Inver Hills Community College

CS 2200: Computer System Architecture

A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 4

Lab Hours/Week: 0

OJT Hours/Week: *.*

Prerequisites:
CS 1119 - Computer Programming with C++

Corequisites: None

MnTC Goals: None

Explore the fundamentals of computer systems architecture as it relates to the execution of a program. This course will examine how memory and processors work and how programming fundamentals take advantage of the computer system architecture. The course will utilize assembly language and other tools to demonstrate the interaction of computer hardware and software.

B. COURSE EFFECTIVE DATES: 03/13/2018 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Evolution of computer architecture and influence on development of systems (7%)
2. Boolean algebra and simplification, simple combinational and sequential logic design,
3. Binary representation of different types of data (6%)
4. Basic operation and organization of the Von Neumann machine architecture (6%)
5. Machine instruction set formats and architectures (6%)
6. Machine language concepts, characteristics, and programming (17%)
7. Storage system concepts, types, and operations (12%)
8. Memory cache and virtual memory: concepts and operations (12%)
9. Fundamental concepts of I/O and buses (12%)
10. Performance improvements such as by super-scalar, pipe-lining, multi-threading, vector processors, and GPUs (12%)

D. LEARNING OUTCOMES (General)

1. Design and implement simple computational and sequential logic circuits.
2. Represent numeric and text data in current standard formats and convert between numeric formats.
3. Describe instruction execution cycle and how the processor and memory work
4. Describe machine instruction formats and discuss features and differences of instruction set formats and architectures.
5. Write assembly language programs that incorporate standard programming structures, subroutines, I/O and macros.
6. Describe the memory hierarchy including different levels and optimization strategies such as cache and virtual memory.
7. Discuss different I/O and storage devices and mechanisms including bus protocols, interrupts, and interfaces.
8. Discuss concurrency techniques to bypass performance bottleneck including pipe lining, super-scalar, multi-core, and multi-threading.
9. List and compare the different architecture categories and describe emerging technologies.
10. Explain Flynn's revised taxonomy including SISD, SIMD, MISD, and MIMD; categorize current systems in this taxonomy.
11. Describe Quantum computing, neural networks, DNA data storage and other emerging technologies.

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted