Department: Electrical and Computer Engineering

**EEL 4713 — Computer Architecture**

**Curriculum Designation:**  Elective for EE majors. Required course for CpE majors.

**Course (Catalog) Description:** Modern computer architectures are presented by studying how the relationships between hardware and software impact performance, machine language definition, processor data path and control designs, interfacing, and advanced topics, such as caching and pipelining.

**Prerequisite:** EEL4746 and COP 3014

**Text and/or other required material:** Computer Organization and Design, Author: Patterson & Hennessey, Publisher: Morgan Kaufman, Edition: 5th, Year Published: 2013

**Course Objectives:**
1. Calculate and interpret different performance and cost metrics of computer systems.
2. Derive binary machine code from assembly instructions.
3. Derive assembler code from an equivalent C-code representation.
4. Calculate and interpret IEEE standard binary floating point number representations.
5. Analyze the control and data flow when executing specific instructions within a single-cycle CPU datapath and/or arithmetic logic unit.
6. Design and implement multiplication and division algorithms.
7. Analyze a multicycle datapath of a microprocessor.
8. Analyze and compare different cache architectures and/or identify most suitable cache designs for a given need.
9. Analyze contemporary issues in computer architecture design.
10. Recognize the need for lifelong learning and engage in lifelong learning.

**Topics covered:**
1. Performance and cost analysis.
2. Computer arithmetic.
3. Controller and datapath design.
4. Memory systems.
5. Input-output systems.
6. Interrupts, exceptions, and pipelining.
7. Multiprocessors

**Class Schedule:** Three 50 minute or two 75 minute lectures per week (3 credit hours).

**Subject Area:** Engineering

**Significant Design:** No

**Relationship to Assessed ABET Student Outcomes:** None

**Last Updated by:** R.J. Perry  **Date:** 4/30/2021