1. Course number and name: ECE 3570 Computer Architecture

2. Credits and contact hours: 3hours

3. Instructor’s or course coordinator’s name: Lina Sawalha

   a. other supplemental materials
      - Structured Computer Organization by Andrew Tanenbaum, Prentice Hall

5. Specific course information
   a. brief description of the content of the course (catalog description)

      This course introduces the basic hardware structures and communication between components of a modern computer. It covers the basic concepts of instruction sets, computer arithmetic, processor design, memory system design, and input/output. A major component of the course will be reinforcing the principles presented in the lectures in the laboratory through group projects in which each team of students will design and build a computer in real hardware and then run programs on it.

   b. prerequisites or co-requisites; ECE 2510 or CS 2230; with a grade of “C” or better

   c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

6. Specific goals for the course
   a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.

      - The student will learn a comparative overview of multiple computer processors, peripheral devices, instruction set architectures and their effects on modern society. (h)
      - The student will develop an ability and a structured approach to the study, analyze, and assessment of contemporary and novel designs of computers, processors, and microcontrollers. (i)
      - The students will apply classroom knowledge in a series of hands-on lab projects.
      - The students will create designs to meet the design specifications of the lab projects.
      - The students will develop an ability to work effectively in teams: Students will work in teams of two on class projects
b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

ABET student outcome: This course contributes to the attainment of the following student learning outcomes a, b, c, e, h, j, and k. ABET learning outcomes h and j are directly assessed in this outcome.

7. Brief list of topics to be covered

Tentative Topics:
- Introduction to Computer Abstractions
- MIPS Instruction Set Architecture (ISA), Fundamental Concepts and ISA, ISA Tradeoffs
- Computer Arithmetic
- Representation of Floating Point Values and Floating Point Arithmetic
- Datapath Design
- Single-Cycle Microarchitectures
- Control Path Design
- Pipelined Datapath and Control
- Data Hazards and Forwarding
- Control Hazards and Prediction
- Instruction-level Parallelism
- Cache Memories
- Virtual Memory
- I/O
- Multiprocessor Architectures