1 Course Information

Course Number:	CSCE 313-200 (honors)
Course Title:	Introduction to Computer Systems
Time:	MWF 1:50-2:40pm
Location:	126 HRBB
Credit Hours:	4
Lab Time:	TR 2:35-3:25pm
Lab Location:	590 ZACH
Website:	http://irl.cse.tamu.edu/courses/313/
Piazza:	http://piazza.com/tamu/spring2024/csce313200

Instructor Details

Instructor:	Dmitri Loguinov
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Office Hours:	WF 3-4pm

TA:	Gabriel Stella
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Office hours:	TR 4-5pm

Course Description

This class is covers common algorithmic and implementation problems arising in operating systems, inter-process communication, multi-threading, synchronization, memory management, process scheduling, and large-scale file I/O.

Course Prerequisites

CSCE 312 (computer organization), CSCE 222 (discrete structures for computing), CSCE 221 (data structures and algorithms), and **solid knowledge of C/C++, debugging, and pointers.**

Course Learning Outcomes

At the end of the semester, the students will obtain experience with operating-system functionality, multi-threading, synchronization, file I/O, virtual memory, and C/C++ system APIs. Compared to the non-honors version of the class, this course provides a more in-depth coverage of synchronization/threading, focuses on achieving CPU/memory efficiency, and requires more sophisticated code development & debugging.

Textbook and/or Resource Materials

W. Stallings, "Operating Systems: Internals and Design Principles," Pearson, 9th Edition, 2017.

Grading Policy

A: 90-100%, B: 80-89%, C: 70-79%, D: 60-69%, F: 0-59%

Assignment	Qty	Format	Percent of final grade
Homework	4	Implementation and report	40%
Midterms	6	Closed-book	45%
Quizzes	6	Closed-book	15%

Late Work Policy

Homework submissions are due at 10 am. Late homework is acceptable with a penalty of 20% of the original grade per day (no points after 5 days). Delays are rounded up to the nearest full day. *Example #1*: your homework scores 76 points, but is 28 hours late. Your score is then reduced by 40 points and becomes 36. *Example #2*: your submission scores 19 out of 25 pts, but is 1 day late. The reduction is then 5 pts, which brings the grade down to 14.

Homework

All submissions must compile in Visual Studio 2022 in both debug and release mode. Solutions with missing files, incorrect project options, or dependency on non-standard libraries (e.g., boost) will not be graded.

Each homework must be accompanied by a written report (if there are multiple parts in the homework, the report applies only to the last part) describing your implementation and showing the performance analysis requested in the handout. Write in as much detail as possible, explain the various observations, and comment on the sanity of obtained results.

This course assumes *independent* work on each assignment. All submissions must be original and developed from scratch. At no time can you receive aid from external sources (e.g., current students, prior students, material found online, AI tools). The only exceptions to this policy are: sample code provided by the instructor on the course website, Microsoft help pages, and any interaction with the TA/instructor. **Any academic dishonesty, including cheating and plagiarism, will result in an F* for the course and may lead to expulsion from the university.**

Course Schedule

Lecture #	Title	Topic
1	Preliminaries I	Syllabus

2	Preliminaries II	Cave search
3	Preliminaries III	Visual Studio demo
4	Operating Systems	History, purpose
5	Processes	Definition, states
6	**Quiz 1**	**System notes**
7	Threads	Reasons, APIs, execution modes
8	Synchronization I	Principles of concurrency, terminology
9	**Quiz 2**	**System notes**
10	Synchronization II	Hardware mutex
11	Synchronization III	Semaphores
12	**Midterm 1**	**Chapters 2-5**
13	Synchronization IV	Kernel mutex/event
14	Synchronization V	Producer-consumer problem
15	**Midterm 2**	**Chapters 2-5**
16	Synchronization VI	Monitors, condition variables
17	Practice I	Simple semaphore puzzles
18	**Quiz 3**	**Chapters 4-5**
19	Practice II	Simple semaphore puzzles
20	Synchronization VII	Messages, reader-writer, performance
21	**Quiz 4**	**Chapters 4-5**
22	Practice III	Harder semaphore puzzles
23	Deadlocks I	Prevention
24	Deadlocks II	Dining philosophers
25	File System I	I/O devices, speed
26	File System II	APIs
27	**Midterm 3**	**Chapters 5-6**
28	File System III	Buffering, disk internals
29	File System IV	RAID, caching
30	**Midterm 4**	**Chapters 5-6**
31	File System V	File structure
32	File System VI	Directories, file allocation
33	**Quiz 5**	**Chapters 6, 11, 12**
34	Memory I	Process heap
35	Memory II	Buddy system
36	**Quiz 6**	**Chapters 6, 11, 12**
37	Memory III	Virtual memory, paging
38	Practice IV	Quiz review
39	**Midterm 5**	**Chapters 11, 12, 7, 8**
40	Practice V	String search
41	Memory IV	Buffer overflows, page eviction
42	**Midterm 6**	**Chapters 11, 12, 7, 8**

2 University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" (Student Rule 7, Section 7.4.1).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" (Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See Student Rule 24.)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage

in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.