
Syllabus

- **Course Outline:**

- o Introduction
 - Fundamentals of computer design, evaluating performance
 - Pipelining
 - Instruction set design principles
- o Caches and memory hierarchy design
 - Review of memory hierarchy
 - Advanced memory hierarchy design concepts
- o Instruction level parallelism and its exploitation
 - Limits on instruction level parallelism
- o Multiprocessors and Thread-level parallelism
- o Simultaneous Multi-Threading (SMT), Chip Multi-Processors (CMP), General Purpose Graphics Processing Units (GPGPU) and other advanced topics

- **Course Objectives and Outcomes:**

At the completion of the course in the semester, the students should have:

1. Learned various hardware and software techniques for exploiting instruction level parallelism (ILP) and thread/task level parallelism (TLP), and apply the mechanisms for analysis in various single and multiple processor architectures.
2. Evaluate the ILP and TLP techniques and validate the design of various configurations of state-of-art architecture designs such as CMPs and SMTs through a specific project using processor evaluation tools.

- **Targeted Audience:**

Graduate students and senior students in Electrical Engineering, Computer Engineering, and Computer Science.

- **Lectures:**

Monday and Wednesday, 2:30 p.m.- 3:45 p.m. (ECSS 2.415).

- **Prerequisites:**

Undergraduate Computer Architecture and C Programming.

- **Text Book:**

Computer Architecture: A Quantitative Approach, 5th Edition, 2011, By John L. Hennessy & David A. Patterson, Morgan Kaufmann, ISBN: 978-0-12-383872-8

- **Examinations:**

There will be two non-cumulative examinations for this course, each covering approximately half of the material. Both exams will be administered during regular class meeting times and will be graded by the instructor. Tentatively:

Exam #1: Wednesday, October 5th, 2:30 p.m. - 3:45 p.m. (ECSS 2.415)

Exam #2: Monday, December 5th, 2:30 p.m. - 3:45 p.m. (ECSS 2.415)

- **Homework:**

Five homework problem sets will be assigned during the course of the semester. Homework will consist of problems from the textbook, which are often open-ended and intended to make you think beyond what is covered in class. Homework will not be collected and will not be graded but similar problems may be asked in the Examinations and in the Quizzes.

- **Quizzes:**
On most Thursdays, a quiz will be given in class during the last 15 minutes of the lecture. Answers to the quizzes will be collected and graded by the TA. Details about the quiz format and grading details will be announced in class.
- **Project:**
Two projects will be assigned, involving an architectural simulation tool-set and programming in C. The projects will be carried out in teams of 2 students and will also be graded by the Teaching Assistant. Details about the projects will be provided as the semester progresses. Tentatively the first project will be assigned on 9/19 and will be due on 10/17 and the second project will be assigned on 10/31 and will be due on 12/5.
- **Solution Availability:**
Solutions to homework problem sets will NOT be distributed. You can direct questions to the Teaching Assistant.
- **Collaboration Policy:**
You are encouraged to talk about the project assignments with other teams. However, the report must be written by each team *on its own*.
- **Attendance Policy:**
The course follows a textbook but not in a particular order and not in its entirety, so *don't miss lectures* as you are responsible for all the material covered in class.
- **Evaluation:** Exam #1: (25%) Exam #2: (25%) Quizzes: (20%) Project #1: (15%) Project #2: (15%)
- **Re-grading Policy:**
Sometimes you may disagree with the grades you receive. Since *to err is human*, it is possible that mistakes may occur during grading despite our efforts to prevent this. You may appeal the grade you receive in an examination, within ONE WEEK from the day it is made available to you. To request a quiz or project re-grade contact the teaching assistant. To request an examination re-grade contact the instructor. After this one-week period grades will be assumed correct and final.
- **Getting Help:**
The best way to help yourself with this course is to attend lectures.
There are several more ways to get help, preferably in the following order:
a) E-mail the Teaching Assistant or the instructor.
b) See the Teaching Assistant during office hours.
c) See the instructor during office hours.
PLEASE include EE6304 in the subject line of all e-mail correspondence.
- **Feedback:**
If you have any concerns regarding the course please inform the instructor early during the term so that a prompt effort to resolve them can be made. Comments and feedback are also solicited as early as possible. Finally, please do not hesitate to stop the instructor in class and ask questions. Remember that if you have a question others may do too and will benefit from your input.
- **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.