ELEC2350   Introduction to Computer Organization and Design (Fall 23-24)

Credits: 4

Course Description

This is an introductory course to computer hardware and software organization. The topics covered include computing systems, computing programing, hardware-software collaboration, computer arithmetic, computer hardware organizations and operations, parallel processing, memory technologies and organization, and technology trends. *Exclusion(s):* COMP 2611, ELEC 2300 *Prerequisite(s):* ELEC 1100

List of Topics

1. Computing System Overview
2. Software Development Process
3. Software Programing
4. Computer Hardware-Software Collaboration
5. Computer Arithmetic: representation systems
6. Computer Arithmetic: Addition, Subtraction, Multiplication, Division, Overflow and Underflow
7. Computer Performance, Power, Cost Metrics and Benchmarking
8. Computer Hardware Components
9. Computer Hardware Organizations and Operations
10. Hardware Pipelining
11. Parallel Processing and Domain Specific Computers
12. Memory technologies and organization
13. Memory and programs

Statement of Objectives/Outcomes:

On successful completion of this course, students will be able to:

CO1 – Understand the typical computer hardware and software components and computer technology trends.

CO2 – Understand typical instruction set architecture and assembly programming method.

CO3 - Use computer arithmetic techniques to represent and process data in computers.

CO4 - Use typical methods to evaluate computer performance.

CO5 - Use a typical computer system design flow to systematically develop single-cycle processor architectures including datapath and control for an instruction set.

CO6 - Systematically develop basic multi-cycle pipelined processor architectures for an instruction set and handle hazards.

CO7 – Understand memory hierarchies and use cache to handle temporal and spatial locality in programs.

Textbook(s):

D. Patterson & J. Hennessy, Computer Organization and Design: The Hardware/Software Interface (5th edition)

Relationship of Course to Program Outcomes:

Please refer to the Report Section 4.3.2 (iii).

Grading Scheme:

Homework	15%	Online
Lab	20%	F2F / Online
Midterm	20%	F2F
Final	45%	F2F