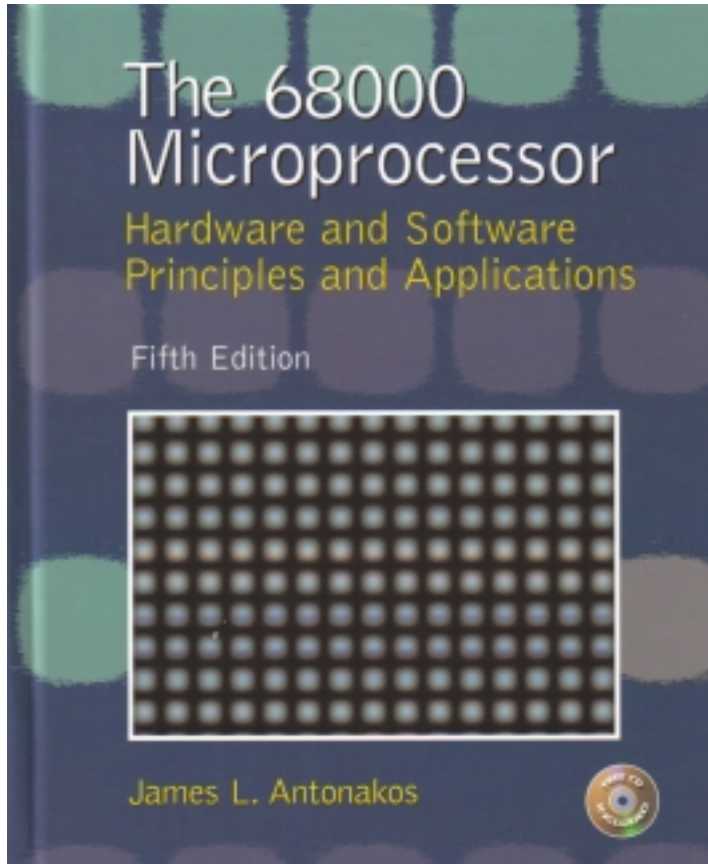


# EECE416 :Microcomputer Fundamentals and Design

Instructor: Dr. Charles Kim



EMBEDDED COMPUTING WITH PIC16F877  
- Assembly Language Approach



Charles Kim

# Class Web-Site

- [CLASS NOTES](#) and [THE OTHER SIDE-A \(Q&A\)](#) and [THE OTHER SIDE-B](#) of the CLASSNOTES - Circuit Theory, Microcomputer, [PIC16F877](#), Embedded Computing, and Electrical Engineering Lab.
- [Embedded Computing with PIC 16F877-Assembly Language Approach:A complete guided project book for PIC students](#) - Topics covered, with full assembly source codes, are: **Bootloader**, Hex code download, LED light on/off, Piezo-electric buzzer application, **LCD** and series LCD connection, AT **Keyboa**

# Course Objectives

- ⌘ Familiarity in Computer Architecture
- ⌘ Architecture of Motorola 68000 Microprocessor
- ⌘ Assembly Language Programming in 68000
- ⌘ Architecture of PIC 16F877 microcontroller
- ⌘ Assembly Language Programming in PIC 16F877
- ⌘ Application of 16F877 for future project
- ⌘ ARM processor (optional)

# Course Structure

## ⌘ Computer Architecture

- ⌘ Computer History
- ⌘ Computer Architecture

## ⌘ 68000 Processor (50%)

- ⌘ Architectural Study
- ⌘ Instruction Sets and ASM68K & EMU68K (DOS-based assembler and emulator)
- ⌘ Programming Practices
- ⌘ Project

## ⌘ 16F877 microcontroller (50%)

- ⌘ Architectural study
- ⌘ Instruction Sets and MPLAB( Windows-based assembler & simulator)
- ⌘ Programming Practices
- ⌘ Project

## ⌘ Final Exam - Optinal

# Course Expectations

- ⌘ Active Participation
- ⌘ Timely Submission of Program Practices
- ⌘ Greater Efforts in Project
- ⌘ Could be an Early Start of Senior Design Project
  - ☑ PIC Board Purchase encouraged, but not a must
- ⌘ Lecture/Programming Lab Combination
- ⌘ Individual Work –PC/Laptop/Tablet use in Classroom encouraged.

# Microprocessor

## ⌘ Everywhere

- ☒ PC, VCR, Toys, etc

## ⌘ Hardware and Software

## ⌘ Evolution of uP

### ☒ First Generation

- ☒ ENIAC

- ☒ 10s of Vacuum Tubes

- ☒ Smithsonian Museum

### ☒ Second Generation

- ☒ Advent of Transistors (solid-state)

# Microprocessor

## ^ Third Generation

- ⊗ Advent of IC (Integrated Circuit)

- ⊗ Chips

## ^ Fourth Generation

- ⊗ VLSI (Very Large Scale Integration)

## ^ Advent of uP

- ⊗ Intel

8080 → 8086 → 80186 → 286 → 386 → 486 → Pentium

- ⊗ Motorola 6800 → 68000 → 68020

- ⊗ Zilog Z80 series