COURSE PLAN

Name of the Course Teacher : Udayprakash Raghunath Singh
Subject : Electronic Devices & Circuits
Branch: CS&E Semester: II Year: I
Course Code: EC 103 L-T-P-C: 3-1-1-5 ***w.e.f. 29.12.2009***

Sr. No.	Topics	Contact Hours (Lectures)
1.	Transport phenomenon in semiconductors;Classification of substance: Conductor, Insulator & Semiconductor;	01
2.	Classification of semi-conducting materials; expressions of total current density (p type and n type); equation of charge distribution within semiconductor; mass action law; relation between intrinsic concentration and temperature	01
3.	Generation and recombination of charge carriers in semiconductor; equation of law of conservation of charge	01
4.	Graded semiconductor; diffusion current density; total current density; built-in potential within open circuited graded semiconductor;	01
5.	Continuity equation; step graded semiconductor; p-n junction diode	01
6.	Forward biased and reverse biased p-n junction diode; breakdown of p-n junction	01
7.	Components of current for forward biased and reverse biased p-n junction diode; temperature dependence of reverse saturation current	02
8.	Diode parameters: forward resistance, reverse resistance; junction capacitance: transition and diffusion capacitance	01
9.	Different types of diodes: tunnel diode, light emitting diode, photo diode, zener diode	01
10.	Diode as a rectifier: half wave and full wave rectifier with and without filters	01
11.	Clipping and clamping circuits	01
12.	Bipolar junction transistors: constructional details, operating modes, basic current and voltage equations	01
13.	Transistor configuration and characteristics: CB, CE, CC	02
14.	Current components in transistors; temperature dependence of α and β	01
15.	Sufficient and necessary condition for saturation and cut-off region of BJT; temperature dependence of I_{CBO} ; transistor parameters: base spreading, R_{CE}-sat	01

16.	Base width modulation; Eber Moll's model for transistor	01
17.	Transistor biasing and thermal stabilization: load line concept, necessity of proper biasing (thermal run-away of transistor)	01
18.	Various biasing techniques: fixed biased, self biased or emitter biased, collector biased, collector and emitter biased circuits	01
19.	Analysis of self biased circuit; stability factors: S, S', S"	01
20.	Stabilization and compensation techniques: diode compensation against V_{BE} and I_{CO}, thermistor compensation; thermal resistance and condition for thermal stability	01
21.	JFET and its static characteristics	01
22.	Pinch off voltage and Volt-Ampere Characteristics; drain saturation current	01
23.	MOSFET- enhancement, depletion modes	01
24.	Biasing of FETs	01
25.	Voltage controlled, Current controlled negative resistance circuits	01
26.	Introduction and characteristics of Tunnel diode and UJT	01
27.	Applications of Tunnel diode and UJT in switching circuits	01
28.	Transistor hybrid model	01
29.	Analysis of transistor amplifier circuits using 'h' parameters, Conversion formula for the parameters of the three configurations	02
30.	Analysis of single stage transistor amplifier circuits. RC coupled amplifier	01
31.	Effect of bypass and coupling capacitors on the low frequency response of the amplifier, Emitter follower amplifier	01
32.	Effect of bypass and coupling capacitors on the low frequency response of the amplifier, Emitter follower amplifier. Cascaded amplifiers, Low frequency model of FET-Common Source & Common Drain Amplifier	02
33.	Frequency response of amplifier circuits, Analysis of single and multistage amplifier circuits	01
34.	Power dissipation in transistors	01
35.	Comparison between Voltage amplifier, Current amplifier and Power amplifier	01
36.	Classification of amplifier: Class A, Class B, Class C	01
37.	Class AB, Class AB push pull amplifier	01
38.	Collector efficiency of each amplifier, cross over distortion	01
	Total	**42**

Recommended Books:

1. Integrated Electronics by Millman & Halkias, Tata McGraw-Hill

2. Pulse Digital and Switching waveforms, Millman and Taub, Tata McGraw Hill.

3. Electronics Devices and Circuits by Boylested,Pearson Education

4. Electronics devices and Circuits by Millman & Halkias, McGraw-Hill

5. Semiconductor Device Fundamental by Robert F. Pierret, PHI

6. Electronic Devices and Circuits by Y.N Bapat,, Tata Mc-Graw Hill, New Delhi.