



	<b>Course name:</b> EE325 Introduction to Electronics		<b>Department:</b> Electrical and Electronics Engineering				<b>Semester</b> 5
	<b>Methods of Education</b>						<b>Credit (ECTS)</b>
	Lecture	Recitation/	Lab	Project/Field Study	Homework	Other	Total
42			40	60	15	157	5
<b>Language</b>	English						
<b>Compulsory/Elective</b>	Compulsory						
<b>Prerequisites</b>	EE213 - Circuit Theory I						
<b>Course Contents</b>	Semiconductor Diodes, Rectification, Zener Diodes, Clipper, Clampers, Bipolar Junction Transistors (BJT): Transistor Models, Bipolar Transistor Biasing, Common Emitter Amplifier (CE), Common Collector Amplifier (CC), Common Base Amplifier (CB), Input Resistance, Current Gain, Voltage Gain, Output Resistance. Junction Field Effect Transistors (JFET): Types of FETs, operation and Construction, MOSFET Operation and Construction Field Effect Transistor (JFET & MOSFET) Amplifier: Biasing of FETs, Analysis and Design of Common Source (CS), Common Drain (CD), and Common Gate (CG) Amplifiers, Input Resistance, Current Gain, Voltage Gain, Output Resistance						
<b>Course Objectives</b>	<p>To know the operation and the structure of the electronics devices like diodes, bipolar transistor and field effect transistors.</p> <p>To design rectifier circuit, clipping and clamping circuits.</p> <p>To design and analysis of different types of amplifiers.</p> <p>To have an idea about the Operational Amplifier and its applications.</p> <p>To develop skills to prepare effective project report</p>						
<b>Learning Outcomes and Competences</b>	Learn basic operating principles and equivalent circuits for nonlinear semiconductor devices including diodes, bipolar junction transistors, and field effect transistors. Learn how to analyse and design basic analog electronic circuits, such as rectifiers, BJT and FET amplifiers, and opamps						
<b>Textbook and /or References</b>	Razavi, Fundamentals of Microelectronics, 2nd. Ed., Wiley, 2012. Adel & Sedra and Kenneth C. Smith; Microelectronic circuits; 3rd Ed; Saunders College Pub.; 1991. Jacob Milkman and Arvin Grabel; Microelectronics; 2nd Ed; McGraw - Hill Pub.; 1988.						
<b>Assessment Criteria</b>			<b>If any, mark as (X)</b>		<b>Percentage (%)</b>		
	Midterm Exams		X		30		
	Quizzes		X		15		
	Homework						
	Projects		X		15		
	Term Paper						
	Laboratory work						
	Attendance						
Final Exam		X		40			
<b>Instructor</b>							
<b>Week</b>	<b>Subject</b>						
1	Electronics versus Microelectronics, Examples of Electronic Systems, Basic Concepts						
2	Semiconductor Materials and Their Properties, PN Junction, I/V Characteristics						
3	Ideal Diode, PN Junction as a Diode, Large- Signal and Small-Signal Operation, Applications of Diodes						
4	Structure of Bipolar Transistor, Operation of Bipolar Transistor in Active Mode						

5	Bipolar Transistor Models and Characteristics, Large-Signal Model, I/V Characteristics, Transconductance , Small-Signal Model, Early Effect, Operation of Bipolar Transistor in Saturation Mode, The PNP Transistor
6	Input and Output Impedances, DC and Small-Signal Analysis, Operating Point Analysis, Simple Biasing, Resistive Divider Biasing
7	Biasing with Emitter Degeneration, Self-Biased Stage, Biasing of PNP Transistors
8	Common-Emitter Topology, Common-Base Topology, Emitter Follower Topology
9	<b>Midterm</b>
10	Structure of MOSFET, Operation of MOSFET, I/V Characteristics, Channel-Length Modulation
11	MOS Transconductance, Large-Signal Model, Small-Signal Model, PMOS Transistor, CMOS Technology
12	MOS Amplifier Topologies, Biasing, Realization of Current Sources
13	Common-Source Stage, Common-Gate Stage, Source Follower
14	Error performance of digital modulation methods in slow,flat fading channels
15	Op-Amp-Based Circuits, Noninverting Amplifier, Inverting Amplifier, Integrator and Differentiator, Voltage Adder, Nonlinear Functions, Precision Rectifier, Logarithmic Amplifier, Square-Root Amplifier, Op Amp Nonidealities