

## Core Engineering Program: ABET Course Outcomes

**Course:** ENGN1640 – Design of Computing Systems

**Instructor:** Sherief Reda

**Revision Date:** Spring 2014

**Course Description:** Basics and fundamentals of computing system design. Some concepts discussed include computer design fundamentals, computer performance analysis, arithmetic units, instruction set design principles and examples, basic and intermediate pipelining concepts, memory hierarchy, I/O, and contemporary issues in computer design. Laboratory fundamentals include prototyping of processors in programmable logic fabrics and use of Verilog to describe computing hardware.

**Prerequisite:** ENGN1630

### Outcomes:

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. Understand how to describe hardware in hardware definition languages like Verilog and real issues (e.g., timing and area) arising in implementing processors. Understand programmable logic and its usage for prototyping processors.  
*Addresses ABET outcome: a, b, e, k, l*  
**Assessment:** labs
3. Understand basic pipelining and other architectural and organizational techniques for increased performance, including pipelining techniques, mitigation of pipeline hazards.  
*Addresses ABET outcome: a, e, j*  
**Assessment:** homework, labs, quizzes
4. Understand memory hierarchy and virtual memory, including tradeoffs and difficulties inherent in different approaches.  
*Addresses ABET outcome: a, e*  
**Assessment:** homework, labs, quizzes
5. Understand basic issues in processor I/O including interrupts.  
*Addresses ABET outcome: a, e*  
**Assessment:** homework, labs, quizzes

6. Contemporary issues in computer design  
*Addresses ABET outcome: h, i, j*  
**Assessment:** Homework

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

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

<b>3 - Pipelining</b>						<b>4 - Memory hierarchy and virtual memory</b>					
	Not helpful				Very		Not helpful				Very
			helpful					helpful			
<b>Lectures</b>	1	2	3	4	5	1	2	3	4	5	
<b>Exams</b>	1	2	3	4	5	1	2	3	4	5	
<b>Homework</b>	1	2	3	4	5	1	2	3	4	5	
<b>Laboratories</b>	1	2	3	4	5	1	2	3	4	5	

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