



## *Course Syllabus 2016 Fall*

---

### **Course Information**

CS/SE/TE 3340.003 Computer Architecture

Time: MW 1:00 – 2:15 pm

Location: JSOM 2.722

---

### **Professor Contact Information**

Dr. Karen Mazidi

Email: Karen.Mazidi@utdallas.edu

Office: ECSS 3.203

Office phone: 972-883-3868

Office hours: Monday, Tuesday, Thursday 4:00-5:00 pm or by appointment

(It might be a good idea to email or call to make sure I'm not in another meeting.)

### **Mentoring Center Information**

ECSS 4.415 Main Room / Walk-in Tutoring

ECSS 3.620 and 3.621 Review/Reword Rooms

login at: <https://csmc.utdallas.edu/login.php> to see hours of operation and other information

### **TA Information**

Mr. Behnam Torabi

bxt140930@utdallas.edu

Hours to be posted in eLearning

---

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

CE 1337 or CS 1337 or TE 1337 with a grade of C or better

and

CE 2305 or CS 2305 or TE 2305 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 3340 or SE 3340 or TE 3340) and (CE 4304 or EE 4304).

---

### **Student Learning Objectives/Outcomes**

After successful completion of this course, students will:

1. Be able to write a fully functional, stand-alone medium size assembly language program
2. Have an ability to represent numbers in and convert between decimal, binary, and hexadecimal and perform calculations using 2's complement arithmetic



3. Understand the basic model of a computer including the datapath, 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 architectures including datapaths and hazards
7. Be able to demonstrate comprehension of computer performance measures and their estimation
8. Understand the memory hierarchy including caches and virtual memory

---

### Required Textbooks and Materials

Computer Organization and Design, Fifth Edition: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design) Patterson and Hennessy, ISBN 9780124077263.

There are many editions of this book, make sure you get the 5<sup>th</sup> edition with MIPS.

This course will involve coding in the MIPS assembly language. A good IDE for MIPS is MARS (MIPS Assembler and Runtime Simulator). Get it free here:

<http://courses.missouristate.edu/KenVollmar/mars/index.htm>

The home page of MARS also has links for tutorials. See the Download link for download instructions. This should work on any computer with Java installed.

### Suggested Course Materials

Any additional materials will be available from the course webpage.

---

### Assignments & Academic Calendar

#### *Important Dates*

- Class starts Monday August 22
- Labor Day September 5 (School Closed)
- Census Day September 7
- Mid-term exam Wednesday October 5
- Fall break November 21 - 25
- Last day of class Wednesday December 7
- Final exam Wednesday 12/14 2:00-4:45 pm SOM. 2.722

#### *Topics and Sequence (a tentative schedule)*

- Week 1 August 22 - Read Chp.1
  - Course introduction
  - Classes of computers and their architectures
  - CPU performance evaluation
- Week 2 August 29 – Read 2.1 – 2.5 and look through Appendix A
  - Getting started with MIPS
  - MIPS operations and operands
  - Number representation
- Week 3 September 5 – Read 2.6 – 2.9
  - Monday 9/5 – no class, Labor Day

- Logical operations
- Week 4 September 12 – Read 2.10 – 2.14
  - MIPS Addressing
  - Parallelism
  - Arrays v. pointers
- Week 5 September 19 – Read rest of Chp. 2
  - Comparison of x86 and ARM
- Week 6 September 26 – Read 3.1 – 3.4
  - MIPS arithmetic operations
- Week 7 October 3
  - Review for MidTerm
  - MidTerm Wednesday October 5
- Week 8 October 10 – Read rest of Chp. 3
  - Floating point arithmetic
  - Parallelism and arithmetic
- Week 9 October 17 – Read 4.1 – 4.6
  - Logic Design
  - Pipelining
- Week 10 October 24 – Read rest of Chp. 4
  - Exceptions
  - ARM v. Intel pipelines
- Week 11 October 31 – Read 5.1 – 5.5
  - Memory
- Week 12 November 7 – Read rest of Chapter 5
  - Virtual memory
- Week 13 November 14 Read Chapter 6
  - Parallel processing
- November 21 – 25 Thanksgiving break
  - No classes
- Week 14 November 28
  - GPUs
- Week 15 December 5
  - Review
- Exam

### Grading Policy

- Project Assignments (30% of the course grade): There will be several programming/project assignments.
- Mid-term exam (30% of the course grade).
- Final exam (30% of the course grade).
- Quizzes and class participation (10%).

Letter grades will be assigned as follows:

Below 60 is an F

100 is an A+

Otherwise:

Grades ending in 7,8,9 are +

Grades ending in 0,1,2 are –

Grades ending in 3,4,5,6 are neither + nor -



### Course & Instructor Policies

- Computers and phones must remain out of sight during class. Students should take notes by hand using either physical or electronic paper. Here is why:  
<http://www.scientificamerican.com/article/a-learning-secret-don-t-take-notes-with-a-laptop/>
- Assignments must be turned in on the due date, by midnight.
- Late assignments are deducted by 10% on the first and second days late. After two days, the assignment will not be accepted.
- Makeup exams are not given unless prior permission has been granted due to extenuating circumstances.
- Do not turn in programming code or other work that is not your own. This will result in a zero for all parties. 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.

---

### 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.”

---

### Attendance Policy

Per Computer Science administration guidelines, please be aware that **3 consecutive absences leads to one letter grade drop. Four consecutive absences lead to an F.**

---

### 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.*