

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

Course Outline Cover Page

Semiconductor Devices

VEE 105

Course Title

Department and Number

Course Description: This course is designed to introduce to the students to the basic principles and applications of semiconductor devices. It includes semiconductor fundamentals, semiconductor diodes, the zener diode, bipolar transistor operation & characteristics, field effect transistors and integrated circuits. Great emphasis will be placed on the practical aspects of designing, building, investigating and troubleshooting semiconductor devices or circuits.

Prepared By: Gardner K. Edgar

State Pohnpei

	Hours per Week	No.of Week	Total Hours	Semester Credits
Lecture	2	16	32	2
Laboratory	1	16	16	1

Total Semester Credits: 3

Purpose of Course

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

Prerequisite Course(s): Circuit Analysis & Advances AC Circuits or Concurrently

SPENSIN JAMES

Signature, Chairperson, Curriculum Committee

4/16/01

Date Approved by Committee

SUSAN MOSES

Signature, President, COM-FSM

4/25/01

Date Approved by the President

General Objectives:

This introductory course is designed for students to investigate the operation of semiconductors. Student will discover how semiconductor components such as diodes,

bipolar junction transistors (BJT's), Field Effect Transistors (FET's) are made, operate, and used.

Specific Objectives:

Upon successful completion of this course the students will:

1. Be able to demonstrate an understanding of the basic properties of semiconductor materials
2. Be able to demonstrate an understanding of PN junction diodes
3. Be able to read the characteristic curves and identify the symbols and the terminals of diodes
4. Become familiar with several important types of diodes and their applications.
5. Be able to demonstrate an understanding of the transistors and their applications
6. Be able to develop an understanding of a power supply system.
7. Be able to demonstrate an understanding of how power supplies use rectifier diodes to convert alternating current to direct current.
8. Be able to demonstrate an understanding on the uses of zener diodes as voltage regulators.
9. Be able to demonstrate an understanding of component-level troubleshooting on power supply circuits.
10. Be able to demonstrate an understanding of small-signal amplifiers (voltage amplifiers).

Course Content:

1. Semiconductors
 - a. Conductors and insulators
 - b. Semiconductors
 - c. N-Type & P-Type Semiconductors
 - d. Majority and Minority Carriers
2. Junction Diodes
 - a. The PN Junction
 - b. Characteristic Curves of Diodes
 - c. Diode Lead Identification
 - d. Diode Types and Application
3. Junction Transistors
 - a. Amplification
 - b. Transistors
 - c. Characteristic Curve
 - d. Transistor Data
 - e. Transistor Testing
 - f. Other Transistor Types

4. Power Supplies
 - a. The Power Supply System
 - b. Rectification
 - c. Full Wave Rectification
 - d. Conversion of Root Mean Squared (RMS) Values to Average Values
 - e. Filters
 - f. Voltage Multipliers
 - g. Ripple and Regulation
 - h. Zener Regulators
 - i. Troubleshooting
 - j. Replacement Parts

5. Introduction to Small-Signal Amplifiers
 - a. Measuring Gain
 - b. Common-Emitter Amplifiers
 - c. Stabilizing the Amplifiers
 - d. Other Configuration
 - e. Simulation and Models

Required Course Materials:

1. Instructor:

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

2. Student:

- a. Text, handouts provided by instructor
- b. Ring binder
- c. College ruled note sheets, pen or pencil
- d. Scientific calculator
- e. Combo Tool Kit provided by instructor
- f. Electronic Lab Kit provided by instructor

Reference Materials:

Basic Electronics, Eight Edition
Bernard Grob, 1997

Electronics – Principles and Applications, Fifth Edition
Charles A. Schuler, 1999

Experiment book, Basic Electronics, Eight Edition
Frank Pugh & Wes Ponick, 1997

Experiment book, Electronics – Principles & Applications, Fifth Edition

Charles A. Schuler, 1999

Videos, Semiconductors
Ucando Educational Videotapes Production

Instructional Costs:

Text, Grob	\$61.00
Text, Schuler	\$40.00
Instructor's Resource Guide, Grob	\$22.00
Experiment Book, Pugh/Ponick	\$26.00
Experiment Book, Schuler	\$26.00
Combo Tool Kit	\$26.95
Electronic Lab Kit	\$27.95
Video Tape	\$29.95

Methods of Instruction:

1. Lecture/Demonstration
2. Group work/Individual projects
3. Discussion
4. Experiments and practice exercises
5. Videos

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 vocational education attendance policy will apply.