MIDWESTERN STATE UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
CMPS 3023: Logic Design
Spring semester 2022

Instructor   Dr. Nelson L. Passos
Office   Bolin Science Hall 126B
Office phone: 397-4129
E-mail: nelson.passos@msutexas.edu
Webpage: cs.msutexas.edu/~passos
Office Hours: MW   9:00 - 11:00 am
                      TR   9:30 - 12:00 pm
                               1:00 - 3:00 pm
Class Hours: MWF   8:00 - BO 320

Course Description:
Study of topics related to the design of modern microprocessors, including Boolean algebra, logic gates, design simplification techniques, memory design, programmable control units, and use of hardware description languages.

Prerequisites:
Minimum grade of C in CMPS 2084

Extrta Credit Text book online:
1. Sign in or create an account at learn.zybooks.com (or get it from bookstore)
2. Enter zyBook code **MWSUCMPS3023PassosSpring2022**
3. Subscribe.

Recommended published books:
Digital Design and Computer Architecture, by David Harris and Sarah Harris or
Digital Logic and Microprocessor Design with Interfacing, by Enoch Hwang, 2nd ed.

Grading:
Tests and Final Exam   20 % (each)
Homework Assignments   20 %
Project   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, 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 **March 21, 2022**.

<u>Attendance</u>:   **Students are expected to attend all meetings of the classes in which they are enrolled.** In case of virtual classes, attendance will be verified by online participation. Attendance is rewarded by the participation points in the grading criteria.

<u>Campus Carry</u>: 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.

<u>Assignments</u>: 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.
<u>Assistance</u>:   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.

<u>Academic Honesty</u>: 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.

<u>Testing Process</u>
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

<u>Midterm Progress Report:</u> In order to help students keep track of their progress toward course objectives, the instructor for this class will provide a Midterm Progress Report 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 r. Students earning below a C at the midway point should schedule a meeting with their instructor.

<u>RECORDING OF CLASS LECTURES:</u> 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.

<u>Grades will be posted on D2L</u>

Tentative agenda:

Jan	**10-**	Introduction
Jan	**12-**	Binary numbers and data representation - a review
Jan	**14-**	Binary numbers – negative values
Jan	**17-**	**Martin Luther King Holiday**
Jan	**19-**	Fractions
Jan	**21-**	Floating point
Jan	**24-**	Logic gates
Jan	**26-**	Logic levels - transistors
Jan	**28-**	Switching functions (AND, OR, NOT, NAND, NOR)
Jan	**31-**	Power consumption
Feb	**2-**	Boolean algebra
Feb	**4-**	Boolean algebra – properties/theorems
		Homework Assignment # 1
Feb	**7-**	Boolean algebra – De Morgan's law
Feb	**9-**	Logic to gates – don't cares
Feb	**11-**	Karnaugh maps - introduction
Feb	**14-**	Sum of products/product of sums
Feb	**16-**	Karnaugh maps - examples
Feb	**18-**	More Karnaugh maps - examples
		Homework Assignment # 2
Feb	**21-**	Don't cares
Feb	**23-**	5 input Karnaugh map
Feb	**25-**	Quine-McCluskey method
		Homework Assignment # 3
Feb	**28-**	Multiplexers, Decoders
Mar	**2-**	Introduction to Quartus VHDL - basics
Mar	**4-**	**Test # 1**
Mar	**7-**	VHDL - examples
Mar	**9-**	VHDL - Quartus
Mar	**11-**	Timing - Glitches
Mar	**14-18**	**Spring Break**
Mar	**21-**	Project example
Mar	**23-**	Sequential circuits - latches
Mar	**25-**	Sequential circuits - latches
		Homework Assignment # 4
Mar	**28-**	D Flip-flops
Mar	**30-**	VHDL - registers
Apr	**1-**	Project example - register
Apr	**4-**	Sequential logic design
Apr	**6-**	Finite state machine
Apr	**8-**	Finite state machine implementation – traffic light
		Homework Assignment # 5
Apr	**11-**	Mealy and Moore Finite state machines
Apr	**13-**	Simplifying a finite state machine
Apr	**15-**	**Easter Holiday**
Apr	**18-**	Digital building blocks
Apr	**20-**	Adders, Subtractors
Apr	**22-**	Comparators- ALU
Apr	**25-**	Shift registers, Counters
Apr	**27-**	**Test # 2**
Apr	**29-**	**Review**
May	**4-**	**Finals (Wednesday, 8:00 am)**