Course Code	Course Title
COMP 2611	**Computer 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

Assessment Rubrics

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

			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.