COURSE SYLLABUS

EECE416 Microcomputer Design

Instructor's name: Charles Kim
Office location: LKD 3014
Office hours: TW 1 - 3
Email address: ckim@howard.edu

CRN: 80105
Class meeting days and hours: F 9:10 – 12:00 pm
Classroom location: LKD3113
Course website: www.mwftr.com/416F23.html

COURSE DESCRIPTION
The course examines microprocessor and support architectures, hardware and software system design, assembly language coding, and microcontroller applications.

Prerequisites or Co-requisites
EECE212 Fundamentals of Digital Systems

Course Goals

1. Understanding ARM Architecture
2. Understanding ARM Instruction Sets
3. Sufficient skill development for ARM Assembly Language coding

Learning Objectives: Upon completion of the course, students attain

1. (ABET Outcome 3) Ability to communicate effectively with a range of audiences
2. (ABET Outcome 4) Ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
3. (ABET Outcome 6) Ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Instructional Methods

1. Lecture and class activity
2. Embedded lab sessions for coding practices
3. ARM Emulator for checking codes for proper operation
4. ARM Coding with a target microcontroller or SoC

TEXTBOOKS AND OTHER RESOURCES
Required: Mazidi et. al, ARM *Assembly Language Programming & Architecture, 2nd Edition, MicroDigitalEd.com 2016*
Supplementary: Knaggs & Welsh, ARM: Assembly Language Programming, 2014
C. W. Kann, Introduction to Assembly Language Programming: ARM Edition, 2021

COURSE OUTLINE

I. ARM Fundamentals
II. Numbering System overview
III. ARM Architecture and Assembly Language Programming
IV. Arithmetic and Logic Instructions
V. Branch, Call, and Looping in ARM
VI. Signed Integer Number Instructions
VII. ARM Assembly Language Programming in ARM Emulator
VIII. ARM Memory Map, Memory Access, and Stack
IX. ARM Assembly Language Programming with Target SoC

COURSE REQUIREMENTS *(What must students do to fulfill the objectives?)*

1. Class Attendance
2. Active Coding Participation

3. Sufficient background in number systems
4. Timely submission of coding practices/assignments

COURSE GRADING

Computation of Final Course Grade

Assignment ……..……...…..20 %

Late submission of 2 to 3 days after the due date: 30% deduction

Late submission of 4 to 5 days after the due date: 50% deduction

Late submission of more than 7 days after the due date: 70% deduction

Technical Essay ……..….10 %

Exam 1 ……....25 %

Project ……20 %

Exam 2 …..……...25 %

Schedule of Activities and Assignments (daily or weekly)

Wk number	***Topic***	***Assignment***
1	ARM Introduction + Class kick-off	
2	ARM Fundamentals	
3	Numbering Theory	
4	ARM Architecture and Assembly Language Programming	
5	Arithmetic and Logic Instructions	
6	Branch, Call, and Looping in ARM	
7	ARM coding environment – ARM Emulator	
8	Signed Integer Number Arithmetic	
9	EXAM1	
10	Arm Memory Map, Memory Access, and Stack	
11	ARM and Thumb Instructions	
12 - 14	ARM coding with a target SoC	
15	Project	
16	EXAM2	