Department of Information Technology

II B.Tech –I Sem

ELECTRONIC DEVICEs CIRCUITS
(Subject code# 53009)

Mr.Sandeep
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Results Target

Total Strength of the Class: 105

S. No	Class / Division	No. of Students
a.	First Class with Distinction	70
b.	First Class	30
c.	Pass Class	5

Method of Evaluation

a.	Internal Examination	
b.	Unit Wise Assignments	
c.	Descriptive Exam	
D	Objective	
e.	Final Examination	

Course Objective

- This subject is helpful in understanding the behavior of basic electronic devices and their applications
- The characteristics and behavior of different basic electronic devices.

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Syllabus

Subject Name: Electronic Devices Circuits Subject Code: 53009

Class : II B.Tech

Unit – I	Qualitative theory of p-n junction as a diode, diode equation, volt-ampere characteristics, temperature dependence of VI characteristics, ideal versus practical resistance levels (static and dynamic),Transition and diffusion capacitance, Diode equivalent circuits, Load line analysis, breakdown mechanisms in semi conductor diodes, Zener diode characteristics
Unit – II	The p-n junction as a rectifier, Half wave rectifier, Bridge rectifier , Harmonic components in a rectifier circuit, Inductor filters, Capacitor filters, L-section filters, CLC filters, comparison of filters, voltage regulation using Zener diode.
Unit – III	The junction transistor, transistor current components, transistor as an amplifier, transistor construction, BJT operation, BJT symbol, common base, common emitter and common collector configurations, limits of operation, BJT specifications.
Unit – IV	Operating point, The DC and AC load lines, need for biasing, Fixed bias, collector feedback bias, emitter feedback bias, collector-emitter feedback bias, voltage divider bias, bias stability, stabilization factors, stabilization against variations in VBE, and β bias compensation using diodes and transistors, thermal runaway, thermal stability.
Unit – V	BJT Hybrid model, Determination of h-parameters from transistor characteristics, Analysis of transistor amplifier circuit using h-parameters, Comparison of CB, CE, CC amplifier configurations
Unit - VI	The junction Field Effect Transistor (construction, principle of operation, symbol)-pinch off voltage-VI characteristics, JFET small signal model, MOSFET (construction, principle of operation, symbol), MOSFET characteristics in Enhancement and Depletion modes.
Unit - VII	FET common source amplifier, common drain amplifier, generalized FET amplifier, Biasing FET, FET as voltage variable resistor, comparison of BJT &FET.
Unit - VIII	Negative resistance Devices, Uni junction Transistor(UJT), UJT Relaxation Oscillator, Programmable UJT(PUT), Silicon Controlled Rectifier(SCR), Transient Effect in SCR, Light Activated SCR(LASCR), SILICON Controlled Switch(SCS), Schottky Barrier Diode, DIAC,TRIAC Diodes & Their characteristics.(NEWLY ADDED).

Books / Material

Text Books (TB)
TB1. Millman's Electronic Devices and Circuits-J.Millman, CC.Halkias and Satyabratr, 2ed, 1998 TMH TB2. Electronic Devices and Circuits-R.L.Boylestad and Louis Nashelsky Reference books (RB):

Suggested / Reference Books (RB)
RB1. Electronic Devices and Circuits –K. Lal Kishore RB2. Electronic Devices and Circuits-S. Salivahanan ,N. Suresh Kumar,A.Vallavaraj,2ed,2008,TMH

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SUBJECT PLAN:

Subject Name: Electronic Devices Circuits Subject Code: 53009

Class: II B.Tech Faculty Name: Ch.Sandeep

Number of Hours / lectures available in this Semester / Year

Unit	Topic	Total No. of Hours
I	P-N JUNCTION DIODE	10
II	*RECTIFIERS AND FILTERS*	10
III	BIPOLAR JUNCTION TRANSISTOR	8
IV	Transistor Baising	8
V	SMALL SIGNAL LOW FREQUENCY BJT MODELS	7
VI	FIELD EFFECT TRANSISTOR	7
VII	FET AMPLIFIERS	12
VIII	INDUSTRIAL ELECTRONIC DEVICES & APPLICATIONS	7
	Total	**69**

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LESSON PLAN :

Subject Name : EDC
Subject Code : 53009
Class : II B.Tech
Faculty Name: Ch.Sandeep

Unit I: P-N Junction overview

LEARNING OBJECTIVES:

- To learn Basic EDC concepts.
- To learn where we use in these.

LECTURE PLAN:

Total no_ of classes: 10

S.NO	Topic as per JNTU syllabus	Lesson #	Suggested Books ** (Refer the list	Question Bank			Hand outs
				OQ	DQ	AQ	
1	Brief description of EDC syllabus		TB1				
2	Introduction to basic components, Identification of components		TB1, RB1,				
3	Comparison of conductors, insulators, semi conductors, Energy band diagrams		TB1 ,2-11				
4	Conductivity, Mobility, Drift, Diffusion, Intrinsic &Extrinsic semiconductors		TB1 ,3-1, TB1,5-7, TB1,5-1				
5	P-type, N-type SC, PN junction diode, Forward &Reverse biasing, Diode equation, Resistance levels		TB1,6-2, TB1,6.2				
6	Temperature dependence of VI characteristics, Diode equivalent circuits, DC load line analysis		TB1,6-6, TB1,				
7	Derivation of diode current equation, Diffusion, Transition capacitance, Zener Diode		TB1,6.4, TB1,6.10				

UNIT-II :

LEARNING OBJECTIVES:

- ❖ To learn about Rectifiers & Filters,
- ❖ Learn How to AC current to DC Current
- ❖ To learn where we use in Electronic circuits.

LECTURE PLAN:

Total No_ of Classes: 10

S.NO	Topic as per JNTU syllabus	Lesson #	Suggested Books ** (Refer the list	Question Bank			Hand outs DQ
				OQ	DQ	OQ	
8	Rectifiers, Half wave rectifier &its parameters		RB1 ,3.1,3.2				
9	Full wave rectifier &its parameters (center tapped), problems		RB1,3.3				
10	Bridge rectifier, problems		RB1,3.4				
11	Filters, Capacitor filter		RB1 ,3.6				
12	Inductor filter		RB1 ,3.7				
13	LC Filter, Bleeder resistor, critical inductance		RB1 ,3.9				
14	CLC Filter, problems, Comparison of filters		RB1 ,3.10				

UNIT-III

LEARNING OBJECTIVES:

- ❖ To Learn about basic concepts of Transistor
- ❖ Construction, operation
- ❖ Characteristics, And Specification
- ❖ Advantage and Disadvantages

LECTURE PLAN:

Total No_ of Classes: 07

S.NO	Topic as per JNTU syllabus	Lesson #	Suggested Books ** (Refer the list	Question Bank			Hand outs
				OQ	DQ	AQ	
15	Introduction to transistor, current components in transistor		TB1 ,RB1 ,9.1,4.1				
16	Transistor as an amplifier, BJT Construction		TB1 ,RB1,9.3,4.2				
17	Early effect, large signal current gain		TB1 ,RB1,9.5,4.3				
18	CB configuration & characteristics		TB1 ,RB1,9.7,4.4				
19	CE configuration & characteristics		TB1 ,RB1 ,9.8,4.4				

20	CC configuration & characteristics		TB1 ,RB1,9.12,4.4				
15	Limits of operation & BJT specifications		TB1 ,RB1,9.17,4.5				

UNIT-IV :

LEARNING OBJECTIVES:

- To learn about Transistor Biasing.
- To learn Load line Analysis.

LECTURE PLAN:
Total No_ of Classes: 08

S.NO	Topic as per JNTU syllabus	Lesson #	Suggested Books ** (Refer the list	Question Bank			Hand outs
				OQ	DQ	AQ	
22	Operating point, load line analysis		TB1 ,RB1,10.1,5.1				
23	Need for biasing, Fixed bias		TB1 ,RB1,10.2,5.2				
24	Collector Feedback bias, Emitter feedback bias		TB1 ,RB1,10.3,5.6				
25	Collector-Emitter feedback bias, voltage divider bias		TB1 ,RB1,10.4,5.7				
26	Compensation using diodes &transistors		TB1 ,RB1,10.7,5.12				
27	Thermal runaway, Thermal stability		TB1 ,RB1,10.10,5.15				
28	Problems						

UNIT-V:

LEARNING OBJECTIVES:

- To learn BJT Hybrid Parameters.
- Comparison of Different Amplifiers

LECTURE PLAN:
Total No_ of Classes: 07

S.NO	Topic as per JNTU syllabus	Lesson #	Suggested Books ** (Refer the list	Question Bank			Hand outs
				OQ	DQ	AQ	
30	BJT hybrid model		RB1 ,6.3				
31	Determination of h-parameters from transistor characteristics		RB1 ,6.4				
32	Analysis of transistor amplifier using h-parameters		RB1 ,6.5				
33	Analysis of transistor amplifier using h-parameters		RB1,6.6				
34	Comparison of CB,CE,CC configurations		RB1,6.12				

UNIT-VI:

LEARNING OBJECTIVES:

- To learn about FET Construction
- Operation and Characteristics

LECTURE PLAN:

Total No_ of Classes: 07

S.NO	Topic as per JNTU syllabus	Lesson #	Suggested Books ** (Refer the list	Question Bank			Hand outs
				OQ	DQ	AQ	
35	The junction Field Effect Transistor (construction, principle of operation, symbol.)		TB1 ,RB1,14-1,4.7				
36	pinch off voltage-VI characteristics,		TB1 ,RB1 14.2,4.8-4.9				
37	JFET small signal model,		TB1,RB114.4,4.11				
38	MOSFET(construction, principle of operation, symbol)		TB1,RB1 ,14.5,4.12				
39	MOSFET characteristics in Enhancement mode, MOSFET characteristics in Depletion mode		RB1 ,4.13, RB1,4.14				
40	Comparison of FET & MOSFET, Comparison of Enhancement Depletion mode		RB1 ,4.15, RB1 ,4.14				

UNIT-VII:

LEARNING OBJECTIVES:

- To learn FET Amplifiers
- Biasing FET

LECTURE PLAN:

Total No_ of Classes: 12

S.NO	Topic as per JNTU syllabus	Lesson #	Suggested Books ** (Refer the list	Question Bank			Hand outs
				OQ	DQ	AQ	
41	FET common source amplifier		TB1, 14.6				
42	common drain amplifier		TB1, 14.7				
43	Generalized FET amplifier.		TB1 ,14-8				
44	Biasing FET		TB1 ,14-9				
45	FET as voltage variable resistor		TB1 ,14-11,				

UNIT-VIII:

LEARNING OBJECTIVES:

- To learn UJT , SCR
- To learn Schottky Barrier Diode, DIAC,TRIAC Diodes

LECTURE PLAN:

Total No_ of Classes: 12

S.NO	Topic as per JNTU syllabus	Lesson #	Suggested Books ** (Refer the list	Question Bank			Hand outs
				OQ	DQ	AQ	
41	Negative resistance Devices, Uni junction Transistor(UJT)		TB1 ,14-12				
42	UJT Relaxation Oscillator , Programmable UJT(PUT),		TB1 ,14-12				
43	Silicon Controlled Rectifier(SCR), Transient Effect in SCR		RB1,4.15				
44	Light Activated SCR(LASCR), SILICON Controlled Switch(SCS),		TB1 ,19.8				
45	Schottky Barrier Diode, DIAC,TRIAC Diodes & Their characteristics.(NEWLY ADDED).		RB1 ,2.1.13				