NORTHEASTERN TECHNICAL COLLEGE
COURSE OUTLINE


TITLE: MICROPROCESSORS I  |  CREDITS: 3.0  |  CONTACTS: CLASS - LAB - TOTAL 2.0 3.0 3.0

PREREQUISITES: EEM 201

DESCRIPTION: This course is an introduction to basic microprocessor concepts such as microprocessor structure, numbering systems, computer arithmetic, programming, architecture, and basic interfacing techniques.

TEXTBOOK(S) OR ALTERNATIVE: 8-Bit Microprocessor Programming by Heathkit. Carolina Training. Pdfs and/or handouts for textbook will be given.


MATERIALS (specifying those to be purchased by student): Materials provided are course outline and lab equipment. Students will provide textbook, lab manual, paper, pencils, and a scientific calculator.

COLLATERAL READING: Internet research on the Motorola 68HC11 microprocessor.

CLASS MANAGEMENT ACTIVITIES (Attendance, tardies, testing, etc.): Academic Dishonesty: Students are expected to do their own work. Please refer to the NETC Student Code and Grievance Procedure for definition of academic dishonesty and an outline of disciplinary action that may result.

Attendance: Students are expected to attend all scheduled classes, however, up to 10 hours of absence are allowed for unavoidable hardships such as illness or car trouble. A student missing more than 10 hours of class for any reason will be dropped from the course for excessive absences. A grade of "W" will be assigned if a student drops, or is dropped from a class prior to midterm. After midterm, a grade of "WF" is assigned unless there are extenuating circumstances and the student is passing the course at the time of withdrawal.

Tardies: A student is considered tardy if he or she arrives for class after the roll has been taken. Three tardies constitute one hour of absence.
Assigned Work: If a student is absent the day an assignment (test and/or homework) is due, he or she is required to complete the work on the first day back in class.

Classroom Etiquette: An integral part of an education is developing a sense of integrity and responsibility not only toward ourselves but also toward others. In the classroom, as on the job or in your home, exhibiting appropriate behavior reflects on your maturity. Arriving on time to class, being prepared, and considerate of others as they are talking has a positive effect on others. Please be considerate.

Student ID: It is mandatory that every student wear his or her student ID at all times. During the first week of classes, the instructor will issue a reminder to wear the ID. This reminder is a warning.

Then instructors are required to dismiss students without ID from class. The student may get his/her ID (or a new one from Student Services for $3.00) and return to class before the midpoint of the class. If the student cannot get his/her ID and return to class by the midpoint, the instructor will record the absence.

Disabilities Statement: Students with disabilities are encouraged to contact the Dean of Student Services to discuss needs or concerns as they pursue an academic program and participate in campus life. The Dean of Student Services will provide guidance regarding official documentation of disabilities and/or accommodation of needs. (See College Catalog)

RESOURCES (A-V, persons, tools/equipment): Video tapes by VTR the Microprocessor Series (MP1-MP8), Lab trainer ETW3800, and the Microprocessor Parts Kit.

COURSE TOPICAL OUTLINE (List topics and sub-topics of course) and Calendar or approximate length of time devoted to topic.

UNIT 1  MICROCOMPUTER BASICS
  a. Terms
  b. Elementary Microcomputer
  c. Executing a Program
  d. Labs #1 and #2

UNIT 2  ADDRESSING MODES
  a. Types of Addressing
  b. Sample Program
  c. Combining Addressing Modes
  d. Labs #3 and #4
UNIT 3  INTRODUCTION TO PROGRAMMING  
  a.  Programming Languages  
  b.  Branching  
  c.  Algorithms  
  d.  Additional Instructions  
  e.  Labs #5, #6, and #7  

UNIT 4  MICROPROCESSOR ARCHITECTURE AND INSTRUCTION SET  
  a.  Architecture of the 68HC11 MPU  
  b.  Instruction Set of the 68HC11 MPU  
  c.  New Addressing Modes  
  d.  Write Index-Addressing Program  
  e.  Labs #8 and #9  

UNIT 5  STACK OPERATIONS  
  a.  Cascade Stack  
  b.  Memory Stack  
  c.  Pull Instructions  
  d.  Write Stack Operation Program  
  e.  Lab #10  

UNIT 6  DOUBLE ACCUMULATOR AND SUBROUTINE INSTRUCTIONS  
  a.  D-Accumulator Instructions  
  b.  Subroutine Instructions  
  c.  Write a Subroutine Program  
  d.  Lab #11  

UNIT 7  INPUT/OUTPUT AND INTERRUPT OPERATIONS  
  a.  Input/output Operations  
  b.  Resets and Interrupts  
  c.  Write an Input/Output Program  
  d.  Lab #12  

STUDENT LEARNING OUTCOMES:  Upon completion of this course the student will have demonstrated the ability to:  

1. Define terms used in microprocessors such as MPU, I/O, ALU, memory, mnemonic, bus, etc.  

2. Explain the purpose of typical microprocessor circuits.  

3. Describe the difference between the types of addressing used in microprocessors.  

4. Write simple programs that can perform arithmetic operations, and store and retrieve data from the stack.  

5. Explain the operations performed by and write simple programs using push, pull, increment, decrement, load, and jump.
INSTRUCTIONAL METHODS TO COMPLETE OUTCOMES: Classroom lectures, demonstrations, videotapes, textbook assignments and lab experiments.

EVALUATIVE METHODS TO APPRAISE OUTCOMES: Unit tests will be given. The unit average will constitute 80% of the course grade with 20% assigned to labs.

GRADING SCALE:

- 90 - 100 = A
- 80 - 89 = B
- 70 - 79 = C
- 60 - 69 = D
- Below 60 = F