

Electronics and Communication Engineering

Lesson Plan

Subject : **SEMICONDUCTOR DEVICES AND CIRCUITS (14BT30402)**

Faculty Member: **Dr. N. Padmaja**

Class & Semester : **II. B.Tech., I-Sem., ECE**

S. No.	Topic	No. of periods required	Book(s) followed	Topics for Self Study
Unit-I :PN JUNCTION DIODE, RECTIFIERS AND REGULATORS:				
1.	p-n Junction Diode <i>p-n</i> Junction as a diode, <i>p-n</i> Junction diode equation	1	T1	<i>p-n</i> diode switching times, Multiple L Section Filters
2.	Volt-Ampere (V-I) characteristics, Temperature dependence of <i>p-n</i> characteristics	1	T1	
3.	Diode resistance-static and dynamic resistances, transition and diffusion capacitances	1	T1	
4.	Break down mechanisms in semiconductor diodes	1	T1	
5.	Zener diode characteristics	1	T1	
6.	Rectifiers and Regulators <i>p-n</i> Junction as a Rectifier, Half Wave Rectifier, Ripple Factor	1	T1	
7.	Full Wave Rectifier, Harmonic Components in a Rectifier Circuit	2	T1	
8.	Inductor Filter, Capacitor Filter	1	T1	
9.	L & π Section Filters	1	T1	
10.	comparison of various filter circuits in terms of ripple factors	1	T1	
11.	Use of Zener Diode as a Regulator, Problems on Rectifier Circuits and Voltage Regulator	1	T1	
Total of periods required:		12		
Unit-II : BIPOLAR JUNCTION TRANSISTOR, BIASING AND STABILIZATION				
12.	Transistor Construction, BJT Operation, Transistor currents and their relations	1	T1	Bias compensation
13.	Input and Output Characteristics of Transistor in CE,CB & CC Configuration	1	T1	
14.	BJT specifications, Transistor Operating Point, DC and AC Load Lines, Importance of Biasing	2	T1	
15.	Fixed Biasing, Emitter Feedback Bias	1	T1	
16.	Collector to Base Feedback Bias	1	T1	
17.	Voltage Divider Bias, Bias Stability	1	T1	
18.	Transistor as an amplifier, Thermal Runaway	1	T1	
19.	Problems on Biasing Circuits	1	T1,R1	
Total of periods required:		09		

Unit-III : SMALL SIGNAL ANALYSIS OF BJT AMPLIFIERS				
20.	BJT Hybrid Modeling for CB, CE & CC Configurations	1	T1	Dual of Miller's Theorem
21.	BJT Hybrid Modeling for CC Configurations	2	T1	
25.	Determination of h-parameters from Transistor Characteristics, Measurement of h-Parameters	2	T1	
27.	Analysis of CE, CB and CC configurations using h-Parameters	2	T1	
28.	Comparison of CB, CE and CC Configurations	1	T1	
29.	Simplified Hybrid Model	1	T1	
30.	Millers Theorem	1	T1	
Total of periods required:		10		
Unit- IV FIELD EFFECT TRANSISTOR (FET)				
31.	Junction Field Effect Transistor(Construction, Principle of Operation, Symbols)	1	T1	Practical FET Applications.
32.	Pinch-off Voltage, Volt-Ampere Characteristics of JFET	1	T1	
33.	MOSFET Characteristics in Enhancement and Depletion Modes	1	T1	
34.	Biasing of FET	1	T1	
35.	Small Signal Model of JFET	1	T1	
36.	Common Source and Common Drain Amplifiers using JFET	1	T1	
37.	Generalized FET Amplifier	1	T1	
38.	FET as Voltage Variable Resistor	1	T1	
39.	Comparison of BJT and FET	1	T1	
Total of periods required:		09		
Unit- V SPECIAL PURPOSE ELECTRONIC DEVICES				
40.	Principle of Operation and Characteristics of Tunnel Diode	1	T1	Diac, Triac
41.	Uni-Junction Transistor (UJT)	1	T1	
42.	Varactor Diode	1	T1	
43.	Silicon Control Rectifier(SCR)	1	R1	
44.	Principle of operation of Schottky Barrier Diode	1	T1	
Total of periods required:		05		
Grand total of periods required:		45		

TEXT BOOKS:

T1. J. Millman, Christos C. Halkias and SatyabrataJit, *Electronic Devices and Circuits*, TMH, 3rd Edition, 2010.

REFERENCE BOOKS:

R1. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits*, PHI, 10th Edition, 2009.
R2. David A. Bell, *Electronic Devices and Circuits*, Oxford University press, 5th Edition, 2014.
R3. S. Salivahanan, N. Suresh Kumar, *Electronic Devices and Circuits*, Mc-Graw Hill, 3rd Edition 2013.