

**CMPS 4760/6760 Distributed Systems**  
**3 credits**  
**Spring 2021**

**Instructor:** Prof. Zizhan Zheng (zzheng3@tulane.edu)  
**Class Time & Place:** Tue and Th 2:05PM - 3:15PM, Stanley Thomas 302  
**Office hours (online):** TBA

**COURSE OVERVIEW**

This course covers the fundamental concepts in distributed computing at the graduate level. The objective is to introduce students to the core notions, techniques, and algorithms in the design of distributed systems when there is no global clock and when unpredictable failures and variable latency are the norms. Recent developments in the Internet, cloud computing, and blockchain, etc. will be used as case studies to help students establish a firm understanding of the philosophy and pitfalls in achieving reliable and efficient distributed computing. Topics to be covered include interprocess communication, time and clocks, mutual exclusion, group communication, consensus, decentralized optimization, transactions, and security.

**PREREQUISITES**

Discrete Mathematics (CMPS/MATH 2170), Introduction to Algorithms (CMPS 2200), Introduction to Computer Systems and Networking (CMPS 2300) or equivalent or instructor approval.

**COURSE WEBPAGE**

<http://www.cs.tulane.edu/~zzheng3/teaching/cms6760/spring21/>

**COURSE MATERIALS**

Textbook: George Coulouri, Jean Dollimore, Tim Kindberg, and Gordon Blair, Distributed Systems: Concept and Design (5th edition), Pearson, 2012.

References

- Sukumar Ghosh, Distributed Systems: An Algorithmic Approach (2nd edition), Chapman and Hall/CRC, 2014.
- V. K. Garg, Elements of Distributed Computing, John Wiley & Sons, 2008.

**CLASS MEETING PLAN**

We will meet both in person and online (about 40% of lectures will be online). A detailed class schedule can be found on the course webpage.

**HOMEWORK AND LABS**

There will be both written problem assignments and labs (programming assignments). Graduate students will be given extra questions that require advanced algorithmic/analytic techniques. Specific instructions will be given in each assignment.

**PAPER PRESENTATION**

Each student will present one or two papers from the suggested paper list or chosen by the student (please confirm with me). Two undergraduate students can present together while each graduate student should give a presentation independently. For each presentation, all the students (other than the presenter) are expected to give feedback to the presenter.

**EXAMS**

There will be a midterm and a final exam. Both will be online, open-book and open-notes.

## **RECORDINGS OF CLASS SESSIONS**

Classes will be recorded and the recordings will be posted to Canvas. Students may not post a class recording elsewhere, either wholly or in part.

## **LATE POLICY**

Each student has a total of 6 grace days that may be applied to the homework assignments. No more than 2 grace days may be used on any single assignment. Any assignment submitted more than 2 days past the deadline (or the date the student no longer has late day credit) will get zero credit. No late days are allowed for the final presentation and report.

## **GRADING POLICY**

25% Homework, 15% Labs, 5% Presentation, 20% Midterm, 25% Final, 10% Class Participation

The weighted average will determine your final letter grade as follows:

A >= 93% [Exemplary. Superior achievement.]

A- >= 90% [Outstanding]

B+ >= 87%, B >= 83%, B- >= 80% [High Pass, Above Average]

C+ >= 77%, C >= 73%, [Pass, Average work, Satisfactory] C- >= 70% [Below Average]

D >= 60%, [Low Pass, Unsatisfactory, Barely passing]

F < 60% [Failure, Unacceptable]

All grades will be posted on Canvas. As a reminder to undergraduate students, the S/U option may not be used to satisfy the writing, foreign language, quantitative or formal reasoning, and laboratory components of the NTC Core Curriculum, nor may it be used to satisfy major or minor requirements. Details of the policy can be found here: <https://registrar.tulane.edu/2020-21-covid-19-grading-policy>. Students are encouraged to consult with their Newcomb Tulane College academic advisor if they have any questions.

## **ATTENDANCE POLICY**

Faculty and students must comply with University policies on COVID-19 testing and isolation, which are located here[<https://tulane.edu/covid-19/health-strategies>]. Faculty and students must wear face coverings in all common areas, including classrooms, and follow social distancing rules. Failure to comply is a violation of the Code of Student Conduct and students will be subject to University discipline, which can include suspension or permanent dismissal.

If a student cannot attend class for any reason, the student is responsible for communicating with their instructor to make up any work they may miss. Faculty will provide online options for class participation, outlined in this document, and unless a student is seriously ill, they are expected to use this option. The University Health Center will provide documentation verifying a student is ill, as well as verification that a student may return to class. With the approval of the Newcomb-Tulane College dean, an instructor may have a student who has excessive absences involuntarily withdrawn from a course with a WF grade after written warning at any time during the semester.

## **ADA/ACCESSIBILITY STATEMENT**

Tulane University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability, please let me know immediately so that we can privately discuss options. I will never ask for medical documentation from you to support potential accommodation needs. Instead, to establish reasonable accommodations, I may request that you register with the Goldman Center for Student Accessibility. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. Goldman Center contact information: [goldman@tulane.edu](mailto:goldman@tulane.edu); (504) 862-8433; [accessibility.tulane.edu](http://accessibility.tulane.edu).

## **CODE OF ACADEMIC CONDUCT**

The Code of Academic Conduct applies to all students, full-time and part-time, in Tulane University. Tulane University expects and requires behavior compatible with its high standards of scholarship. By accepting admission to the university, a student

accepts its regulations (i.e., [Code of Academic Conduct](#) and [Code of Student Conduct](#)) and acknowledges the right of the university to take disciplinary action, including suspension or expulsion, for conduct judged unsatisfactory or disruptive.

**RELIGIOUS ACCOMMODATION POLICY**

Per Tulane’s religious accommodation policy, I will make every reasonable effort to ensure that students are able to observe religious holidays without jeopardizing their ability to fulfill their academic obligations. Excused absences do not relieve the student from the responsibility for any course work required during the period of absence. Students should notify me within the first two weeks of the semester about their intent to observe any holidays that fall on a class day or on the day of the final exam.

**TITLE IX**

Tulane University recognizes the inherent dignity of all individuals and promotes respect for all people. As such, Tulane is committed to providing an environment free of all forms of discrimination including sexual and gender-based discrimination, harassment, and violence like sexual assault, intimate partner violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone. Resources and support are available: you can learn more at [allin.tulane.edu](http://allin.tulane.edu). Any and all of your communications on these matters will be treated as either “Confidential” or “Private” as explained in the chart below. Please know that if you choose to confide in me I am mandated by the university to report to the Title IX Coordinator, as Tulane and I want to be sure you are connected with all the support the university can offer. You do not need to respond to outreach from the university if you do not want. You can also make a report yourself, including an anonymous report, through the form at [tulane.edu/concerns](http://tulane.edu/concerns).

<b>Confidential</b>	<b>Private</b>
Except in extreme circumstances, involving imminent danger to one’s self or others, nothing will be shared without your explicit permission.	Conversations are kept as confidential as possible, but information is shared with key staff members so the University can offer resources and accommodations and take action if necessary for safety reasons.
Counseling and Psychological Services (CAPS)   (504) 314-2277 or The Line (24/7)   (504) 264-6074	Case Management and Victim Support Services   (504) 314-2160 or <a href="mailto:srss@tulane.edu">srss@tulane.edu</a>
Student Health Center   (504) 865-5255	Tulane University Police (TUPD)   Uptown - (504) 865-5911. Downtown – (504) 988-5531
Sexual Aggression Peer Hotline and Education (SAPHE)   (504) 654-9543	Title IX Coordinator   (504) 865-5615 or <a href="mailto:msmith76@tulane.edu">msmith76@tulane.edu</a>

**EMERGENCY PREPAREDNESS & RESPONSE**

<b>EMERGENCY NOTIFICATION SYSTEM: TU ALERT</b>	<b>RAVE GUARDIAN</b>
<p>In the event of a campus emergency, Tulane University will notify students, faculty, and staff by email, text, and phone call. You were automatically enrolled in this system when you enrolled at the university.</p> <p>Check your contact information annually in Gibson Online to confirm its accuracy.</p>	<ul style="list-style-type: none"> <li>Download the RAVE Guardian app from the App Store</li> <li>Communicate with dispatchers silently by selecting “Submit Tip” feature in the app</li> <li>Use the Safety Timer feature to alert your “guardian” (TUPD, family, friend) when travelling alone at night</li> </ul> <p>For more information, visit <a href="http://publicsafety.tulane.edu/rave-guardian">publicsafety.tulane.edu/rave-guardian</a></p>
<b>ACTIVE SHOOTER / VIOLENT ATTACKER</b>	<b>SEVERE WEATHER</b>
<ul style="list-style-type: none"> <li><b>RUN</b> – run away from or avoid the affected area, if possible</li> <li><b>HIDE</b> – go into the nearest room that can be locked, turn out the lights, silence cell phones, and remain hidden until all-clear message is given through TU ALERT</li> <li><b>FIGHT</b> – do not attempt this option, except as a last resort</li> </ul> <p>For more information on Active Shooter emergency procedures or to schedule a training, visit <a href="http://emergencyprep.tulane.edu">emergencyprep.tulane.edu</a></p>	<ul style="list-style-type: none"> <li>Follow all TU Alerts and outdoor warning sirens</li> <li>Seek shelter indoors until the severe weather threat has passed and an all-clear message is given</li> <li>Do not attempt to travel outside if weather is severe</li> <li>Monitor the Tulane Emergency website (<a href="http://tulane.edu/emergency/">tulane.edu/emergency/</a>) for university-wide closures during a severe weather event</li> </ul>