CSE 2312: Computer Organization & Assembly Language Programming
Summer 2015

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Office Hours: Monday & Wednesday 2:00 PM – 4:00 PM, or by appointment

Section Information: CSE 2312-003

Time and Place of Class Meetings: Monday & Wednesday 4:00 PM – 5:20 PM, WH 210

Description of Course Content: This course is designed to provide the student with knowledge of fundamental concepts in computer organization. Individual topics include memory hierarchy, instruction set architectures, memory addressing, input-output, integer and floating-point representation, arithmetic and logic operations, etc. The relationship of higher-level programming languages to the operating system and underlying instruction set architecture will be explored, as well as assembly language programming.

Student Learning Outcomes: Upon successful completion of this course, students will understand the design concepts used to establish the interface between hardware and software in modern computer systems. Students will also be able to solve problems with assembly language programming while understanding the advantages and disadvantages of various approaches.

Required Textbooks and Other Course Materials: David A. Patterson & John L. Hennessy, _Computer Organization and Design: The Hardware / Software Interface_, 5th Edition, Morgan Kaufmann, 2014.

Descriptions of major assignments and examinations: The final letter grade for this course will be based on scores received on regular homework and programming assignments, a midterm exam, and a final exam. Homework and programming assignments are to be submitted electronically via Blackboard. Late assignments will be accepted with a 20% penalty applied for each day late up to 2 days. Assignments submitted later than 2 days after the original deadline will not be accepted.

Attendance: Class attendance will be recorded at the beginning of lecture sessions, but will not factor into the final course grade. Students who do not regularly attend lecture sessions risk missing valuable material, such as homework solutions, sample exam problems, and demonstrations. Regular attendance of class lectures is strongly encouraged.

Grading: Final course grades will be computed as follows:

Homework Assignments	25%
Programming Assignments	25%
Midterm Exam	25%
Final Exam	25%

Make-up Exams: Make-up exams will only be allowed under extraordinary circumstances and must be approved by the instructor, who's decision is final. If an exam is missed due to unavoidable circumstances, the instructor must be notified of the situation as soon as possible. Travel will not be considered as a valid excuse for missing an exam, unless for the purpose of representing the university or department. Any exams that are missed due to unexcused reasons will receive an automatic grade of zero.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos. For information regarding Title IX, visit www.uta.edu/titleIX.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT

Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Course Schedule: An outline of the course schedule and individual topics covered is presented below. As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.

- Week 1
  - Aug 31: Computer Abstractions & Technology I
  - Sep 02: Computer Abstractions & Technology II
- Week 2
  - Sep 07: Instruction Set Architecture I *(Homework 1 assigned)*
  - Sep 09: Instruction Set Architecture II
- Week 3
  - Sep 14: Arithmetic Operations I *(Homework 1 due, Homework 2 assigned)*
  - Sep 16: Arithmetic Operations II
- Week 4
  - Sep 21: The Processor I *(Homework 2 due, Homework 3 assigned)*
  - Sep 23: The Processor II
- Week 5
  - Sep 28: The Processor III *(Homework 3 due, Homework 4 assigned)*
  - Sep 30: The Processor IV
- Week 6
  - Oct 05: Memory Hierarchy I *(Homework 4 due, Homework 5 assigned)*

- ◦ Oct 07: Memory Hierarchy II
- Week 7
  - ◦ Oct 12: Midterm Exam Review *(Homework 5 due)*
  - ◦ Oct 14: Midterm Exam
- Week 8
  - ◦ Oct 19: Introduction to embedded ARM SoCs
  - ◦ Oct 21: Compiling, Assembling, Linking, Loading
- Week 9
  - ◦ Oct 26: ARM Assembly Overview, Numeric Representation
  - ◦ Oct 28: Debugging *(Program 1 assigned)*
- Week 10
  - ◦ Nov 02: Input / Output I
  - ◦ Nov 04: Input / Output II *(Program 1 due, Program 2 assigned)*
- Week 11
  - ◦ Nov 09: Arithmetic and Logic Operations I
  - ◦ Nov 11: Arithmetic and Logic Operations I *(Program 2 due, Program 3 assigned)*
- Week 12
  - ◦ Nov 16: Functions & Conditional Execution I
  - ◦ Nov 18: Functions & Conditional Execution II *(Program 3 due, Program 4 assigned)*
- Week 13
  - ◦ Nov 23: Addressing I
  - ◦ Nov 25: Addressing II *(Program 4 due, 5 assigned)*
- Week 14
  - ◦ Nov 30: Floating Point Operations I
  - ◦ Dec 02: Floating Point Operations II *(Program 5 due)*
- Week 15
  - ◦ Dec 07: Introduction to GPU processing
  - ◦ Dec 09: Final Exam Review
- Week 16
  - ◦ Dec 16: Final Exam (2:00 – 4:30 PM)

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911.