

Mercer County Community College

Division of Business and Technology

EET 263

Digital Technology II: Microcomputer Assembler Programming

COURSE DESCRIPTION

Uses the 8080/8085/Z80 family of microprocessors for the study of complex digital systems. In the lab the student builds a simple model of a microprocessor using TTL logic circuits. The student studies a microcomputer system and assembly language programming and practices this knowledge in the lab with equipment developed to implement programs that the student will write.

Text (s): **Digital Computer Electronics**
 by Malvino
 Glencoe/McGraw Hill
 Latest Edition

Experiments for Digital Computer Electronics
 by Miller
 Glencoe/McGraw Hill
 Latest Edition

Prerequisites/Co-requisites: **EET-251**

Credits: **4** Lecture Hours: **3** Studio/Lab Hours: **3**

**Food and Drink are Strictly Prohibited in Classrooms as per Health and Safety Laws.
Students may not bring in chemicals of any kind without the Appropriate MSD sheets.**

Course Coordinator: **I. Ashkenazy**

Latest Review: Spring 2003

Instructor _____
Office Number _____
Telephone Extension _____
Office Hours _____

Other Student _____
Telephone _____

GENERAL OBJECTIVES

We want the student to continue building on the knowledge that was obtained in EE251. TTL chips are now combined to form a simple model of a microprocessor. Even though the model is simple the student experiences a greater complexity in the circuits than in EE251. Trouble shooting circuits now demand a broad grasp of the system. The whole “forest” must be comprehended as well as the individual “trees”.

The effect of this course should push the student towards a comprehension of the 8085 microprocessor chip. The ability of the class and the speed of learning determine how far into mastery of the 8085 the class goes.

METHOD OF PRESENTATION

The lab and lecture combine into a total experience. In lecture the student studies the three generations of the simple microprocessor (SAP-1, SAP-2, and SAP-3). The SAP-1 is built in lab. It is a “bare bones” computer built with TTL chips. In lab and lecture they see every wire, every signal and every circuit used in this elementary computer. In lab each squad builds and trouble shoots an assigned section of the SAP-1. Exchanges are made as each squad has the opportunity to investigate what the other squads have built. In later weeks the sections are combined to form a complete SAP-1. The class must trouble shoot the whole system and get it to work.

In lecture many of the operational details of the 8080 and 8085 microprocessors are covered in SAP-2 and SAP-3. After studying these the class should have learned (almost) the entire 8080/8085 Instruction set.

GRADING

Grades are based on the results of:

One exam on the operation and troubleshooting of the SAP-1.

One exam on the operation of SAP-2, SAP-3, and 8085. Stress is laid on the assembly language programming of these computers.

15 labs in which the instructor evaluates lab reports and student competence at troubleshooting and general building techniques.

Student attendance is considered important to both lecture and lab and the instructor may reinforce this by deducting points for deficiencies.

Exam average counts 2/3 of final grade.

Lab average counts 1/3 of final grade.

TOPIC OUTLINE

THE SAP-1

This material should take about 8 weeks:

- Architecture
- Instruction Set
- Programming the SAP-1
- SAP-1 Fetch Cycle
- SAP-1 Execution Cycle
- SAP-1 Microprogram
- SAP-1 Schematic Diagram
- Microprogramming

- Homework
- Self testing Review Chapter 10
- All the problems at the end of Chapter 10
- Instructor's optional questions

THE SAP-2

This material should take about 3 weeks:

- Bidirectional registers
- Architecture
- Memory Reference Instructions
- Register Instructions
- Jump and Call Instructions
- Logic Instructions
- Other Instructions

- Homework
- Self testing Review Chapter 11
- All the problems at the end of Chapter 11
- All examples described in Chapter 11

THE SAP-3

This material should take about 2 weeks:

- Programming Model
- MOV and MVI
- Arithmetic Instructions
- Increments, Decrements, and Rotates
- Logic Instructions
- Arithmetic and Logic Immediates
- Jump Instructions
- Extended Register Instructions
- Indirect Instructions
- Stack Instructions

- Homework
- Self testing Review Chapter 12
- All problems at end of Chapter 12
- All examples described in Chapter 12

THE 8085

This material should take about 2 weeks:

Block diagram
New Instructions
SDK-85 system development kit

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