

EE 382 N Vijay K. Garg

Instructor: Prof. Vijay K. Garg ; **Phone:** (512) 705-7689 ; **e-mail:** garg AT ece.utexas.edu;
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Prerequisites: Programming experience, Graduate standing

Textbook :

[Elements of Distributed Computing](#) by Vijay K. Garg, Wiley & Sons, 2002. The textbook will be supplemented with [a set of papers](#).

Course Contents: This will be an introductory graduate level course in distributed systems. It will expose students to theoretical as well as practical aspects of designing such systems. The course assumes that the student has some familiarity with programming. There is no final exam but there will be three tests during the course. The following topics will be covered in the course:

Number	Topics	Course Material
1	Introduction, posets, Happened-Before, lattices, Clocks (physical, logical, vector, chain)	C1-5, [L78]
2	Mutex Algorithms: Lamport, Ricart-Agrawala, Drinking Philosophers, Quorums	C6-8
3	Snapshot algorithms, Leader election, Spanning tree,	C9, C10, C18, [CL], [GG], [GHS]
4	Randomization, Chernoff's bound, Distributed Trigger Counting, Maximal Independent Set	[CCGS11], [Luby86]
5	Global Predicates (linear, relational), Birkhoff's Theorem, Slicer, termination detection	[IG06], [MG02], C11-14, C21
6	Causal and Total Message Order, Synchronizers, Self-stabilization	C16, C17, C21, C23
7	Common Knowledge, FLP, Consensus in synchronous systems, Paxos,	C24-26,
8	Byzantine Agreement, Weighted Byzantine, Accurate Byzantine, Approximate Agreement, Practical Byzantine,	[GB11], [GBB11]
9	Basic Linear Codes, Reed-Solomon, Fusion based Fault-Tolerance	[G10], [GB11]
10	Failure Detectors, Publish-Subscription Systems	C28, [PubSub03]
11	Map-Reduce, Google File System	[DG04], [GGL03],
12	Multidimensional Agreement	[VG 13]
13	Lattice Agreement	[ZHG 18, ZG 20]
14	Term Project Presentations	
15	Term Project Presentations, Survey	

Grading: 30 % Assignments, 15 % Test 1, 15 % Test 2, 20 % Test 3, 15% Term paper, 5% Class presentation

----- Course Independent Information -----

Video Streaming and Recording

Video streaming and recording of class activities are reserved only for students and TAs in this class for educational purposes and are protected by [FERPA](#) laws if any students are identifiable in the video. Video streams and recordings should not be shared outside the class in any form. Students violating this university policy could face misconduct proceedings.

Regrade Requests

Request for regrading an assignment or Test must be made in writing within one week of the graded assignment or test being made available to students in the class.

Q Drop Policy

If you would like to drop a class after the 12th class day, you'll need to execute a Q drop before the Q-drop deadline, which typically occurs near the middle of the semester. Under Texas law, you are only allowed six Q drops while you are in college at any public Texas institution. For more information, see <http://www.utexas.edu/ugs/csacc/academic/adddrop/qdrop>.

Religious Holy Days

A student who misses classes or other required activities, including examinations, for the observance of a religious holy day should inform the instructor as far in advance of the absence as possible so that arrangements can be made to complete an assignment within a reasonable period after the absence. A reasonable accommodation does not include substantial modification to academic standards, or adjustments of requirements essential to any program of instruction. Students and instructors who have questions or concerns about academic accommodations for religious observance or religious beliefs may contact the [Office for Inclusion and Equity](#). The University does not maintain a list of religious holy days.

Disabilities statement: "The University of Texas at Austin provides upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, at (512) 471-6259, 471-4641 TTY,<http://www.utexas.edu/diversity/ddce/ssd>."

COVID-19 Pandemic

The COVID-19 pandemic has been disrupting our health and well-being for several months. More than 1.5% of the US population has tested positive, including friends and family in some cases. Its cumulative effect has taken a serious toll on our physical and mental health. Many of our friends and family have lost their jobs or been furloughed. Many of us are living in an environment that may not have a quiet place to study or adequate Internet access. Please let me know if you face difficulties this semester in accessing course resources or completing work. The University provides student emergency assistance through [Texas One Stop](#) (US citizens), [Texas Global](#) (International), [Student Emergency Fund](#) (All Students).

COVID-19 Guidance

To help keep everyone at UT and in our community safe, it is critical that all students report COVID-19 symptoms and testing, regardless of test results, to [University Health Services](#), and faculty and staff report to the [HealthPoint Occupational Health Program \(OHP\)](#) as soon as possible. Please see this link to understand what needs to be reported. In addition, to help understand what to do if a fellow student in the class (or the instructor or TA) tests positive for COVID, see [University Health Services](#).

Title IX Reporting

Title IX is a federal law that protects against sex and gender-based discrimination, sexual harassment, sexual assault, sexual misconduct, dating/domestic violence and stalking at federally funded educational institutions. UT Austin is committed to fostering a learning and working environment free from discrimination in all its forms where all students, faculty, and staff can learn, work, and thrive. When sexual misconduct occurs in our community, the university can:

1. Intervene to prevent harmful behavior from continuing or escalating.

2. Provide support and remedies to students and employees who have experienced harm or have become involved in a Title IX investigation.
3. Investigate and discipline violations of the university's relevant policies.

Faculty members and certain staff members are considered "Responsible Employees" or "Mandatory Reporters," which means that they are required to report violations of Title IX to the Title IX Coordinator at UT Austin. **I am a Responsible Employee and must report any Title IX related incidents** that are disclosed in writing, discussion, or one-on-one. Before talking with me, or with any faculty or staff member about a Title IX related incident, be sure to ask whether they are a responsible employee. If you want to speak with someone for support or remedies without making an official report to the university, email advocate@austin.utexas.edu. For more info about reporting options and resources, visit <https://titleix.utexas.edu/campus-resources> or contact the Title IX Office at titleix@austin.utexas.edu.

Personal Pronoun Use

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender expression, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name, unless they have added a "preferred name" with the [Gender and Sexuality Center](#). Canvas provides an opportunity to select a pronoun preference. I will gladly honor your request to address you by a name that is different from what is on the roster, and by the gender pronouns you use (she/he/they/ze, etc).

Mental Health Counseling

College can be stressful and sometimes we need a little help. Luckily, we have a wealth of resources and dedicated people ready to assist you, and treatment does work. The [Counseling and Mental Health Center \(CMHC\)](#) provides counseling, psychiatric, consultation, and prevention services that facilitate student academic and life goals and enhance their personal growth and well-being. CMHC counselors are available Monday-Friday 8am-5pm by phone (512-471-3515) and Zoom videoconference. They are no longer available for in-person meetings due to social spacing and other precautions to reduce exposure to the coronavirus.

Alternatively, you can talk to [Ms. Jeni Wade, LCSW](#) right here in the College of Engineering. Ms. Wade is our [Care Counselor](#) and she can be reached at 512-471-8396.

If you are experiencing a mental health crisis (e.g. depression or anxiety), please call the Mental Health Center Crisis line at 512-471-CALL(2255). Call even if you aren't sure you're in a full-blown crisis, but sincerely need help. Staff are there to help you.

Land Acknowledgment

I would like to acknowledge that we are meeting on Indigenous land. Moreover, I would like to acknowledge and pay our respects to the Carrizo & Comecrudo, Coahuiltecan, Caddo, Tonkawa, Comanche, Lipan Apache, Alabama-Coushatta, Kickapoo, Tigua Pueblo, and all the American Indian and Indigenous Peoples and communities who have been or have become a part of these lands and territories in Texas, here on Turtle Island.