CS3360: Computing Systems Fundamentals

Spring 2026

Instructor:
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Office: Comal building (office #307.D.1)

Instructor Office Hours:
Mondays: 8:30 am – 10:30 am (Comal #307.D.1)
Wednesdays: 3:30 pm – 5:00 pm (Comal #307.D.1)

Teaching Assistant:
Ishrak Ratul
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Teaching Assistant Office hours:
Tuesdays: 11:30 am – 12:30 pm (over zoom)
Thursdays: 11:30 am – 12:30 pm (over zoom)

Zoom link:

https://txstate.zoom.us/j/6528289319?pwd=RThJbjlXRTJiN1hmN2VGOURQZmFFQT09

Meeting ID: 652 828 9319
Passcode: 673370

Class Material:
Maintained on Canvas. Homework, projects, and other documents will be uploaded under Files. An email will be sent out any time an assignment has been added.

Copyrights:
All class material provided in-class and on the Canvas course site are protected by Copyright and for the exclusive use of students enrolled in this course. Allowing others to access this material by placing it on publicly available git repositories or submitting to "note sharing sites" such as Chegg and CourseHero (which encourage you to break the law and post copyrighted content you don't own) is expressly forbidden. Note that you are not allowed to publicly post any of this material even if you made modifications to it. This copyright protection extends past the end of the semester.

Lectures:
Mondays: 11:00 am - 12:20 pm (DERR #234)
Wednesdays: 11:00 am – 12:20 pm (DERR #234)

This class meets face-to-face.

Textbooks (Recommended):
Probability, Statistics, and Queueing Theory with Computer Science Applications, Allen, 2nd Edition.

Operating Systems Concepts, Silberschatz, Galvin and Gagne, 10th Edition.

Grading Policy:
Assignments and Projects ~ 6 (30%)
Midterm exam (30%)
Final exam (40%)

Assignments will be posted on Canvas and are due at midnight on the assignment due date. Solutions are to be uploaded on Canvas. Assignments will include programming and coding questions. Late assignments will not be accepted without prior arrangements. It is your responsibility to ensure that you have uploaded the correct assignment. No makeup exams and/or extensions are allowed without prior arrangement.

The Teaching Assistant (TA) oversees the written assignments and projects and their grading aspects. Please reach out to them with any grading issues first and if an issue is not resolved, please reach out to the instructor.

Usage of AI and generative AI:
For this class, "AI" has a broad definition and refers to any application or website that creates content including creating code. The use of most AI or Generative AI tools, including those provided by Texas State University, is limited in this course. Using AI to solve homework problems and write code for project assignments is not allowed and will be treated as any violation of the Academic Honor Code as explained below.

You may use AI to check for certain programming syntax, understanding the nature of errors that can occur while compiling and running programs. It is your responsibility to clearly understand any assistance received from AI that you adopt.

Academic Honesty:
Discussion of course material, problem sets, and projects are encouraged between students. However, you must write up your answers on your own. You must also write the names of other students you discussed any problem with. As for programming assignments, you may still discuss them with other students, however, what you submit should be strictly the code that you wrote. Submitting someone's else code/work (including AI-generated ones) will result in a final grade of 'F' and a referral to the Chair of the Texas State University Honor Code Council (HCC).

Midterm and Final exam Policy: The use of smart phones during exams is strictly prohibited and phones must be turned off and stored away. Any phone that is turned on during an exam will result in a grade of zero in the exam.

Please refer to the Code of student conduct:

https://studenthandbook.txst.edu/rules-and-policies.html

and the Honor Code:

https://www.txst.edu/honorcodecouncil/Academic-Integrity.html

Mission:
Texas State University is a public, student-centered research institution dedicated to excellence, discovery, and innovation. We create new knowledge, embrace a diversity of

people and ideas, foster cultural and economic development, and educate our students to participate fully and freely in the communities of Texas, the nation, and the world.

Shared Values:

In pursuing our mission, we, the faculty, staff, and students of Texas State University, are guided by a shared collection of values:

- Teaching and learning based on research, student needs, and the free exchange of ideas in a supportive environment;
- Research and creative activities that encompass the full range of academic disciplines;
- Meaningful student engagement built on active involvement, accessibility, and intentional educational experiences;
- The cultivation of university community that consistently practices integrity, civility, compassion, and respect;
- A shared commitment to creating a sense of belonging across unique communities, identities, ideas, and contributions;
- A welcoming spirit and a global perspective;
- Dedication to service and leadership for the public good;
- Responsible stewardship of our resources and environment; and
- Continued reflection and evaluation to ensure that our strengths always benefit those we serve locally and globally.

Course Description:
This course covers fundamental concepts underlying the design and implementation of computing systems. It introduces students to problems that reoccur in computing systems and the tools and algorithms used to solve them. Topics include performance evaluation, resource management and scheduling, concurrency and synchronization, and communication and networks.

Learning Objectives:

- Describe different distribution models and use some of them for workload generation.
- Evaluate the performance of a system using different metrics.
- Analyze different queueing systems and assess their performance.
- Evaluate and tradeoff different scheduling algorithms on single and multiple resources.
- Design and implement parallel programs and synchronize their execution.
- Implement remote procedure calls in a client/server architecture.

Prerequisites:
CS 2318 Assembly Language
CS 3358 Data Structures

Accommodations:
If you require any special accommodation(s), please make sure to inform the instructor during the first two weeks of the semester.

Roadmap:

This is a tentative roadmap and is subject to change!

Date	Topic(s)
1/21/2026	Background: Computer organization. Events. Interrupts.
1/26/2026	Processes. Resources. Process State Diagram. Context Switching.
1/28/2026	Performance metrics.
2/2/2026	Workload generation. Probability analysis. Sampling.
2/4/2026	Distributions as models.
1/9/2026	Distributions as models.
2/11/2026	State transitions and Markov Chains.
2/16/2026	M/M/1 queueing system. Little's law.
2/18/2026	M/M/1 queuing system.
2/23/2026	Discrete-Time Event Simulation.
2/25/2026	Other Queue types.
3/2/2026	Network of Queues.
3/4/2026	Scheduling on a single resource.
3/9/2026	Review
3/11/2026	Midterm
3/23/2026	Scheduling on a single resource.
3/25/2026	Scheduling on multiple resources.
3/30/2026	Inter-process Communication
4/1/2026	Synchronization: Dependence and race conditions
4/6/2026	Synchronization: Critical section and mutual exclusion.
4/8/2026	Synchronization: Mutexes and semaphores.
4/13/2026	Synchronization: Deadlocks.
4/15/2026	Parallel Computing: Data and task parallelism. Speedups.
4/20/2026	Parallel Computing: OpenMP.
4/22/2026	Networks and Distributed Systems.
4/27/2026	Networks and Distributed Systems.
4/29/2026	Virtualization.
5/4/2026	Cloud Computing.
5/6/2026	Review.
5/11/2026	Final exam from 8:00 AM till 10:00 AM (2-hour final)