Course Syllabus: Spring 2023

Class Logistics

- CS/SE 2340 Computer Architecture
- Tuesday/Thursday 5:30 – 6:45 pm
- ECSW 1.355

Professor Contact Information

- Dr. Karen Mazidi
- Email: Karen.Mazidi@utdallas.edu
- Office: ECSS 3.203
- Office phone: 972-883-3868 (goes directly to Teams)

- Office hours: Monday, Wednesday 5:30 – 6:00 pm or by appointment

Grader Contact Information

TBD

Class Resources.

- **eLearning**: We will use eLearning for the grade book, links to quizzes, and links to upload assignments.
- **GitHub**: Code samples and other course materials are available on the GitHub for this class: https://github.com/kjmazidi/Computer_Architecture_for_Coders
- **YouTube**: Content lectures are on YouTube in the Computer Architecture playlist on my channel: https://www.youtube.com/user/JaniceMazidi
    - This content duplicates what I will cover in class, so you are not required to watch the videos. However, the videos can be helpful if you are quarantined or want a short refresher on a topic.

Course Pre-requisites

CS/CE/TE 1337 (Computer Science I) with a grade of C or better, and
CS/CE/TE 2305 (Discrete Math I) with a grade of C or better

Course Description

This course introduces the concepts of computer architecture by going through multiple levels of abstraction, and the numbering systems and their basic computations. It focuses on the instruction-set architecture of the MIPS machine, including MIPS assembly programming, translation between MIPS and C, and between MIPS and machine code. General topics include performance calculation, processor datapath, pipelining, and memory hierarchy.
Credit cannot be received for both courses, (CS 2340 or SE 2340 and (CE 4304 or EE 4304).

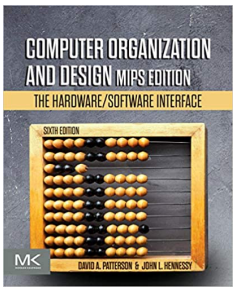
Student Learning Objectives

1. Students will convert numbers between bases 2, 10, and 16. Students will perform 2's complement arithmetic calculations.
2. Students will create and debug Assembly language programs that include (a) integer operations, (b) floating-point operations, (c) control structures, (d) functions and macros, (e) static memory allocation for varied data types, (f) dynamic memory allocation, (g) standard I/O, and (h) memory-mapped I/O.
3. Students will critique programs for efficient use of data types, addressing modes, and instructions, as well as for readability and maintainability using a provided rubric.
4. Students will calculate computer performance measures. Students will use performance metrics to evaluate a chosen CPU architecture. Students will define terms used in CPU technical brochures.
5. Students will differentiate between systems programs such as compilers, assemblers, linkers, and loaders, and explain how they are used by operating systems to convert programs into machine language to be executed.
6. Students will explain the flow of information through a computer's core components, including the datapath, control, memory, and I/O.
7. Students will diagram the flow of data, code, and control signals through a pipelined architecture. Students will evaluate the presence or absence of hazards in a pipelined architecture, and explain how the hazards could be avoided.
8. Students will diagram and explain the memory hierarchy, including caches and virtual memory. Students will explain the different memory technologies used in computers.
9. Students will contrast the four types of parallelism.

Textbooks and Materials

Notes in pdf will be provided. Reading the notes is required. The textbook below is optional, but strongly recommended.

Optional Textbook: Computer Organization and Design MIPS Edition (6th ed) by David A. Patterson and John L. Hennessy
ISBN-13: 978-0128201091
ISBN-10: 0128201096



Software:

This course will involve coding in the MIPS assembly language using MARS (MIPS Assembler and Runtime Simulator). Get it free here:
http://courses.missouristate.edu/KenVollmar/mars/ or google MIPS MARS

This is a simple jar file that you can download and run.

Grading and Course Deliverables

Course grade is composed of:

- 30% - homework; approx. 10 assignments, mostly coding assignments
- 45% - 3 exams; 15% each
- 15% - quizzes; at least one a week
- 10% - attendance/participation
- Letter grades will be assigned according to the UTD +/- conventions. The eLearning system does not round up.
  - 0,1,2,3 minus
  - 4,5,6 neither plus nor minus
  - 7,8,9 plus

Attendance is strongly correlated with grade in the course. Attendance in person is expected.

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."

Course & Instructor Policies

- Assignments must be turned in on the due date, by 11:59 pm.
- Late assignments are deducted by 10% on the first and second days late. After two days, the assignment will not be accepted.
- Quizzes are not accepted late.
- Makeup exams are not given unless prior permission has been granted due to extenuating circumstances.
- There are no extra credit points or do-overs in this class. This is a college course with expectations that students put forth their best efforts as much as possible, and that not everyone will make an A.
- Do not turn in code or other work that is not your own. Discussion and collaboration are good things, turning in someone else's work as your own is not.
- **If you do not agree with a grade you have been given, you must make your case within a week of receiving the grade or the grade stands as is.**

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 http://go.utdallas.edu/syllabus-policies for these policies.

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