# Course CodeCourse TitleCOMP 2611Computer Organization

## Course Description

Inner workings of modern digital computer systems and tradeoffs at the hardware-software interface. Topics include: instructions set design, memory systems, input-output systems, interrupts and exceptions, pipelining, performance and cost analysis, assembly language programming, and a survey of advanced architectures. Prerequisite(s): COMP 2011 OR COMP 2012H. Exclusion(s): ELEC 2300, ELEC 2350

## List of Topics

Introduction of digital logic Data representation MIPS ISA and assembly Computer Arithmetic Processor: Datapath and Control Pipelined Processor Memory System

## Textbooks

Computer Organization and Design MIPS Edition: The Hardware/Software Interface

6th Edition

Reference books N/A

#### Grading Scheme

4 Homework	15%
1 Individual Programming Project	15%
Mid-term Exam	30%
Final Exam	40%
Total	100%

#### Course Intended Learning Outcomes

- Understand the basic concepts of digital logic and build the small circuits involved in computer systems
- Describe the interaction between software and hardware and instruction set architecture

- Write and execute small programs of a few hundred lines in assembly language
- Define the basic concepts of modern computer hardware, including datapath, control, memory and input/output
- Describe the organizational paradigms that determine the capability and performance of computer systems

Course	Exemplary (A-	Competent (C	Needs Work (D	Unsatisfactory
Learning	to A+)	to B+)	to C-)	(F)
Outcome				
1. Use the	Demonstrates	Demonstrates	Demonstrates	Demonstrates
basic concepts	thorough	sufficient	some theoretic	limited
of digital logic	theoretic	theoretic	knowledge of	theoretic
and build the	knowledge of	knowledge of	digital logic	knowledge of
small circuits	digital logic	digital logic	design	digital logic
involved in	design	design	principles	design
computer	principles.	principles.		principles.
systems			Has some	
	Has a high	Has a	degree of	Has a low
	degree of	considerable	correctness in	degree of
	correctness in	degree of	designing small	correctness in
	designing	correctness in	circuits.	designing small
	small circuits	designing small		circuits.
		circuits.		
2. Describe the	Demonstrates	Demonstrates	Demonstrates	Demonstrates
interaction	thorough	sufficient	some	limited
between	knowledge and	knowledge and	knowledge and	knowledge and
software and	understanding	understanding	understanding	understanding
hardware and	of the design	of the design	of the design	of the design
instruction set	principles of	principles of	principles of	principles of
architecture	instruction set	instruction set	instruction set	instruction set
	architecture	architecture	architecture	architecture
3. Write and	Program	Program	Program	Program fails
execute small	correctly	correctly	correctly	majority of test
programs of a	handles all	handles	handles around	cases
few hundred	specified test	majority of test	half of test	<b>T</b> 1 1 1
lines in	cases.	cases	cases	The code is
assembly	The code is	T1 1 '	<b>T1</b> 1	huge and
language	very efficient	The code is	The code	appears to be
	with clear	fairly efficient,	works because	patched
	logic, easy to	easy to read	of brute force;	together
	read and	and understand.	it's not easy to	without logic.
	understand.			

# Assessment Rubrics

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			read and understand	
4. Define the basic concepts of modern computer hardware, including datapath, control, memory and input/output	Demonstrates thorough theoretic knowledge of computer hardware and design principles Has a high degree of correctness in describing datapath and control of given machine instruction, and memory structure	Demonstrates sufficient theoretic knowledge of computer hardware and design principles Has a considerable degree of correctness in describing datapath and control of given machine instruction, and memory structure	Demonstrates some theoretic knowledge of computer hardware and design principles Has some degree of correctness in describing datapath and control of given machine instruction, and memory structure	Demonstrates limited theoretic knowledge of computer hardware and design principles Has a low degree of correctness in describing datapath and control of given machine instruction, and memory structure
5. Describe the organizational paradigms that determine the capability and performance of computer systems	Able to clearly analyze and compare computer performance in all given circumstance	Able to analyze and compare computer performance in most given circumstances.	Able to analyze and compare computer performance in some given circumstances.	Fails to analyze and compare computer performance in most given circumstances.