 **CSE6350: Advanced Computer Architecture**

Fall 2014

**Instructor(s):** Hao Che

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**Office Hours:** 2:00pm-4:00pm, MW

**Section Information:** CSE6350-001

**Time and Place of Class Meetings:**  5:30pm-6:50pm, SH331

**Description of Course Content:** This is a 6000-level course designed for students in both networking and system tracks. Accordingly, it covers two related subjects. The first subject addresses a major Internet router implementation challenge, i.e., how to program router interface cards using the state-of-the-art multithreaded multicore processors or chip multiprocessors (CMPs) to achieve high speed forwarding performance. This subject is a sequel to CSE5344 and it also serves as a motivating case study for the second subject. The second subject provides in-depth coverage of the emerging CMPs and warehouse-scale computers (WSCs) and is a sequel to CSE5350. The aim is to not only cover known facts but also stimulate research interests in addressing fundamental challenges facing the design and programming of CMPs and WSCs. As the number of cores in a CMP/WSC ever increases, how to design and program CMPs/WSCs to achieve desired performance for various workloads becomes a challenge. Clearly, the traditional uniprocessor analysis approaches, such as benchmark testing and cycle-accurate simulation, quickly become ineffective as the number of cores in a CMP/WSC increases. To tackle this challenge, this course will introduce a novel thread-level analysis methodology for large design space exploration of CMP/WSC. In particular, based on this methodology, initial results on the development of performance bound analysis, bottleneck resource identification, simulation, and analytical modeling techniques, all at the thread level, will be introduced. These techniques will be further explored and applied to the analysis of various aspects of CMP/WSC architectures by the students in a term project.

**Student Learning Outcomes:** Good understanding of the subjects covered; Able to make use of the knowledge learnt to analyze CMP/WSC; Able to reason about the design options and tradeoffs in building future computing systems

**Required Textbooks and Other Course Materials:** The main references of this course will include handouts and presentation slides prepared by the instructor. The following textbook is recommended as a reference book:

Computer Architecture: A Quantitative Approach by John Hennessy and David Patterson, Morgan Kaufmann Publishers, ISBN: 978-0-12-383872-8

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**Assignments, examinations and grading policies:** There will be about 5 quizzes throughout the semester, which will be announced at least one week in advance (NOT popup). Among those quizzes, the one with the lowest score will NOT be counted toward the final grade. There will also be a term project and a presentation

* Quiz: 40%
* Term Project: 40%
* Presentations: 20%

If you take all the quizzes, the one with the lowest score will be dropped and each of the rest contributes equally towards the 80% final grade. No makeup quiz is allowed. In case of emergency, sickness, or any other reasons, you may skip one quiz. In this case, however, all other quiz scores will contribute to your final grade.

Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels.

**Attendance:** At The University of Texas at Arlington, taking attendance is not required. Rather, 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. As the instructor of this section, [insert your attendance policy and/or expectations. I allow students to attend class at their own discretion

**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](http://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 is committed to upholding U.S. Federal Law “Title IX” such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit [www.uta.edu/titleIX](http://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](mailto:resources@uta.edu), or view the information at [www.uta.edu/resources](http://www.uta.edu/resources).

**Course Schedule**

Students are expected to involve in the teaching of a significant portion of the course materials. The instructor will assign topics for students to present. The pace at which the course materials can be covered will be adjusted as we go and there is no fixed timetable for the materials to be covered.

**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.

Library Home Page <http://www.uta.edu/library>

Subject Guides <http://libguides.uta.edu>

Subject Librarians <http://www.uta.edu/library/help/subject-librarians.php>

Database List <http://www.uta.edu/library/databases/index.php>

Course Reserves <http://pulse.uta.edu/vwebv/enterCourseReserve.do>

Library Tutorials <http://www.uta.edu/library/help/tutorials.php>

Connecting from Off- Campus <http://libguides.uta.edu/offcampus>

Ask A Librarian [http://ask.uta.edu](http://ask.uta.edu/)

The following URL houses a page where we have gathered many commonly used resources needed by students in online courses: <http://www.uta.edu/library/services/distance.php>.

The subject librarian for your area can work with you to build a customized course page to support your class if you wish. For examples, visit <http://libguides.uta.edu/os> and <http://libguides.uta.edu/pols2311fm> . If you have any questions, please feel free to contact Suzanne Beckett, at [sbeckett@uta.edu](mailto:sbeckett@uta.edu) or at 817.272.0923.