

ELEI/ENSC 228

Computer Organization

3 Credits (3 lecture hours and 1 lab hour)

Community College of Baltimore County

Common Course Outline

Description

ELEI/ENSC 228 – Computer Organization: introduces architecture and organization of computer systems. Topics include registers, memory management, control, I/O, data and instruction formats, addressing modes, and assembly language programming. Modern processor architectures will be discussed along with their performance. The role of system software, subroutines, and the interface between hardware and software is explored.

Pre-requisites: CSIT 111

Co-requisites: ELEI/ENSC 204

Overall Course Objectives

Upon completion of this course, students will be able to:

1. describe the standard binary encodings of programs and data;
2. compare the basic electric functional components that make up a computer including bus architecture, memory hierarchy, pipelining, control and I/O, and addressing modes;
3. write, assemble, load, execute, and debug a basic assembly program;
4. compare the dominant computer architectures such as embedded, desktop, and server;
5. differentiate the basic operating software hierarchy and interactions, including kernel, system, and application layers;
6. summarize the modern Internet-based Computational Architecture from browser client to virtual cluster;
7. contrast the different modern processor architectures;
8. write a program that interfaces a browser on a remote device (e.g. a smartphone) to an embedded system to control that system;
9. describe the current state of the embedded system Internet of Things (IoT) architecture ;
10. identify historical and modern CPU hardware optimizations; and
11. explain a simple microcode program.

Major Topics

- I. Computer Organization
- II. Data Representation
- III. Instruction Set Architecture
- IV. Hardware Optimization
- V. Memory Hierarchy

- VI. Operating Systems
- VII. Software Execution
- VIII. Peripherals

Course Requirements

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- 7 Homework Assignments
- 1 Midterm Exam
- 1 Final Exam
- 1 Programming Project
- 1 Design Project

Written assignments and research projects: Students are required to use appropriate academic resources in their research and cite sources according to the style selected by their professor.

Other Course Information

Labs may involve exposure to electric currents, magnets, and voltages.

Date Revised: 2/18/2020