

Core Engineering Program: ABET Course Outcomes

Course: ENGN1640 – Design of Computing Systems

Instructor: Sherief Reda

Revision Date: Spring 2012

Course Description: Architectures of computers with reference to current microprocessors, traditional computers, and parallel processors. Some concepts discussed include computer design fundamentals, computer performance analysis, arithmetic units, instruction set design principles and examples, basic and intermediate pipelining concepts, instruction-level parallelism, memory hierarchy and memory structures, I/O, and bussing. Laboratory fundamentals include prototyping of processors in programmable logic fabrics and use of Verilog to describe computing hardware.

Prerequisite: ENGN1630

Outcomes: Students completing ENGN1640 shall:

1. Identify similarities and differences between instruction set architectures, understand tradeoffs in instruction sets and computer organization, and apply knowledge of instruction sets and computer organization to quantify application performance.

Addresses ABET outcomes: a, b, e, k

Assessment: lab completions, homework, exams

2. Understanding how to describe hardware in hardware definition languages like Verilog and real issues (e.g., timing and area) arising in the implementation of computing operations in hardware.

Addresses ABET outcome: a, b, e, k, l

Assessment: labs completions, exams

3. Understand basic pipelining and other architectural and organizational techniques for increased performance, including pipelining techniques, mitigation of pipeline hazards, parallel execution through instruction level parallelism, and basic multiprocessor issues.

Addresses ABET outcome: a, e, j

Assessment: homework, exams

4. Understand memory hierarchy and virtual memory, including tradeoffs and difficulties inherent in different approaches.

Addresses ABET outcome: a, e

Assessment: homework, labs, exams

5. Understand basic issues in processor I/O including interrupts.

Addresses ABET outcome: a, e

Assessment: homework, exams

Core Engineering Program – ABET course outcomes student survey

Course: EN164 – Design of Computing Systems

Outcomes: Please rate your understanding of, and ability to apply, the knowledge and skills listed in the outcomes for this course.

	Weak			Proficient	
1 - Instruction set architectures applications	1	2	3	4	5
2 - Hardware implementation issues encountered in real settings (e.g., timing and area)	1	2	3	4	5
3 - Pipelining and instruction level parallelism	1	2	3	4	5
4 - Memory hierarchy and virtual memory	1	2	3	4	5
5 - I/O and interrupts	1	2	3	4	5

Course Evaluation: Please rate the various components of this course in helping you develop and apply the knowledge and skills listed in the course outcomes.

1: Instruction set architecture						2 - Hardware implementation issues encountered in real settings (e.g., timing and area)					
	Not helpful				Very		Not helpful				Very
			helpful						helpful		
Lectures	1	2	3	4	5	1	2	3	4	5	
Exams	1	2	3	4	5	1	2	3	4	5	
Homework	1	2	3	4	5	1	2	3	4	5	
Laboratories	1	2	3	4	5	1	2	3	4	5	

3 - Pipelining and instruction level parallelism						4 - Memory hierarchy and virtual memory					
	Not helpful				Very		Not helpful				Very
	helpful						helpful				
Lectures	1	2	3	4	5	1	2	3	4	5	
Exams	1	2	3	4	5	1	2	3	4	5	
Homework	1	2	3	4	5	1	2	3	4	5	
Laboratories	1	2	3	4	5	1	2	3	4	5	

4: I/O and Interrupts					
	Not helpful				Very
	helpful				
Lectures	1	2	3	4	5
Exams	1	2	3	4	5
Homework	1	2	3	4	5
Laboratories	1	2	3	4	5