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

Course Outline Cover Page

Electronic Circuits — Course Title
VEE 125 — Department and Number

Course Description: This course allows students to investigate small and large signal amplifiers. Topics include Multistage, RC coupled, Push-Pull Amplifiers; various Sine Wave and Non Sine Wave Oscillators including, Hartley, Colpitts, RC Phase Shift, Crystal Controlled, Sawtooth and Blocking Oscillators.

Prepared by: Gardner Edgar **State:** Pohnpei 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	_____
Certificate	_____XX_____
Remedial	_____
Other (Workshop)	_____

Prerequisite Course(s): VEE 110 Discrete Devices I

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

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

General Objective:

This course will introduce students to the construction and operation of various configurations of Multistage, RC coupled and Push-Pull Amplifiers. This course will also introduce students to the construction and operation of various configurations of Sine Wave and Non Sine Wave Oscillators.

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

1. Describe the purpose of Multistage Transistor Amplifiers.
2. Describe the operating characteristics and measure the circuit parameters of RC coupled Transistor Amplifiers.
3. Describe the operating characteristics and measure the circuit parameters of Push-Pull Amplifiers.
4. Describe the troubleshooting method of signal tracing a Multistage Transistor Amplifier.
5. Practice Multistage Transistor Amplifier Troubleshooting.
6. Describe the purpose of various Sine Wave Oscillators.
7. Describe the operating characteristics and measure the circuit parameters of Hartley Oscillators.
8. Describe the operating characteristics and measure the circuit parameters of Colpitts Oscillators.
9. Describe the operating characteristics and measure the circuit parameters of RC Phase Shift Oscillators.
10. Describe the operating characteristics and measure the circuit parameters of Crystal Controlled Oscillators.
11. Describe the operating characteristics and measure the circuit parameters of Sawtooth Oscillators.
12. Describe the operating characteristics and measure the circuit parameters of Blocking Oscillators.
13. Describe typical Hartley and Colpitts Oscillator faults, recognize when a Hartley and Colpitts Oscillator is faulted and identify the faulted component.
14. Describe typical RC Phase Shift and Crystal Controlled Oscillator faults, recognize when a RC Phase Shift and Crystal Controlled Oscillator is faulted and identify the faulted component.
15. Describe typical Non Sine Wave Oscillators, like Sawtooth and Blocking Oscillator faults, recognize when a Non Sine Wave Oscillator like Sawtooth and Blocking Oscillator is faulted and identify the faulted component.

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. Multistage Transistor Amplifiers.
2. RC coupled Transistor Amplifiers.
3. Push-Pull Amplifiers.
4. Troubleshooting and signal tracing a Multistage Transistor Amplifier.
5. Various Sine Wave Oscillators:
    - Hartley Oscillators,
    - Colpitts Oscillators,
    - RC Phase Shift Oscillators,
    - LC Oscillators,
    - Crystal Controlled Oscillators,
    - Sawtooth Oscillators, and
    - Blocking Oscillators.
6. Typical faults and fault finding techniques used on the following Oscillator circuits:
    - Hartley and Colpitts Oscillators;
    - RC Phase Shift and Crystal Controlled Oscillators; and
    - Non Sine Wave Oscillators; like Sawtooth and Blocking Oscillators.

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

Learning Outcome 1 **Describe the purpose of Multistage Transistor Amplifiers.**

Assessment Criteria
a. Describe the purpose of Cascade amplifiers.
b. Calculate the gain of Cascade amplifiers.
c. Describe the different methods of coupling amplifier stages.

Assessment Method
Multiple choice questions
Short answer questions
Tests

Learning Outcome 2 **Describe the operating characteristics and measure the circuit parameters of RC coupled Transistor Amplifiers.**

Assessment Criteria
a. Describe the operating characteristics of RC coupled transistor amplifiers.
b. Describe the effects of input signal amplitude and frequency on RC coupled transistor amplifiers.
c. Measure input and output waveforms of RC coupled transistor amplifiers.
d. Recognize normal operating conditions of RC coupled transistor amplifiers.
e. Observe the effects of input signal amplitude and frequency on RC coupled transistor amplifiers.

Assessment Method
Multiple choice questions
Short answer questions
Practical exercises/tests

Learning Outcome 3 **Describe the operating characteristics and measure the circuit parameters of Push-Pull Amplifiers.**

Assessment Criteria
a. Identify Push-Pull Amplifier circuits.
b. Describe the operating characteristics of Push-Pull Amplifiers.
c. Measure input and output waveforms of a common collector Push-Pull Amplifier circuit.
d. Recognize normal operating conditions of Push-Pull Amplifiers.

Assessment Method
Multiple choice questions
Short answer questions
Practical exercises/tests

Learning Outcome 4	**Describe the troubleshooting method of signal tracing a Multistage Transistor Amplifier.**
Assessment Criteria	a. Describe the troubleshooting method of signal tracing. b. Identify common faults in a Multistage Transistor Amplifier circuit. c. Recognize when a Multistage Transistor Amplifier circuit is faulted. d. Troubleshoot a faulted Multistage Transistor Amplifier circuit.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 5	**Practice Multistage Transistor Amplifier Troubleshooting.**
Assessment Criteria	a. Identify faulted Multistage Transistor Amplifier operation. b. Determine the faulted component in a faulted Multistage Transistor Amplifier.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 6	**Describe the purpose of various Sine Wave Oscillators.**
Assessment Criteria	a. Describe the purpose of various Sine Wave Oscillators. b. Describe a basic Sine Wave Oscillator circuit. c. Identify LC Oscillators. d. Identify RC Oscillators. e. Identify Crystal Oscillators.
Assessment Method	Multiple choice questions Short answer questions Tests

Learning Outcome 7	**Describe the operating characteristics and measure the circuit parameters of Hartley Oscillators.**
Assessment Criteria	a. Identify Hartley Oscillator circuits. b. Describe the operating characteristics of Hartley Oscillators. c. Identify the purpose of individual components in a Hartley Oscillator. d. Measure input and output waveforms of a Hartley Oscillator. e. Recognize normal operating conditions of a Hartley Oscillator.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests

Learning Outcome 8	**Describe the operating characteristics and measure the circuit parameters of Colpitts Oscillators.**
Assessment Criteria	a. Identify Colpitts Oscillator circuits. b. Describe the operating characteristics of Colpitts Oscillators. c. Identify the purpose of individual components in a Colpitts Oscillator. d. Measure input and output waveforms of a Colpitts Oscillator. e. Recognize normal operating conditions of a Colpitts Oscillator.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests

Learning Outcome 9	**Describe the operating characteristics and measure the circuit parameters of RC Phase Shift Oscillators.**
Assessment Criteria	a. Identify RC Phase Shift Oscillator circuits. b. Describe the operating characteristics of RC Phase Shift Oscillators. c. Identify the purpose of individual components in a RC Phase Shift Oscillator. d. Measure input and output waveforms of a RC Phase Shift Oscillator. e. Recognize normal operating conditions of a RC Phase Shift Oscillator.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 10	**Describe the operating characteristics and measure the circuit parameters of Crystal Controlled Oscillators.**
Assessment Criteria	a. Describe the characteristics of a Quartz Crystal. b. Identify and describe Crystal Oscillator circuits. c. Identify the purpose of individual components in a RC Phase Shift Oscillator. d. Measure input and output waveforms of a RC Phase Shift Oscillator. e. Recognize normal operating conditions of a RC Phase Shift Oscillator
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests

Learning Outcome 11	**Describe the operating characteristics and measure the circuit parameters of Sawtooth Oscillators.**
Assessment Criteria	a. Describe the purpose of a Sawtooth Generator. b. Identify and describe the output waveforms of a Sawtooth Generator. c. Measure input and output waveforms of a Sawtooth Generator. d. Recognize normal operating conditions of a Sawtooth Generator.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 12	**Describe the operating characteristics and measure the circuit parameters of Blocking Oscillators.**
Assessment Criteria	a. Identify the purpose of Blocking Oscillators. b. Describe the operation of free-running and triggered blocking oscillators. c. Observe normal operation of free-running and triggered blocking oscillators.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 13	**Describe typical Hartley and Colpitts Oscillator faults, recognize when a Hartley and Colpitts Oscillator is faulted and identify the faulted component.**
Assessment Criteria	a. Describe typical faults in Hartley and Colpitts Oscillators. b. Describe Hartley and Colpitts Oscillator troubleshooting procedures. c. Recognize when a Hartley Oscillator is faulted. d. Identify the faulted component in a Hartley Oscillator. e. Recognize when a Colpitts Oscillator is faulted. f. Identify the faulted component in a Colpitts Oscillator.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests

Learning Outcome 14	**Describe typical RC Phase Shift and Crystal Controlled Oscillator faults, recognize when a RC Phase Shift and Crystal Controlled Oscillator is faulted and identify the faulted component.**
Assessment Criteria	a. Describe typical faults in RC Phase Shift and Crystal Oscillators. b. Describe RC Phase Shift and Crystal Oscillator troubleshooting procedures. c. Recognize when a RC Phase Shift Oscillator is faulted. d. Identify the faulted component in a RC Phase Shift Oscillator. e. Recognize when a Crystal Oscillator is faulted. f. Identify the faulted component in a Crystal Oscillator.
Assessment Method	Multiple choice questions Short answer questions Practical exercises/tests
Learning Outcome 15	**Describe typical Non Sine Wave Oscillators, like Sawtooth and Blocking Oscillator faults, recognize when a Non Sine Wave Oscillator like Sawtooth and Blocking Oscillator is faulted and identify the faulted component.**
Assessment Criteria	a. Describe typical faults in like Sawtooth and Blocking Oscillators. b. Describe Sawtooth and Blocking Oscillator troubleshooting procedures. c. Recognize when a Sawtooth Oscillator is faulted. d. Identify the faulted component in a Sawtooth Oscillator. e. Recognize when a Blocking Oscillator is faulted. f. Identify the faulted component in a Blocking Oscillator.
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:

Electronic Devices, *Fourth Edition*
Thomas L. Floyd, 2002

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