UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
ECE-212	Electronics II	6
Prerequisites	**Department**	**Semester**
ECE-210	Engineering	Fall, Spring
Type of Course	**Field**	**Language of Instruction**
Required	Engineering	English
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Dr Andreas Michaelides	2nd
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Course Objectives:

The main objectives of the course are to:

- Introduce general single and multistage amplifier concepts.
- Provide a solid knowledge and understanding of small-signal BJT amplifiers in low, mid-band and high frequencies as well as small-signal JFET amplifiers.
- Enable students to analyze and design single and multistage transistor amplifiers for analog applications.
- Explain the concept and function of the operational amplifier and its applications.
- Develop skills for troubleshooting and simulating the dc and ac operation of fundamental electronic circuits.

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Learning Outcomes:

After completion of the course students are expected to:

- Analyze single and multistage BJT amplifier circuits with respect to various parameters such as dc biasing and Q-point stability, small-signal gains, input impedance, output impedance and loading effects.
- Derive expressions relating amplifier parameters based on various small-signal transistor models.
- Design single and multistage amplifiers that satisfy certain specifications.
- Perform frequency analysis of BJT amplifiers.
- Analyze basic JFET amplifiers.
- Explain and analyze ideal operational amplifier circuits.
- Utilize software to analyze the dc and small-signal operation of amplifier circuits.

Course Content:

- Introduction to the fundamentals of ac amplifiers: voltage and current gains, input and output resistances, source and load resistances, dc biasing, coupling capacitors.
- Small-signal BJT amplifiers in common base, common emitter, common collector configurations. Small-signal parameters, r_e and h-parameter transistor models, equivalent circuits, derivations of relevant equations, effects of ac load resistance, ac load line, Q-point stability, characteristics of each configuration and application circuits.
- Multistage amplifier theory, capacitor and direct-coupled BJT amplifiers, the Darlington pair.
- Frequency response (gain and phase) of amplifiers. Bode plots, series capacitance and low-frequency response, shunt capacitance and high-frequency response, derivations, BJT amplifier frequency response, Miller theorem, cascode amplifier.
- Small-signal JFET parameters, common-source and common-drain small-signal JFET amplifiers.
- Ideal operational amplifier theory and application circuits, inverting and non-inverting amplifiers, summing and difference amplifiers, voltage follower, integrator and differentiator circuits, oscillators, Barkhausen criterion, voltage comparators, hysteresis and Schmitt triggers

Learning Activities and Teaching Methods:

Lectures, in-class examples and exercises.

Assessment Methods:

Homework, semester project, exams, final exam.

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Electronic Devices and Circuit Theory	Robert Boylestad Louis Nashelsky	Pearson Education	2009	0-13606463-9
Electronic Devices and Circuits	Theodore F. Bogart Jeffrey S. Beasley Guillermo Rico	Prentice Hall	2004	0-13111142-6

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Electronic Devices and Circuits	Theodore F. Bogart Jeffrey S. Beasley Guillermo Rico	Prentice Hall	2004	0-13111142-6