

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: digital logic, data and instruction representation, instruction set architecture, assembly language programming, computer arithmetic, processor, pipelining, and memory systems. 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

### 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 read and understand	Program fails majority of test cases  The code is huge and appears to be patched together without logic.

<p>4. Define the basic concepts of modern computer hardware, including datapath, control, memory and input/output</p>	<p>Demonstrates thorough theoretic knowledge of computer hardware and design principles</p> <p>Has a high degree of correctness in describing datapath and control of given machine instruction, and memory structure</p>	<p>Demonstrates sufficient theoretic knowledge of computer hardware and design principles</p> <p>Has a considerable degree of correctness in describing datapath and control of given machine instruction, and memory structure</p>	<p>Demonstrates some theoretic knowledge of computer hardware and design principles</p> <p>Has some degree of correctness in describing datapath and control of given machine instruction, and memory structure</p>	<p>Demonstrates limited theoretic knowledge of computer hardware and design principles</p> <p>Has a low degree of correctness in describing datapath and control of given machine instruction, and memory structure</p>
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