Jul 7- Quartus - Digital circuits optimization
- Jul 8- Circuit minimization
Assignment # 2
- Jul 12- Combinational components
- Jul 13- Components
Assignment # 3
- Jul 14- Finite State Machines
- Jul 15- Finite State Machines
- Jul 19- **Test # 1**
- Jul 20- Microprocessors
Assignment # 4
- Jul 21- General purpose microprocessor
- Jul 22- Pipelining
Assignment # 5
- Jul 26- Superscalar
- Jul 27- Reservation stations
- Jul 28- Branch prediction
- Jul 29- Memory delays
- Aug 2- Memory techniques
- Aug 3- Prefetching
- Aug 4- **Test # 2**
- Aug 5- **Finals**