



**University of Nicosia, Cyprus**

<b>Course Code</b> ECE-213	<b>Course Title</b> Electronics II Lab	<b>ECTS Credits</b> 2
<b>Department</b> Engineering	<b>Semester</b> Fall, Spring	<b>Prerequisites</b> ECE-211
<b>Type of Course</b> Required	<b>Field</b> Engineering	<b>Language of Instruction</b> English
<b>Level of Course</b> 1 <sup>st</sup> Cycle	<b>Year of Study</b> 2 <sup>nd</sup>	<b>Lecturer(s)</b> Dr Andreas Michaelides
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> ECE-212

**Objectives of the Course:**

The main objectives of the course are to:

- Accompany and reinforce concepts introduced during the Electronics II lecture course.
- Provide students with hands-on experience with small-signal transistor amplifiers and operational amplifier applications.
- Relate small-signal models of bipolar transistors and JFETs to their actual behavior in practical electronic circuits.
- Develop the necessary practical skills required for constructing electronic circuits and making measurements using various lab instruments.
- Provide the student with the experience of designing, simulating, constructing, testing and debugging a multistage amplifier circuit.
- Introduce students to common safety and professional practices in electronic engineering.
- Assist students develop written communications skills by writing formal laboratory reports focusing on technical content, organization, completeness, clarity, presentation, accuracy, and promptness.

**Learning Outcomes:**

After completion of the course students are expected to:

- Demonstrate the ability to use standard laboratory instruments and equipment for building, troubleshooting and measuring the small-signal performance of electronic circuits containing transistors and operational amplifiers.
- Measure and record specific parameters to obtain accurate results containing sufficient details that enable analysis.
- Possess the ability to analyze and design standard transistor amplifiers for low, mid-band and high frequency applications.

- Apply the op-amp as a building block for a multitude of applications.
- Demonstrate critical reasoning and problem solving abilities through the use of software tools to simulate and troubleshoot the dc and small-signal operation of fundamental electronic amplifier circuits.
- Work individually on a direct coupled multistage BJT amplifier design project to employ and demonstrate acquired knowledge on setting bias points for each stage and meeting various ac specifications.
- Communicate their experimental work and findings effectively in written form through a scientific laboratory report.
- Exchange and interact effectively with other students in small teams in ways that contribute to developing working relationships and the achievement of common goals.
- Demonstrate laboratory safety.
- Manage efficiently the use of time and other resources to complete experiments.

### **Course Contents:**

- Laboratory safety guidelines
- Effective technical report writing techniques

#### Experiments on:

- Common Base Amplifier
- Common Emitter Amplifier
- Common Collector Amplifier
- $h$  - Parameters
- RC Coupled Multistage Amplifier & Darlington Pair Amplifier
- Operational Amplifier/Summation, Integration and Differentiation
- Lower Cutoff Frequency
- Upper Cutoff Frequency
- JFET Amplifier
- Comparators
- Oscillators

### **Learning Activities and Teaching Methods:**

Briefing on the theoretical and technical contents of the experiments, presentation of supplemental information, student discussions, direct instruction and supervision of laboratory work.

### **Assessment Methods:**

Lab reports, lab performance and methodology, final examination.

### **Required Textbooks/Reading:**

<b>Authors</b>	<b>Title</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Theodore F. Bogart James W. Brown	Experiments in Electronic Devices and Circuits	Prentice Hall	2004	0-13111143-4

Instructor's Notes

**Recommended Textbooks/Reading:**

<b>Authors</b>	<b>Title</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Theodore F. Bogart Jeffrey S. Beasley Guillermo Rico	Electronic Devices and Circuits	Prentice Hall	2004	0131111426
A. S. Sedra, K. C. Smith	Microelectronic Circuits	Oxford University Press	2004	0-19-511663-1