

Sem.	Subject code	Course title	No. of hours	Credits	Paper type
V	17U5PMC5	Analog electronics	5	5	Major Core

**Objectives:**

(i) To introduce the students to basics of circuit theory (ii) To impregnate knowledge of active devices and their applications to the students.

**Learning outcome:**

(i) The student will be able to solve problems involving circuits and (ii) Design circuits for various physical applications.

**Unit I: Network Theorem and Semiconductor diodes**

Maximum power transfer theorem-Thevenin's theorem-Norton's theorem-Solving problems-Intrinsic Semiconductor-Extrinsic Semiconductor-N type and P type Semiconductor-Semiconductor diode-Crystal diode as a rectifier-Important terms-Half wave rectifier-Efficiency-Full wave bridge rectifier-Efficiency-Ripple factor-Comparison of rectifier-Filter circuits-Voltage stabilization-Zener diode -Zener as voltage stabilizer.

**Unit II: Transistors**

Transistor-Naming the transistor terminals-Action-Symbols-Transistor as an amplifier-Transistor connections(CB,CE,CC)-Characteristics (CE only)-DC load line analysis-Operating points-Methods of transistor biasing-Voltage divider bias.

**Unit III: Hybrid Parameter and Transistor amplifiers**

Hybrid parameter-Determination of h-parameter-Equivalent circuit-Performance of linear circuit in h parameter-The h-parameters of a transistor-Nomenclature for transistor h-parameters-Transistor circuit performance in h-parameters – Single stage transistor amplifier – Transistor amplification and its graphical demonstration-Practical circuits of transistor amplifier-RC coupled amplifier-Performance of power amplifier-Classification of power amplifier.

**Unit IV: Oscillators and Multi-vibrators**

Feedback-Principle of negative feedback amplifier-Advantages of negative feedback-Feedback circuit-Oscillators-Types of sinusoidal oscillations-Oscillatory circuits-Undamped oscillation from tank circuit-Explanation of Barkhausen criterion-Hartley oscillator-Multivibrators-Astable multivibrator.

**Unit V: Field Effect Transistors**

Introduction-Types of FETs-JFET-Working principle of JFET-Difference between JFET and Bipolar transistors-JFET as an amplifier-Output characteristics of JFET-Important terms-Expression for drain current-Advantages of JFET-Parameters of JFET-Relation among JFET parameter.

**Text Book(s)**

1. Principles of electronics, V.K.Mehta & Rohit Mehta, XI<sup>th</sup> Edn., S. Chand and Co. Ltd (2013)

**Unit I:** Sections 1.12-1.16,5.1,5.14-5.16,6.1-6.2,6.8-6.11,6.13-6.15,6.18,6.20,6.21,6.24,6.25,6.27

**Unit II:** Sections 8.1-8.8,8.10,8.12,8.13,8.17,8.18,9.6,9.7,9.12,24.1-24.7

**Unit III:** Sections 10.1 – 10.4, 11.1, 11.2,11.5, 12.5,12.6,13.1-13.5

**Unit IV:** Sections 14.1-14.4,14.7,14.1,18.10-18.12

**Unit V:** Sections 19.1-19.8,19.10-19.14

**Books for Reference:**

1. Basic Electronics:Solid State, B.L.Theraja, S.Chand & Co., New Delhi, (2006).
  2. A Text Book of applied electronics, R.S. Sheda, S.Chand & Co., New Delhi, (2003).
  3. Electronic principles by Albert Malvino & David Bates, 7<sup>th</sup> Edn., Mc Graw Hill Education Pvt. Ltd., 21<sup>st</sup> Reprint, (2017)
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**Websites:**

1. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-101-introductory-analog-electronics-laboratory-spring-2007/>
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