

<b>Course Code</b>	ECE 214
<b>Course Name</b>	Integrated Electronics
<b>Credits</b>	4
<b>Course Offered to</b>	UG
<b>Course Description</b>	The course focuses on building the ability to analyze and design electronic circuits. This course starts with an overview of semiconductor technology. Subsequently it covers Bipolar Junction Transistor (BJT), Small Signal BJT models, BJT based amplifiers, Metal Oxide Field Effect Transistors (MOSFET), Small Signal MOS models, MOSFET based amplifiers; and analog and digital circuits and applications. Design and lab exercises are also significant components of the course.

**Pre-requisites**

Pre-requisite (Mandatory)	Pre-requisite (Desirable)
CSE111/ECE111 Digital Circuits	
ECE113 Basic Electronics (new)	
DES130 Intro. Engg. Design	

\*Please insert more rows if required

Post Conditions			
CO1	CO2	CO3	CO4
Derive small signal model for BJT and MOSFET	Apply appropriate biasing techniques to BJT & MOSFETs	Apply single, multi-stage and power amplifier circuits	Analyze CMOS digital logic circuits

Weekly Lecture Plan			
Week Number	Lecture Topic	COs Met	Assignment/Labs/Tutorial
1	Active devices and their controlled source models	CO1	Reading Assignment
2	Bipolar Junction Transistor (BJT), Metal Oxide Semiconductor Field Effect Transistor (MOSFET)	CO1	Lab & Written Assignment on Circuit analysis (KCL, KVL)
3	BJT & MOS Small Signal Models	CO1	Lab & Written Assignment on Circuit analysis (Small signal model)
4	BJT & MOS Small Signal Models	CO1	Lab & Written Assignment on Circuit analysis (Small signal model)
5	Biasing Techniques	CO2	Lab & Written Assignment on Circuit analysis (Small signal model)
6	Single stage Amplifiers	CO2 & CO3	Lab & Written Assignment on transistor biasing
7	Cascode Amplifier, Differential Amplifiers, Simple Op-Amp	CO2 & CO3	Lab & Written Assignment on amplifier design
8	Power Amplifier – Small-signal vs Large-signal behaviour of amplifiers; Power amplifier requirements – Power Output & Efficiency; Power amplifier using OPAMP and transistors.	CO2 & CO3	Lab & Written Assignment on power amplifier design

9	Power Amplifier – Small-signal vs Large-signal behaviour of amplifiers; Power amplifier requirements – Power Output & Efficiency; Power amplifier using OPAMP and transistors.	CO3	Lab &Written Assignment on power amplifier design
10	TTL & CMOS Inverter Circuit analysis	CO4	Lab &Written Assignment on power amplifier
11	Digital CMOS Logic Circuits	CO4	Lab &Written Assignment on CMOS logic design
12	Memory and Advanced Digital Circuits	CO4	
13	Memory and Advanced Digital Circuits	CO4	
<b>Weekly Lab Plan</b>			
<b>Week Number</b>	<b>Laboratory Exercise</b>	<b>COs Met</b>	<b>Platform (Hardware/Software)</b>
1	Hybrid parameters of passive and active circuits	CO1	Hardware
2	Characteristics of basic active devices	CO1	Hardware
3	Characteristics of MOSFET devices	CO1	Hardware
4	MOSFET common-source amplifier	CO1, CO2 and CO3	Hardware
5	MOSFET biasing- Feedback bias and active bias	CO2 & CO3	Hardware
6	Single stage common emitter BJT amplifier with voltage divider bias	CO2 & CO3	Hardware
7	Two stage common source MOSFET amplifier	CO2 & CO3	Hardware
8	MOSFET current mirror circuit	CO2 & CO3	Hardware
9	Power Amplifier	CO2 & CO3	Hardware

\*Please insert more rows if required

#### Assessment Plan

Type of Evaluation	% Contribution in Grade
Assignment	10
Quiz	10
Mid-sem	30
End-sem	30
LAB	20

#### Resource Material

Type	Title
Textbook	Microelectronic Circuits 6th Edition, Adel Sedra, Kenneth Smith, Oxford University Press.
Reference	Foundations of Analog and Digital Electronics Circuits Anant Agarwal and Jeffrey H. Lang,