Remote / Online Course Syllabus

Course Information

Course Number/Section	CS 2340.HW1
Course Title	Computer Architecture
Term	*Spring* 2021

Professor Contact Information

Professor	Ivor Page
Office Phone	972-883-2160
Email Address	Ivor@utdallas.edu
Office Location	ECSS 4.410
Online Office Hours	Wednesdays 5:00 p.m. – 7:00 p.m. via MS Teams

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Course Modality and Expectations

Instructional Mode	Online – All instruction and testing will be online.
Course Platform	MS Teams
Expectations	Ideally students will receive instruction as it is presented via MS Teams.
Asynchronous Learning Guidelines	All lectures will be recorded thus enabling asynchronous learning.

COVID-19 Guidelines and Resources

The information contained in the following link lists the University's COVID-19 resources for students and instructors of record.

Please see http://go.utdallas.edu/syllabus-policies.

Class Participation

In the following, "Participation" means viewing the lectures synchronously, or asynchronously via recordings, and completing Projects, quizzes, and homework assignments on time. Regular class participation is expected regardless of course modality. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

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Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

The instructor will record meetings of this course. Any recordings will be available to all students registered for this class as they are intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

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Class Materials

The Instructor will provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Course Pre-requisites, Co-requisites, and/or Other Restrictions

CS 2305, Discrete Math I

Course Description
This course introduces the concepts of computer architecture by going through multiple levels of abstraction, the numbering systems, their basic computations, and programing. It focuses on the instruction-set architecture of the MIPS machine design, including MIPS assembly programming, translation between C and MIPS, and between MIPS and machine code. General topics include performance calculations, processor data path, pipelining, instruction level parallelism, and memory hierarchy, including cache memories.

Student Learning Objectives/Outcomes

After successful completion of this course, the student should

1. be able to write a fully functional, stand-alone medium size assembly language program
2. have the ability to represent numbers in and convert between decimal, binary, and hexadecimal and perform calculations using unsigned and 2's complement arithmetic
3. understand the basic model of a computer including the data path, control, memory, and I/O components
4. be able to program efficiently in an assembly level instruction set, including the use of addressing modes and data types
5. understand the role of compilers, assemblers, and linkers and how programs are translated into machine language and executed
6. be able to demonstrate comprehension of a pipelined architecture including data paths and hazards
7. understand memory hierarchy including caches and virtual memory
8. be able to demonstrate comprehension of computer performance measures and their estimation

Required Textbooks and Materials

Computer Organization and Design - The Hardware/Software
Interface – 5th Edition, Patterson and Hennessey, Morgan-Kaufmann, 2012. ISBN: 978-0-12-407726-3.

Note: there are several editions of the same title, make sure that you get the correct edition (for MIPS).

Copious notes will be provided on eLearning, possibly making purchase of the book unnecessary.

Suggested Materials

Notes on eLearning web site for this course.

Textbooks and some other bookstore materials can be ordered online or purchased at the UT Dallas Bookstore.

Technical Requirements

In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements on the Getting Started with eLearning webpage.

Course Access and Navigation

This course can be accessed using your UT Dallas NetID account on the eLearning website.

Please see the course access and navigation section of the Getting Started with eLearning webpage for more information.

To become familiar with the eLearning tool, please see the Student eLearning Tutorials webpage.

UT Dallas provides eLearning technical support 24 hours a day, 7 days a week. The eLearning Support Center includes a toll-free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

Communication
This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the Student eLearning Tutorials webpage for video demonstrations on eLearning tools.

Student emails and discussion board messages will be answered within 3 working days under normal circumstances.

Distance Learning Student Resources
Online students have access to resources including the McDermott Library, Academic Advising, The Office of Student AccessAbility, and many others. Please see the eLearning Current Students webpage for more information.

Server Unavailability or Other Technical Difficulties
The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the online eLearning Help Desk. The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

Tentative Schedule:
Spring Break: Mar 15 – Mar 21

Date	Topic	Readings	Assignments Due
Jan 19	Introduction		
Jan 21	Intro to computer organization	Ch 1	
Jan 26	Performance evaluation, Amdahl's law	Ch 1.6-1.10	HW 1
Jan 28	Number representations Bin/Oct/Hex	Ch 2.4	
Feb 2	1's and 2's complement arithmetic	Ch 2.4	
Feb 4	Computer arithmetic	Ch 3.1-3.4	HW 2
Feb 9	Floating Point Arithmetic	Ch 3.5	
Feb 11	Assembly Ops: Load/Store/Add/Sub/etc.	Ch 2.1-2.3	
Feb 16	MIPS Instruction Formats	Ch 2.5-2.6	HW3
Feb 18	Comparing, branching and looping	Ch 2.7	
Feb 23	Exam I review		
Feb 25	Exam 1		
Mar 2	Procedures: machine language calls	Ch 2.8	HW 4
Mar 4	Reading and writing character strings	Ch 2.9	
Mar 9	Addressing modes \& system software	Ch 2.10	
Mar 11	Translating and starting a program	Ch 2.12-2.14	
Mar 16	SPRING BREAK		
Mar 18	SPRING BREAK		
Mar 23	Processor: Datapath & Control	Ch 4.1-4.3	HW 5
Mar 25	Single Cycle Processor Design	Ch 4.4	
Mar 30	5-stage pipeline, data path, control	Ch 4.5	
Apr 1	5-stage pipeline, Hazards	Ch 4.5	
Apr 6	Exam II review		

Apr 8	Exam II		HW 6
Apr 13	5-stage pipeline, Forwarding	Ch 4.6	
Apr 15	5-stage pipeline, Forwarding, stalls	Ch 4.7	HW 7
Apr 20	5-stage pipeline, Branches, Loop unrolling	Ch 4.8	
Apr 22	Dynamic Branch Prediction	Ch 4.8	HW 8
Apr 27	Cache Memory, Types, Basic Operation	Ch 5.1-5.	
Apr 29	Cache Memory, Details, Blocking	Ch 5.4-5.	
May 4	Virtual Memory, Basics	Ch 5.7	
May 6	Virtual Memory	Ch 5.8	
TBA	Final Exam		

Please go to http://go.utdallas.edu/syllabus-policies for further university policies.

Grading Policy
Exam I   10%
Exam II   20%
Exam III   30%
Home works and quizzes 20%
Projects   20%
Total   100%

University Letter Grade Assignments
A   93.0 - 100
A-   90.0 - 92.9
B+   87.0 - 89.9
B   83.0 - 86.9
B-   80.0 - 82.9
C+   77.0 - 79.9
C   73.0 - 76.9
C-   70.0 - 72.9
D+   67.0 - 69.9
D   60.0 - 66.9
F   Below 60.0

Programming Project Grading
Code Development   30%   compiles w/o errors
Program Execution   20%   runs successfully
Program Design   25%   conforms to spec
Documentation   15%   program, comments
Coding Style   10%   clear, efficient

Course Policies
Make-up exams
Makeup exams will only be granted in the case of a justified absence, such as a religious holy day, or a medical condition. In the latter case, a doctor's note will be needed explaining why the absence was necessary. The makeup exam must be taken within one week of the actual exam. If possible please inform the instructor before the date of the exam, or within two days following the exam.

Late home works or assignments will not be accepted.

Comet Creed
This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

Academic Support Resources
The information contained in the following link lists the University's academic support resources for all students.

Please go to Academic Support Resources webpage for these policies.

UT Dallas Syllabus Policies and Procedures
The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to UT Dallas Syllabus Policies webpage for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.