This course will focus on the design of modern programmable computer systems with an emphasis on exploiting parallelism at the instruction, data, memory, thread and processor levels. The impact this available parallelism (especially multi-core processors) has on software design will also be discussed. The state of the art in computer architecture and its future trends will be examined with case studies of current and proposed microprocessor architectures. Topics will include a detailed look at datath path pipelining/superpipelining, dynamic instruction scheduling, superpipelining, improving memory throughput, SIMD parallelism, VLIW/EPIC processors, multi-core processors and general-purpose computing on graphics processing units.

Required Textbook:


Grading Policy:

Projects: 30% (ESESC simulations and parallel programming)
Exams: 20% Midterm 30% Final
Participation: 15% (Includes in-class presentations and D2L quizzes)
Homework: 5% (due every Thursday)

**OU Academic Misconduct Code**: Students will be held to the highest expectations of academic integrity. Unauthorized collaboration of any kind is *strictly* prohibited and will result in the filing of misconduct charges and imposing academic misconduct "admonitions". Copying of any kind on any assignment will not be tolerated. However, students are encouraged to work together on homework. Some later projects may involve small teams. **No collaboration of any kind is allowed on exams.**

The misconduct system for the College of Engineering is set forth in the Academic Misconduct Code. The Code is included as an appendix to the Faculty Handbook and is available from the Provost's student academic integrity page [http://integrity.ou.edu](http://integrity.ou.edu). Your rights and responsibilities under the Academic Misconduct Code can be found there.
Topic Outline:

1. Quantitative Analysis of Computer Systems
2. Review of Pipelined Datapaths
3. Instruction-Level Parallelism
4. Dynamically Scheduled Processors
5. Branch Prediction
6. Memory Hierarchy Design and Prefetching
7. Data-Level Parallelism
8. SIMD/Vector Machines and General Purpose GPU computing
9. Thread-Level Parallelism
10. Multiprocessor Systems
11. Coherence and Consistency

Reasonable Accommodation Policy: Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

Religious Holidays: It is the policy of the University to excuse absences of students that result from religious observances and to provide without penalty for the rescheduling of examinations and additional required class work that may fall on religious holidays.

Classroom Environment: My intention is to foster discussion during lectures. This means that, in part, all students are responsible for contributing to both their own learning experience and the learning experience of others. Because the contribution of ideas from each student is critical to the learning process, any behavior that makes other students feel uncomfortable will not be tolerated. This includes interrupting others while they are talking, carrying on conversations separate from the class discussion, or making comments that could be perceived by others as offensive in terms of race, gender, sexual orientation, religion, ethnicity, nationality, disability, etc. Please make every effort to maintain an atmosphere where everyone feels comfortable sharing and responding to ideas. This extends beyond the classroom to group work outside of class and to Desire2Learn and other electronic forums.

UOSA Honor Pledge: The University of Oklahoma Student Association has approved, with the concurrence of the Faculty Senate, a resolution encouraging the use of an integrity pledge on all major assignments. The Pledge reads:

On my honor, I affirm that I have neither given nor received inappropriate aid in the completion of this exercise.

This pledge, along with a student signature line, will be placed on quiz and exam sheets. A downloadable version of the pledge text is available at http://integrity.ou.edu/faq.html#Pledge.