# MIDWESTERN STATE UNIVERSITY

## DEPARTMENT OF COMPUTER SCIENCE

CMPS 5143: Advanced Operating Systems

*Fall semester 2022*


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| Instructor: | Dr. Nelson L. Passos | |
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| Office Hours: | M | 1:00 - 3:00 pm |
| | TR | 9:30 - 11:00 pm |
| | MW | 9:00 - 12:00 pm |
| Class Hours: | MW | 3:30 - BO 320 |


### Course Description:

Application of software techniques used in constructing operating systems for large, multi-program batch, and timesharing computer systems. Includes memory management, processor scheduling, concurrent processes, job scheduling, I/O device management, and information management.

### Prerequisites:

CMPS 4103 or consent of instructor.

### Text book (recommended):

Modern Operating Systems, by Tanenbaum (4th edition).

### Grading:

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| Tests and Final Exam: | 20 % |
| Homeworks: | 25 % |
| Project: | 10 % |
| 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 **October 24, 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.

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.

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 (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 fundamentals math skills through assignments and tests.

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

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 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 schedule a meeting with their instructor.

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.

Grading system will be discussed in class.

**Tentative agenda**:

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| **Aug 22-** | Introduction |
| **Aug 24-** | Processes – priorities - resources |
| **Aug 29-** | Threads |
| **Aug 31-** | Scheduling algorithms |
| **Sep 5-** | **Labor Day holiday** |
| **Sep 7-** | Race conditions **[Class time 4:10-5:30 pm]** |
| **Sep 12-** | Semaphores |
| **Sep 14-** | Dining Philosophers problem<br>Homework Assignment # 1 |
| **Sep 19-** | Deadlocks |
| **Sep 21-** | Deadlock detection- avoidance - prevention<br>Homework Assignment # 2 |
| **Sep 26-** | Memory management |
| **Sep 28-** | Paging |
| **Oct 3-** | Segmentation<br>Project assignment |
| **Oct 5-** | **Test # 1 [Class time 4:10-5:30 pm]** |
| **Oct 10-** | Page replacement algorithms - LRU |
| **Oct 12-** | Paging |
| **Oct 17-** | File systems |
| **Oct 19-** | Disk space management<br>Homework Assignment # 3 |
| **Oct 24-** | Disk arm scheduling |
| **Oct 26-** | File systems DOS/UNIX |
| **Oct 31-** | Linux - introduction<br>Homework Assignment # 4 |
| **Nov 2-** | Linux - scheduling |
| **Nov 7-** | Linux Memory Management |
| **Nov 9-** | Linux File System **[Class time 4:10-5:30 pm]**<br>Homework Assignment # 5 |
| **Nov 14-** | Windows - introduction |
| **Nov 16-** | **Test # 2** |
| **Nov 21-** | Windows - scheduling |
| **Nov 23-** | **Thanksgiving Holidays** |
| **Nov 28-** | Windows – file system |
| **Nov 30-** | Virtual machines - cloud |
| **Dec 5-** | **Finals (Monday, 3:30 pm)** |