

Course	ECE 25500 - Introduction to Electronic Analysis and Design
Type of Course	Required for CmpE and EE Programs
Catalog Description	Diode, bipolar transistor, and FET circuit models for the design and analysis of electronic circuits. Single and multistage analysis and design; introduction to digital circuits. Computer-aided design calculations, amplifier operating point design, and frequency response of single and multistage amplifiers. High-frequency and low-frequency designs are emphasized.
Credits	3
Contact Hours	3
Prerequisite Courses	ECE 20100
Prerequisites by Topics	Basic circuit analysis including Ohm's and Kirchhoff's Laws, loop and nodal analysis, Thevenin and Norton equivalents, Sinusoidal forcing functions, phasors, impedance, and admittance
Textbook	Donald A. Neamen, <i>Microelectronics Circuit Analysis and Design</i> , McGraw Hill, 4th Edition.
Course Objectives	One objective of this course is to use the material presented in the introductory courses in an engineering sense, i.e., design. The medium used is the analysis and design of electronic systems. A secondary objective is the use of the computer in this process, i.e., when, if, and how the computer should be used to solve an engineering design problem. A third objective is that of introducing specific electronic systems as design examples of a complete engineering problem using systems specifications and typical specification sheets as a starting point.
Course Outcomes	Students who successfully complete this course will have demonstrated: <ol style="list-style-type: none">1. An ability to identify and correctly utilize the external lead structure and basic electrical characteristics of common semiconductor devices (PN junctions, MOSFETs and BJTs).

2. An ability to analyze and design DC bias circuits.
3. An ability to utilize DC and AC models of semiconductor devices in both analysis and design.
4. An ability to analyze and design operation amplifiers.
5. An ability to use a CAD tool (e.g., Multisim) in circuit analysis and design.

Mapping between course outcomes to program student learning outcomes

Course Outcome	Program Student Learning outcome						
	1	2	3	4	5	6	7
1	x	x					
2	x						
3	x						
4	x	x					
5	x	x					
Assessment Level*	H	H					

* H: Outcome assessed with high degree; M: Outcome assessed with medium degree; L: Outcome assessed with low degree

Lecture Topics

1. Review of Linear Circuit Theory
2. Diodes, diode models, diode applications
3. MOSFETs, MOSFET circuits, MOS logic
4. Bipolar Junction Transistors, BJT circuits
5. Transistor applications, Multi-stage circuits
6. BJT amplifiers, BJT hybrid-pi model
7. MOSFET amplifiers, MOSFET hybrid-pi model
8. Differential amplifiers
9. Frequency response

Computer Usage

Medium

Laboratory Experience

None

Design Experience

Medium

Coordinator

Elizabeth A. Thompson, Ph.D.

Date

09/27/2018