

Course Information

Course Information

Course Number: CSCE 435
Course Title: Parallel Computing
Section: 500
Time: TR 2:20-3:35 pm
Location: 113 HRBB
Term: Spring 2022
Credit Hours: 3

Instructor Details

Instructor: Vivek Sarin
Office: 415 Peterson
Phone: 979-458-2214
Email: sarin@tamu.edu (<mailto:sarin@tamu.edu>) (preferred method of communication)
Office Hours: TR 11am-12 pm (Jan 18 & Jan 20), then TR 10:30-11:30am; via Zoom
<https://tamu.zoom.us/j/99726975773> (<https://tamu.zoom.us/j/99726975773>)

Course Description

This course provides an overview of parallel computing technology and programming methods. The topics in the course include: multiprocessor architectures, programming tools, parallel performance, parallel algorithms, and applications of parallel computing.

Course Prerequisites

CSCE 315 and junior or senior standing; or approval of the instructor.

Special Course Designation

None.

Course Learning Outcomes

The main objective of this course is to provide an opportunity for our undergraduate students to learn about parallel computing technology and to develop programming skills on traditional and emerging platforms for parallel computation. Upon successful completion of the course, a student:

- will be able to design parallel algorithms and develop software implementations on parallel computers;
- will be able to analyze the performance of parallel implementations on various parallel platforms; and
- will know the architecture of modern parallel computing systems.

Textbook and/or Resource Materials

Instructor will provide lecture videos, copies of lecture slides, and links to resources on the internet on the course web site on Canvas.

Grading Policy

Quizzes, assignments and projects will be available on the course web site on Canvas and submissions will have to be uploaded to Canvas.

Course grade will be assigned on the basis of quizzes (40%), assignments (60%). The following scale will be used: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=0-59%. Scores are rounded up to the nearest integer.

Late Work Policy

Late assignments and projects are accepted with 10% penalty for each day late up to a maximum of 3 days (e.g., a score of 80 will be reduced to 72 when submitted within 24 hours after the deadline; it will be reduced to 64 when submitted between 24 and 48 hours after the deadline).

Course Schedule (Tentative)

Week 1	Introduction to parallel computing
Week 2	Parallel algorithm design
Week 3, 4	Programming for shared-memory
Week 5	Parallel Algorithms I - Matrix computations
Week 6	Parallel architectures
Week 7	Parallel algorithms II – Low level kernels
Week 8	Programming for distributed-memory
Week 9	Parallel algorithms III – Sorting
Week 10, 11	Emerging parallel platforms - GPUs
Week 12	Parallel algorithms IV - Graph algorithms
Week 13	Applications (e.g., data analytics)
Week 14	Other computing paradigms (e.g., Map-Reduce)

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** [_\(https://student-rules.tamu.edu/rule07/\)_](https://student-rules.tamu.edu/rule07/) 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** [_\(https://student-rules.tamu.edu/rule07/\)_](https://student-rules.tamu.edu/rule07/) 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** [_ \(https://student-rules.tamu.edu/rule07/\)](https://student-rules.tamu.edu/rule07/)).

“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** [_ \(https://student-rules.tamu.edu/rule07/\)](https://student-rules.tamu.edu/rule07/)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (**See Student Rule 24** [_ \(https://student-rules.tamu.edu/rule24/\)](https://student-rules.tamu.edu/rule24/)).

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** [_ \(https://aggiehonor.tamu.edu/Rules-and-Procedures/Rules/Honor-System-Rules/\)](https://aggiehonor.tamu.edu/Rules-and-Procedures/Rules/Honor-System-Rules/)).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu [_ \(https://aggiehonor.tamu.edu/\)](https://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 office *in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu* [_ \(https://disability.tamu.edu/\)](https://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** [_ \(https://rules-saps.tamu.edu/PDFs/08.01.01.M1.pdf\)_](https://rules-saps.tamu.edu/PDFs/08.01.01.M1.pdf)):

- 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, a person who is subjected to the alleged conduct 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** [_ \(https://caps.tamu.edu/\)_](https://caps.tamu.edu/) (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** [_ \(https://titleix.tamu.edu/\)_](https://titleix.tamu.edu/).*

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 healthy self-care by utilizing available resources and services on your campus.

*Students who need someone to talk to can contact **Counseling & Psychological Services** [_ \(https://caps.tamu.edu/\)_](https://caps.tamu.edu/) (CAPS) or call the **TAMU Helpline** [_ \(https://caps.tamu.edu/helpline/\)_](https://caps.tamu.edu/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** [_ \(https://suicidepreventionlifeline.org/\)_](https://suicidepreventionlifeline.org/).*

COVID-19 Temporary Addendum to Minimum Syllabus Requirements

The Faculty Senate temporarily added the following statements to the minimum syllabus requirements in Summer 2021 as part of the university's COVID-19 response.

Campus Safety Measures

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, Texas A&M University has adopted policies and practices for the Summer 2021 academic term to limit virus transmission. Students must observe the following practices while participating in face-to-face courses and course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.):

- Self-monitoring—Students should follow CDC recommendations for self-monitoring. **Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely if that option is available, and should not participate in face-to-face instruction.**
- Face Coverings— **Face coverings** [_\(https://rules-saps.tamu.edu/PDFs/34.99.99.M0.03.pdf\)](https://rules-saps.tamu.edu/PDFs/34.99.99.M0.03.pdf) (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Description of face coverings and additional guidance are provided in the **Face Covering policy** [_\(https://rules-saps.tamu.edu/PDFs/34.99.99.M0.03.pdf\)](https://rules-saps.tamu.edu/PDFs/34.99.99.M0.03.pdf) and **Frequently Asked Questions (FAQ)** [_\(https://provost.tamu.edu/Menu/News/TAMU-Face-Covering-FAQs\)](https://provost.tamu.edu/Menu/News/TAMU-Face-Covering-FAQs) available on the **Provost website** [_\(https://provost.tamu.edu/Menu/News/TAMU-Face-Covering-FAQs\)](https://provost.tamu.edu/Menu/News/TAMU-Face-Covering-FAQs).
- Physical Distancing—Physical distancing must be maintained between students, instructors, and others in course and course-related activities.
- Classroom Ingress/Egress—Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Leave classrooms promptly after course activities have concluded. Do not congregate in hallways and maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.
- To attend a face-to-face class, students must properly wear an approved face covering. If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the **Student Conduct office** [_\(https://studentlife.tamu.edu/sco/face-covering-violations/\)](https://studentlife.tamu.edu/sco/face-covering-violations/) for sanctions. Additionally, the faculty member may choose to teach that day's class remotely for all students, or dismiss the class in the case of a traditional face to face lecture.

Personal Illness and Quarantine

Students required to quarantine must participate in courses and course-related activities remotely, if that option is available, and **must not attend face-to-face course activities**. Students should

notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities.

Students required to quarantine must also complete the **COVID-19 Form** (<https://redcap.tamhsc.edu/surveys/?s=N38DRD4EMK>) (please select "Self" when asked who is making the report) and follow the **guidance for sick/exposed campus members** (<https://www.tamu.edu/coronavirus/sick-campus-members/>) provided by the University.

Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence (**See Student Rule 7, Section 7.2.2** [_ \(https://student-rules.tamu.edu/rule07/\)](https://student-rules.tamu.edu/rule07/).) To receive an excused absence, students must comply with the documentation and notification guidelines outlined in Student Rule 7.