



CSCI 450, Computer Architecture

COURSE SYLLABUS: Spring 2021

INSTRUCTOR INFORMATION

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| Instructor: | Dr. Srujan Kotikela |
| Office Location: | ACB1-306 |
| Office Hours: | Email or by appointment |
| Office Phone: | 979-317-3429 |
| Office Fax: | NA |
| University Email Address: | srujan.kotikela at tamuc dot edu |
| Preferred Form of Communication: | EMAIL subject must contain <i>Spring 2021 - (CSCI-450-01W)</i> |
| Communication Response Time: | Email response within 1~2 business days |

COURSE INFORMATION

Lectures (Time/Location):

- Asynchronous/online. Recommended to login every Monday and Wednesday after 4PM CST.

Textbook(s) Recommended:

- Andrew S. Tanenbaum and Todd Austin, "Structured Computer Organization", 6th Ed.

Course Description

The class in general will cover how a program controls the very hardware that makes up a computer. Topics include Computer system performance metrics and analysis; instruction set design; CPU organization (data path and control, out-of-order execution, register renaming, branch handling techniques, supporting precise interrupts in out-of-order pipelines, superscalar processors); memory systems (caches, virtual memory, TLBs, multi-level cache hierarchies,

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cache subsystem optimizations); input-output systems; storage systems and RAIDs; and introduction to multicore and multithreaded processors.

Student Learning Outcomes

Upon completing this course students should be able to:

- Understand the operations and timing issues of modern microprocessors, memory systems and input/output devices, and the interactions among these components.
- Understand how hardware and software layers – such as the specific algorithm, programming language, compiler, instruction set architecture, and processor implementation – impact program performance.
- Measure the performance of key processor features, such as caches and branch predictors.
- Articulate a comprehensive view of architecture and performance for real-world computers.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Prerequisites:

- COSC 1437 or COSC 1337 or CSCI 152 minimum grade C
- COSC 2325 or CSCI 241 minimum grade C

Instructional Methods

During this course, we will use traditional and active learning methods, and work together using:

- In-class lectures: using slides, supplementary materials, and hands-on exercises.
- Assignments that will be released via the Learning Management Systems (LMS).
- Individual / group projects: details of the project will be released during week 5.

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Student Responsibilities or Tips for Success in the Course

1. It is expected that you are the owner of your success in this course, including ensuring you understand the expectations, timelines, policies and learning objectives.
2. Baseline expectations:
 - a. Check LMS frequently.
 - b. Follow the material in the textbook frequently, and use the slides as your guideline.
 - c. Start your homework assignments early.
 - d. Check the feedback of homework assignments.
 - e. Do your work independently: collaboration and participation in study groups is encouraged to improve your understanding and to develop problem-solving strategies. However, cheating and plagiarism will not be tolerated, i.e. do not copy other people's work.
 - f. Contact the instructor when you are confused, or having difficulties with the course material / assignment / project.

GRADING

Final grades in this course will be based on the following scale:

A = 90%-100%

B = 80%-89%

C = 70%-79%

D = 60%-69%

F = 59% or Below

Assessments

| Assessment Type | Weight of Final Grade | Learning Objectives |
|-----------------|-----------------------|-----------------------------------------------|
| Assignments | 20% | Understanding of concepts and problem solving |
| Quizzes | 10% | |
| Mid-term Exam | 25% | |
| Final Exam | 25% | |

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| Term Report & Presentation | 20% | Critical understanding and problem solving using course concepts |
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Assignments and term project will be graded on the following:

- Demonstrating good form; including good organization, remarks and indentation
- Submission on-time (Late submission are subject to the penalty, ref. late submission section)
- Meeting assignment / report requirements

Quizzes and exams are graded based on the correctness of the answers and workflow.

The number of assignments and quizzes are negotiable.

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

YouSeeU Virtual Classroom Requirements:

<https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements>

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or

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work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

Interaction with Instructor Statement

To communicate with me about this course, kindly use the email address included in this syllabus. During the week, you can generally expect a response to your emails within 1-2 business days. *If you do not receive my response in 2 business days, please send a second email to me.*

You can call or stop by my office during office hours, or request an appointment through email. To ensure I get your email and respond within indicated timelines above, please make sure that:

- Your email message is sent from your Texas A&M student account.
- Your email message includes a descriptive subject with the indicated prefix:
CSCI 450 – Spring 2020 --<CWID>: <descriptive subject>

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

Attendance is required but not graded. Students are expected to do the readings, attend class, and participate in class discussions. Each student is responsible for managing their own time and work-load. Emergency / extreme circumstances causing a student to miss deadlines/exams will need to be supported by official and university approved documentation.

Positive Learning Environment

Your commitment as a student to learning is evidenced by your enrollment at Texas A &M University-Commerce. "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedure, Conduct). All phones, pagers, and other communication devices are to be turned off or place on silent mode during class.

Late Policy

The syllabus/schedule are subject to change.

The deadline for any assignment/project can be extended with a 15% penalty per day, for a maximum of two days. Assignments/project will NOT be accepted 48 hours after the due date.

Makeup Policy

There will be no makeup exams or quizzes. If you shall miss a quiz/exam because of acceptable extreme circumstances (hospitalization, serious injury, death in the family etc.), you may be offered to choose to receive a grade based on your in-class ranking in the next quiz/exam.

Collaboration Policy

Students are encouraged to consult with each other, with the instructor, or anyone else about any assignments / project. However, this must be limited to the discussion of the problem and sketching general approaches to a solution. Each student is responsible for submitting their own independent solutions to the assignment / project. Consulting another student's or group's solution is prohibited, and submitted solutions may not be copied from any source. These and any other form of collaboration on assignments constitute cheating. If you have any question or doubts about whether some activity would constitute cheating, please feel free to ask.

Academic Integrity

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments / project are to be completed by the individual student unless otherwise specified.

Any student cheating will receive a zero on the work they are doing, and subsequent cheating will result in a failing grade and potential academic sanctions.

Basic Tenets of Common Decency

“All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment.” (Student’s Guide Handbook, Policies and Procedures, Conduct.) This means that rude and/or disruptive behavior will not be tolerated.

Disclaimer

This syllabus is meant to provide general guidance of what to expect from this course. The instructor reserves the right to make changes as appropriate based on the progress of the class. All changes made to this syllabus during the semester will be announced. This document has been posted electronically. If you print a copy of it, please be sure to consult the last modified date of the online version to verify that your printed copy is current.

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Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the [Student Guidebook](#).

<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: <https://www.britannica.com/topic/netiquette>

TAMUC Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

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<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library- Room 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@tamuc.edu

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

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COURSE OUTLINE / CALENDAR

| Week | Course Subject | Important Dates |
|---------|-----------------------------------------------------------------|-----------------|
| Week 1 | Introduction | |
| Week 2 | Processors (instruction sets, registers, RISC and CISC) | |
| Week 3 | Processors (continued), primary memory and secondary memory | |
| Week 4 | Digital Logic (gates, ALU, flip-flops, memory) | |
| Week 5 | Digital Logic (continued) | |
| Week 6 | Digital Logic (continued) | |
| Week 7 | Digital Logic and Microarchitecture | |
| Week 8 | Midterm exam | |
| Week 9 | Microarchitecture (data path, cache memory, register renaming) | |
| Week 10 | Microarchitecture (continued) | |
| Week 11 | Microarchitecture (continued) | |
| Week 12 | Operating System Machine (virtual memory, paging, segmentation) | |
| Week 13 | Operating System Machine (continued) | |
| Week 14 | Assembly Language | |
| Week 15 | Parallel Computer Architecture, term report due | |
| Week 16 | Final exam | |

*The schedule is **tentative** and may be adjusted to fit the actual class progress.

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