

ELN 232
INTRODUCTION TO MICROPROCESSORS

COURSE DESCRIPTION:

Prerequisites: ELN 133

Corequisites: None

This course introduces microprocessor architecture and microcomputer systems, including memory and input/output interfacing. Topics include assembly language programming, bus architecture, bus cycle types, I/O systems, memory systems, interrupts, and other related topics. Upon completion, students should be able to interpret, analyze, verify, and troubleshoot fundamental microprocessor circuits and programs using appropriate techniques and test equipment. Course Hours Per Week: Class, 3. Lab, 3. Semester Hours Credit, 4.

COURSE OBJECTIVES:

Upon completion of this course, the student will be able to:

- a. Identify, select, and handle microprocessors and solid state memories.
- b. Analyze microprocessor circuits.
- c. Analyze computer system building blocks.
- d. Analyze microprocessor I/O devices.
- e. Analyze microprocessor timing considerations.
- f. Interconnect digital circuits to a microprocessor.
- g. Select and apply logic analyzers.
- h. Generate and interpret machine language programming.
- i. Perform decimal, octal, hexadecimal, and binary conversions.
- j. Utilize computer programs.

OUTLINE OF INSTRUCTION:

- I. System configuration
 - A. Block diagram
 - B. Data bus
 - C. Address bus
 - D. Control bus
 - E. Buffering
- II. System performance
 - A. Timing and control
 - B. Architecture vs. Program

- III. Information exchange
 - A. Input/output
 - 1. Ports and porting
 - 2. Programmable ports
 - C. Communication standards
 - 1. Serial data
 - 2. Parallel data
 - C. Synchronizing data transfers
 - D. Peripherals
- IV. Memory
 - A. RAM
 - B. ROM
 - C. EPROM
 - D. EEPROM
- V. Interfacing circuits
 - A. Analog to digital converters
 - B. Digital to analog converters
 - C. RS-232C interface
 - D. Multiplexing circuits and buses
 - E. Digital circuits
 - 1. Logic family requirements
 - 2. Wiring route sheets
- VI. Troubleshooting techniques
 - A. Approach philosophy
 - B. Basic equipment
 - C. Logic analyzers
 - D. Software diagnostics

REQUIRED TEXTBOOKS AND MATERIALS:

What's a Microcontroller. Parallax Inc.

STATEMENT FOR STUDENTS WITH DISABILITIES:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 919-536-7207, ext. 1413 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1209.