College of Micronesia – FSM
P.O. Box 159
Kolonia, Pohnpei

Course Outline Cover Page

Microprocessors I — Course Title
VEE 220 — Department and Number

Course Description: This course is an introduction to computers and their basic functions such as CPU and address/data buses operation, and RAM and ROM. The architecture, I/O ports mode functions, transfer instructions, increment and decrement instructions, computer addition and subtraction, as well as arithmetic, logic, compare, jump, multiply, divide instructions are of the 8086 microprocessor are described.

Prepared by: Brent Villiers **State:** National Campus

	Hours per Week	No. Of Weeks	Total Hours	Semester Credits
Lecture	3/6	16/8	48	3
Laboratory				
		Total Semester Credits:		3

Purpose of Course

Degree Requirement	_____
Degree Elective	_____
Advanced Certificate	_____XX_____
Certificate	_____
Remedial	_____
Other (Workshop)	_____

Prerequisite Course(s): VEE 235 Digital Electronics II or Concurrently

_____ _____
Signature, Chairman, Curriculum Committee **Date Approved by Committee**

_____ _____
Signature, President, COM-FSM **Date Approved by the President**

General Objective:

This course is designed to familiarize the students with basic microprocessor operation and in particular the 8086 microprocessor. The student will interface and troubleshoot the 8086 and in addition the student will be able to describe and perform data transfer, addition and subtraction, logic and jump instructions.

Learning Outcomes: Upon successful completion of this course the student will be able to:

1. Briefly describe the history and structure of Microprocessors.
2. Describe basic microprocessor architecture, physical configuration of memory and the logical configuration of memory.
3. Describe and perform number system conversions and binary math computations.
4. Describe the circuitry of the 8086 and demonstrate the ability to enter a program into the 8086 microprocessor.
5. Describe the operation of an 8086 and observe various signals generated by the 8086 microprocessor.
6. Interface the 8086 microprocessor.
7. Troubleshoot the 8086 microprocessor.
8. Describe and perform data transfer operations in an 8086 microprocessor.
9. Describe and perform computer addition and subtraction operations.
10. Describe and perform logic instructions.
11. Describe and perform jump instructions.

STUDENTS SHOULD BE MADE AWARE OF OCCUPATIONAL HEALTH AND SAFETY ISSUES IN ALL SITUATIONS AND BE EXPECTED TO DEMONSTRATE SAFE WORKING PRACTICES AT ALL TIMES.

Outline of Content:

This course contains:

1. Introduction to Microprocessors
2. Basic Microprocessor Operation
3. Number Systems
4. 8086 Microprocessor Circuit
5. Operation of the 8086 Microprocessor
6. Interfacing with the 8086 Microprocessor
7. Troubleshooting the 8086 Microprocessor

8. 8086 Data Transfer
9. 8086 Addition and Subtraction
10. 8086 Logic Instructions
11. 8086 Jump Instructions

Learning Outcomes: On completion of this course the learner will be able to:

Learning Outcome 1 **Briefly describe the history and structure of Microprocessors.**

Assessment Criteria
a. Describe the development of microprocessors.
b. Identify the major parts of a microprocessor system.
c. Define common terms associated with microprocessors.

Assessment Method
Multiple choice questions
Short answer questions

Learning Outcome 2 **Describe basic microprocessor architecture, physical configuration of memory and the logical configuration of memory.**

Assessment Criteria
a. Identify parts of a microprocessor and describe microprocessor operation.
b. Define and describe internal registers and counters.
c. Discuss and compare ROM and RAM.
d. Describe the following logical configurations of memory:
   - Conventional
   - Extended
   - Upper
   - High
   - Expanded
   - Caches

Assessment Method
Multiple choice questions
Short answer questions

Learning Outcome 3 **Describe and perform number system conversions and binary math computations.**

Assessment Criteria
a. Identify different mathematical numbering systems.
b. Describe and perform number system conversions.
c. Describe and perform binary addition and subtraction.
d. Describe and perform binary multiplication and division.

Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 4	**Describe the circuitry of the 8086 and demonstrate the ability to enter a program into the 8086 microprocessor.**
Assessment Criteria	a. Describe the internal structure of the 8086 microprocessor. b. Identify the various internal components. c. Identify the external connections to the 8086. d. Demonstrate the ability to correctly examine the signal conditions of the 8086. e. Demonstrate the ability to correctly enter a program into the 8086.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 5	**Describe the operation of an 8086 and observe various signals generated by the 8086 microprocessor.**
Assessment Criteria	a. Describe the external timing and control connections to the 8086 microprocessor. b. Describe the memory connections to the 8086 microprocessor. c. Observe the various signals generated by the 8086 microprocessor. f. Observe memory interface signals during actual microprocessor operation.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 6	**Interface the 8086 microprocessor.**
Assessment Criteria	a. Describe the connection of input/output devices attached to the 8086. b. Compare the different types of input/output devices connected to a microprocessor. c. Observe the operation of an input/output device as it is used in a microprocessor system.

Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 7	**Troubleshoot the 8086 microprocessor.**
Assessment Criteria	a. Describe the techniques required to troubleshoot a defective microprocessor system. b. Describe preventative maintenance. c. Describe the basic tools used to troubleshoot a microprocessor system. d. Perform successful troubleshooting with the 8086 microprocessor. e. Identify basic faults in a microprocessor system.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 8	**Describe and perform data transfer operations in an 8086 microprocessor.**
Assessment Criteria.	a. Describe: • Immediate Data Transfers • Direct Data Transfers • Indirect Data Transfers b. In an 8086 perform: • Immediate Data Transfers • Direct Data Transfers • Indirect Data Transfers
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 9	**Describe and perform computer addition and subtraction operations.**
Assessment Criteria	a. Describe computer addition. b. Describe computer subtraction. c. Perform computer addition. d. Perform computer subtraction.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests

Learning Outcome 10	**Describe and perform logic instructions.**
Assessment Criteria	a. Describe logic instructions. b. Perform logic instructions.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 11	**Describe and perform jump instructions.**
Assessment Criteria	a. Describe jump instructions. b. Perform jump instructions.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests

Required Course Materials:

1. Instructor:

a. CAI Classroom with whiteboard or chalkboard
b. Laboratory equipment with tools of the trade
c. Text, Teacher's Resource Guide, workbook
d. Overhead projector, transparencies

2. Student:

a. Text(s), handouts provided by instructor
b. Ring binder
c. College ruled note sheet, pencil or pen
d. Scientific calculator

Reference Materials:

Digital Fundamentals, *Seventh Edition.*
Thomas L. Floyd

Method of Instruction:

1. Computer Aided Instruction
2. Practical/Experimentation
3. Lecture/Demonstration

Evaluation:

Final Grade for this course will be based on meeting the course requirements at the following percentage rates:

90% - 100%	A – Superior
80% - 89%	B – Above Average
70% - 79%	C – Average
60% - 69%	D – Below Average
0 % - 59%	F – Failure

Attendance:

The COM-FSM attendance policy will apply