

STATUS: A

COMMON COURSE NUMBER: CET 2133C

COURSE TITLE: Computer Technology I

CREDIT HOURS: 4

CONTACT HOURS BREAKDOWN:

Lecture/Discussion 32

Lab 32

Other

Contact Hours/Week 4

CATALOG COURSE DESCRIPTION:

Prerequisite: CET 1123C

Corequisite: None

This course will cover the micro processor technology related to the 8086 family of microprocessors and microchips. The student will learn the architecture and instruction set and then use machine and assembly language programming to design and implement interfacing from a microprocessor-based system to peripheral devices such as used in instrumentation and engineering applications.

General Education Requirements - Associate of Arts Degree, meets Area(s):

General Education Requirements - Associate in Science Degree, meets Area(s):

UNIT TITLES:

1. Introduction to Product Development
2. Architecture and Instruction Set for the 8088 Microprocessor
3. Introduction to the SDK-86 Computer Design Kit
4. Programming Experiments for the 8088 Microprocessor
5. Peripheral Device Control Laboratory Experiments
6. Introduction to the Intel Family of Advanced Microprocessors

I. Course Overview:

Upon successful completion of this course, the students should be able to demonstrate a knowledge of the architecture, assembly language programming and peripheral interfacing techniques for the Intel family of microprocessor and support chips.

II. Units:

Unit 1. Introduction to Product Development

General Outcome:

- 1.0 The students should be able to conceptualize product development including the structuring of tasks in a project, hardware and software decisions and the use of development tools.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 Define top-down design.
- 1.2 Draw a diagram showing modularization of a project.
- 1.3 Name and describe the function of several hardware and software development tools.
- 1.4 List the factors involved in making hardware and software decisions in product design.

Unit 2. Architecture and Instruction Set for the 8088 Microprocessor

General Outcome:

2.0 The students will learn the architecture and instruction set of the 8088 microprocessor.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 Describe the advantage of instruction "pipelining."
- 2.2 Draw a diagram of the 8088 architecture.
- 2.3 Describe the generation of 20 bit addresses using segment registers.
- 2.4 List the 8088 addressing modes.
- 2.5 List mnemonics and describe selected instructions from the 8088 set.
- 2.6 List the pin-out functions of the 8088 and draw timing relationships for address, data and control signals.

Unit 3. Introduction to the SDK 86 Computer Design System

General Outcome:

3.0 The students should be able to learn the functional blocks of the SDK-86 and the techniques for entering and executing programs and interfacing peripherals.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Name and give a functional description of each integrated circuit used in the clock generator, wait state generator and CPU.
- 3.2 Name and give a functional description of each integrated circuit used for address decoding in the system.
- 3.3 Name and give a functional description of each integrated circuit used in the RAM and PROM blocks in the system.
- 3.4 Name and give a functional description of each integrated circuit used in the serial and parallel interface ports and the system expansion bus.
- 3.5 Name and give a functional description of each integrated circuit used in the keypad/display block in the system.
- 3.6 Describe and demonstrate the entering of a program, single-stepping, modifying registers and memory and using other control functions of the keypad monitor system.

Unit 4. Programming Experiments for the 8086/8088 Microprocessor

General Outcome:

4.0 The students should be able to learn to use the instruction set of the 8086/8088 Microprocessor to write programs which will demonstrate most of the addressing, computing, and data manipulation capabilities of a microcomputer based on this microprocessor.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 4.1 Write a program to move blocks of data between memory locations and between keyboard, memory and CRT screen.
- 4.2 Write a program to add sets of numbers using 16 bit and 32 bit operands.
- 4.3 Write a program to convert ASCII lists of data to Hex lists using indexed addressing.
- 4.4 Write a program to scan a list of character strings and compose a subset of located strings in memory.
- 4.5 Write a program to display a blinking message on the CRT in response to a specified input string from the keyboard.
- 4.6 Write a process control program that uses logic instructions to test input bits and respond by changing output bits in order to simulate closed loop transducer control.

Unit 5. Peripheral Device Control Laboratory Experiments

General Outcome:

5.0 The students should be able to learn to utilize the parallel and serial ports to interface with several peripheral devices.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 5.1 Design and implement the connection of binary switches and led's to a parallel port.
- 5.2 Connect and write software to test implementation of a device to connect to a serial port.
- 5.3 Design and implement one of several interfacing projects to include parallel printers, thumbwheel switches and led display, stepper motor, D/A conversion, A/D conversion, line power control with opto-isolators, or bit-mapped CRT display.
- 5.4 Document and present to a group the results of the previous project.

Unit 6. Introduction to the Intel Family of Advanced Microprocessors

General Outcome:

6.0 The students should be able to learn the additional capabilities of the Intel advanced microprocessors and the compatibility with the 8086/88 microprocessors.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 6.1 Draw a block diagram of the 80186/88 microprocessor.
- 6.2 Describe the functions of the blocks in the 80186/88.
- 6.3 Describe the difference in capabilities between the two operating modes of the 80286/88.
- 6.4 Describe the virtual memory functions of the 80286/88.
- 6.5 List four improvements of the 80286/88 over previous microprocessors.
- 6.6 List five advanced features of the 80386 microprocessor.