Course name	**ECE 25500 Introduction to Electronics Analysis and Design**
Credit and contact hours	(3 cr.) Class 3
Course coordinator's name	Maher Rizkalla
Textbook	*ECE 25500:* 1. *Instructor Notes, assessable from CANVAS Course Site, IUPUI* 2. *A Course Manual*, Xanedu Publisher, Ed. W14, ISBN#: 9781466771253
References	*Electronic Circuit Analysis and design, Second Edition, McGraw Hill, 2001*
Course information	ECE 25500 Introduction to Electronics Analysis and Design (3 cr.) P: ECE 20100. C: ECE 20800. Class 3. Diode, bipolar transistor, and field effect transistor (FET) circuit models for the design and analysis of electronic circuits. Single-stage and multistage analysis and design. Computer-aided design calculations, amplifier operating point design, and frequency response of single and multistage amplifiers. High-frequency and low-frequency designs are emphasized. **Prerequisites/ Co-Requisite** ECE 20100. Students enrolling in ECE25500 should enroll concurrently in ECE 20800. **Required, Elective, or Selected Elective:** EE Required, CE Elective

Goals for the course	Upon successful completion of the course, students should be able to 1 Determine parameters in the Shockley diode equation from voltage and current data. [1] 2 Determine the states of diodes in a DC circuit using the Methods of Contradiction and Confirmation. [1] 3 Perform dc bias analysis and design for bipolar transistor and MOSFET circuits. [1,2] 4 Perform ac analysis and ac design for BJT and FET circuits. [1,2] 5 Determine the lower 3 dB frequency of a transistor amplifier. [1] 6 CMOS Digital Logic Design [6] 7 Select coupling capacitor values for a prescribed lower 3 dB frequency. [1,2] 8 Analyze a capacitive-coupled multi-stage amplifier. [1] 9. Design a cascaded amplifier to achieve voltage gain, frequency bandwidth, input impedance, and output impedance. [1,2] 10. Analyze integrated circuit biasing circuitries [1,2] 11. Active Loads for integrated circuit biasing [1, 2] 12. Simulate a cascaded combined MOSFET BJT amplifiers using PSPICE [1,2,6]
List of topics to be covered	1. Introduction to semiconducting materials and their properties (.5 classes) 2. P-N junction diode and their applications (.5 classes) 3. BJT's; NPN and PNP (1 class) 4. Biasing BJT's (3 classes) 5. DC models of BJT's; analysis and design of stable DC operating point (1 class) 6. Low frequency and high frequency models of BJT's; design and analysis (8 classes) 7. The field-effect transistor (1 class) 8. AC and DC models of the field-effect transistor (1 class) 9. Biasing the field-effect transistor (2 classes) 10. Design and analysis of small-signal amplifiers using field-effect transistors (3 classes) 11. Introduction to Digital CMOS Logic Circuits (2 classes) 12. Multistage amplifier (1 class) 13. DC and AC models of the junction diode (1 class) 14. Analysis of diode circuits (1 class) 15. Rectification circuits using diodes (1 class) 16. Cutoff frequencies (2 classes)
Syllabi approved by	Maher Rizkalla

Date of approval	04/21/2021