Department: Electrical and Computer Engineering

EEL 4746 — Microprocessor-Based System Design

Curriculum Designation: Required course for EE and CpE majors.

Course (Catalog) Description: Fundamental topics in basic computer design, structured assembly-language software design, RTL, CPU design, pipelineing and superscaling, computer arithmetic, memory and I/O organization and interface, cache, and design tools.

Prerequisite: EEL3705; EEL3705L

Online Documentation from Texas Instruments

Course Objectives:

1. Identify important parts of a microprocessor-based system design.
2. Calculate binary, hexadecimal, decimal, and two’s complement number conversion and solve arithmetic relationships using signed and unsigned integer arithmetic.
3. Calculate physical memory addresses from programming code and interpret different memory addressing schemes.
4. Interpret memory and register operations and results by analyzing assembler code to determine data movement and microprocessor state.
5. Identify microprocessor interface types and design interface routines.
6. Develop and verify a program for a modern microprocessor.
7. Ability to acquire, interpret and apply programmable device technical documentation.

Topics covered:

1. Brief Review of Number Systems and Digital Logic Design
2. C programming language for Embedded Systems
3. Introduction to the MSP430 Architecture
4. Hardware Module: Port I/O
5. Hardware Module: Interrupts
6. Hardware Module: Timers
7. Hardware Module: Analog to Digital Converters
8. Hardware Module: Serial I/O Modules
9. Introduction MSP430 Assembly Language Programming

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

Significant Design: Yes

Relationship to Assessed ABET Student Outcomes: 1(a-c), 7(e)

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