LEVEL IV COURSES

4101 – ELECTRICAL ENGINEERING MATERIALS

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
					Theory		Practical Ex.	Total
Lectures	Practical	Credits						
3	-	3	25	-	3 Hrs	100	-	125

Pre-requisite	Source	Semester	Theory	Test	Total	TW	PR	Gr Total
NIL	ELL		75	25	100	—	—	100

Rationale: The knowledge of Electrical Engineering material is needed for selecting appropriate material for conductor/insulation in machinery & equipment as well as repair of installation.

The subject is intended to teach students the concept, specification and properties of various material used in electrical machinery and installation. The student will acquire the knowledge and skill in selecting and use of Electrical materials.

COURSE CONTENTS	Hrs	Mks
1. CONDUCTING MATERIALS Concept of electrical conduction in conducting materials. Classification, Properties, Characteristics, Commonly used materials and their characteristics. Material used for specific purpose like OH line, underground cables, electric machines.	8	18
2. RESISTOR MATERIALS Factors affecting conductivity, their types, properties and application.	4	6
3. SEMI CONDUCTORS Factors affecting resistance, their behaviour, type and applications, materials used in special elements like thermisters, Photo conductors, Photovoltic cells and Varistors, Hall effect, LDR, LCD, Strain gauges and piezo-electric materials.	8	18
4. DIELECTRIC MATERIALS Phenomenon of Dielectric strength, Dielectric loss, polarisation. Charging and discharging of dielectric material, Conduction in solid, Liquid and gaseous dielectrics. Types of dielectric materials and their application capacitors, their types and application.	8	18
5. INSULATING MATERIALS Properties, Classification and applications/waxes, varnishes and coolants.	6	14
6. MAGNETIC MATERIALS Characteristics, classification and applications	6	8
7. SPECIAL PURPOSE MATERIALS Thermocouple, fuses, contacts, material. Radioactive Material, Fluorescent and phosphorescent materials, Students will be asked to prepare a chart with samples and characteristics of commonly used materials.		
Total	48	100

REFERENCE BOOKS:

1. Electrical engineering materials TTTI Madrass.
2. Electrical Engineering Basic Technology hubscher, Kique & others.
3. Electrical Engineering Materials – A.J. Dekker.
4. An introduction to Electrical Engineering Materials – C.S. Indulkar & S. Thiruvengadam.
5. Electrical Engineering Materials

2. Static characteristics of zener diode. Zener as a regulator.
a) Study of full wave rectifier with and without full load.
3. Study of Full wave rectifier with capacitor filter with and without full load
a) Study of Bridge rectifier with and without full load.
4. Study of Bridge rectifier with capacitor filter with and without full load.
5. Static input and output characteristics of BJT in CB configuration
a) Study of potential divider biasing circuit with emitter resistance.
6. Study of potential divider biasing circuit with emitter resistance and bypass capacitor.
7. Study of static characteristics of FET.
8. Study of common Emitter amplifier.

TEXT/REFERENCE BOOKS:

1. Basic Course in Electronics by Bhargava and Others, TTTI Publication.
2. Electronic Principles, by Malvino.
3. Electronic Devices & Circuits, by Allen Mottershed.
4. Electronic Devices and Circuit, by Millman and Halkias.
5. Electronic Devices and Circuits, by G.K. Mithal.
6. A Textbook of Applied Electronics by R.S. Sedha, S. Chand & Company Ltd.