



# Maharaja Agrasen Institute of Technology

(Approved by AICTE & Affiliated to GGSIP University, New Delhi)

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## Department of Electrical & Electronics Engineering

Academic Year : 2023-2024 (ODD Semester)

### ELECTRICAL MATERIALS EEC 209

#### ACADEMIC PLAN FOR SEMESTER III 2023

S. No	TOPICS to be Covered	No. of Lectures	CO
1	Energy Band Diagram of Conductors, Semiconductors and Insulators	1	CO1
2	Conductivity and Resistivity, Factors affecting the resistivity	2	
3	Classification of Conducting Materials	1	
4	UNIT-1 (Conducting Materials) Electrical, mechanical and thermal properties and applications of low resistance materials like copper, aluminum, steel, gold, silver, platinum, brass and bronze	2	
5	Electrical, mechanical and thermal properties and applications of high resistance materials like manganin, constantan, nichrome, mercury, tungsten and carbon	2	
6	Introduction of Super conductors	2	
7	Classification of Insulating Materials	1	CO2
8	UNIT-2 (Insulating Materials) Electrical, physical, thermal, chemical, mechanical properties of insulating materials	2	
9	Thermoplastic materials	2	
10	Natural insulating materials	1	
11	Gaseous and liquid insulating materials	2	
12	Ceramics and synthetic insulating materials	2	
13	UNIT-3 (Magnetic Materials) Introduction and classification of magnetic materials	1	
14	Permeability, B-H Curve	1	
15	Magnetic saturation, Hysteresis Loop	1	

16		Coercive force and residual magnetism	1	CO3
17		Concept of eddy current and hysteresis loss	1	
18		Curie temperature, Magnetostriction effect	2	
19		Soft and hard magnetic materials	1	
20		Ferro and Ferri magnetic materials	1	
21		Special purpose materials	1	
22	<b>UNIT-4 (Special Materials and Components)</b>	Properties and applications of materials used in electrical systems like thermocouples, bimetallic	2	CO4
23		Properties and applications of materials used in electrical systems like fusing and soldering	2	
24		Introduction to different types of materials used in electromagnetic systems	1	
25		Introduction to different types of materials used in electro mechanical systems	1	
26		Introduction to different types of materials used in resistors	1	
27		Introduction to different types of materials used in capacitors	1	
28		Introduction to different types of materials used in inductors	1	
29		Introduction to different types of materials used in special semiconductors used in electrical engineering	1	

### COURSE OBJECTIVES

<b>CO.EEC209.1</b>	Ability to understand properties and applications of conducting materials
<b>CO.EEC209.2</b>	Ability to understand properties and applications of insulating materials.
<b>CO.EEC209.3</b>	Ability to understand properties and applications of magnetic materials.
<b>CO.EEC209.4</b>	Ability to understand properties and applications of special materials.