

COURSE DESCRIPTION

The course will begin with coverage of basic computer architecture concepts such as functional units, processor organization, instruction sets, memory hierarchy, input/output organization, and storage. The course will then investigate architectures for improving performance including pipelined processors, parallel processors including shared and distributed memory, multicore, vector and graphics processors, memory and cache design, computer peripherals, and computer clusters.

STUDENT LEARNING OUTCOMES – By the end of the course, you will have demonstrated an ability to do the following.

1. Apply knowledge of basic mathematical, computer science and computer engineering principles to computer system analysis and design.
2. Understand tradeoffs in performance, cost, and energy usage in computer system design.
3. Understand the basic concepts of qualitative and quantitative computer architecture.
4. Write a technical paper.

INSTRUCTOR

Bill Carroll, Professor, Computer Science and Engineering

Office: ERB 521

Office Hours: MTuWeTh 4:00 to 6:00 PM, or by appointment.

Phone: 817-272-3787

Email: carroll@uta.edu

Course web-site: Blackboard, <https://elearn.uta.edu>

Faculty profile: <https://www.uta.edu/profiles/bill-carroll>

TEACHING ASSISTANT

TBA, Office: ERB TBA, Office Hours: TBA, Email: TBA

TIME AND PLACE – TuTh 11:00 AM to 12:20 PM, NH 111

PREREQUISITES – CSE 3320 Operating Systems

TEXTBOOK – Hennessy and Patterson, *Computer Architecture: A Quantitative Approach*, 5th edition, Morgan Kaufmann, 2012.

REFERENCE BOOKS

1. Patterson and Hennessy, *Computer Organization and Design*, 5th Edition, Morgan Kaufmann, 2014.
2. Tanenbaum and Austin, *Structured Computer Organization*, 6th Edition, Pearson, 2013.
3. Stallings, *Computer Organization and Architecture: Designing for Performance*, 9th Edition, Pearson, 2013.
4. Comer, *Essentials of Computer Architecture*, Pearson, 2005.
5. Carpinelli, *Computer Systems Organization and Architecture*, Addison Wesley, 2001.
6. Mano, *Computer System Architecture*, 3rd Edition, Pearson, 1993.

HANDOUTS – will be posted on Blackboard, <https://elearn.uta.edu>

GRADING

A: 100-90, B: 89-80, C: 79-70, D: 69-60, F: 59-0 with points computed as follows.

$$0.25 * \text{Exam1} + 0.25 * \text{Exam2} + 0.25 * \text{FinalExam} + 0.25 * (\text{HomeWorkAverage} \& \text{ClassParticipation} \& \text{TermPaper})$$

Students not completing one or more of these requirements may receive an Incomplete grade (I) in the course.

EXAMINATIONS

There will be two examinations during the semester plus a comprehensive final exam. See the lecture schedule for the dates. Examinations will be closed book and closed notes.

HOMEWORK

Homework will be given on a regular basis, will be graded, and will count toward your course grade both directly and indirectly. Late homework will generally not be accepted.

ACTIVE LEARNING

Active learning exercises will be performed in class on a regular basis to help you better understand the concepts being covered in the course. These exercises will typically be done in small groups. All students are expected to participate. Some may be graded and count as homework and class participation.

TERM PAPER

There will be an individual term paper due on the last day of classes of the semester (12/7/16). The paper will consist of a comparative survey of key architectural features of classical and current computers. More details on the paper will be provided later in the semester. This paper must be completed and submitted in order to receive a final grade (A,B,C,D,F) in the course. Those not submitting a term paper will get a grade of Incomplete or F depending upon their performance on other course work.

POLICIES

1. **Academic Integrity** – Students enrolled in 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. Additional information is available at <https://www.uta.edu/conduct/>.

2. **Attendance** – At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. However, while UT

Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients “begin attendance in a course.” UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients. **My policy for this course – You are expected to attend class and attendance will be checked on a regular basis. Those with more than two unexcused absences will have their final average reduced by five points for each additional absence before their final letter grade is assigned.**

3. **Campus Carry** -- Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>
4. **Cell phones and wireless devices** – Please refrain from using cell phones during class times. All electronic devices must be powered off during examinations. Use of tablets or laptops for viewing class materials is permitted.
5. **Disability Accommodations** – UT 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)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. 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 disability. Students are responsible for providing the instructor with official notification in the form of a **letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:
 - **The Office for Students with Disabilities, (OSD)** www.uta.edu/disability or calling 817-272-3364.
 - **Counseling and Psychological Services, (CAPS)** www.uta.edu/caps/ or calling 817-272-3671.
6. **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://www.uta.edu/ao/fao/>).
7. **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>.
8. **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, which is located down the hallway to the left as you exit ERB 129 and straight ahead as you exit ERB 127. 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 arrangements and will make to assist individuals with disabilities.
9. **Final Review Week** – For semester-long courses, 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.

10. **Grade appeals** – Should you have a concern about the grade you received on an assignment or exam, you may submit a re-grading request to the instructor or TA in writing within two class days from the day the assignment or exam was returned. Appeal of the final course grade should follow the established UT Arlington policy which begins with a written appeal to the course instructor of record. You can learn more about grade appeals and other academic regulations at http://www.uta.edu/catalog/content/general/academic_regulations.aspx#17.
11. **Make-up work** – Late homework will not be accepted and cannot be made up. Make up of missed examinations and laboratory assignments will be handled case-by-case and, generally, be approved only if sufficient justification can be made and documented. Requests for make-up must be made to the instructor within one week of the missed work's due date.
12. **Non-Discrimination Policy** – *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.*
13. **Preparation for class** – You are expected to read the appropriate sections of the textbook and supplemental material prior to each class and/or lab session.
14. **Student Feedback Survey** – At the end of each term, students enrolled in face-to-face and online classes categorized as “lecture,” “seminar,” or “laboratory” are 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 via the SFS database is aggregated with that of other students enrolled in the course. Students’ anonymity will be protected to the extent that the law allows. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.
15. **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 <http://www.uta.edu/universitycollege/resources/index.php>. Engineering Student Services, 242 Nedderman Hall, is another resource for guidance on academic and career questions.
16. **Title IX** – The University of Texas at Arlington (“University”) is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.*