

COURSE NAME : Chemical Engineering Group
COURSE CODE : CH
SEMESTER : Fourth
SUBJECT TITLE : Electrical Engineering & Electronics.
SUBJECT CODE : 9204

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
04	--	02	03	80	20	--	--	25@	125

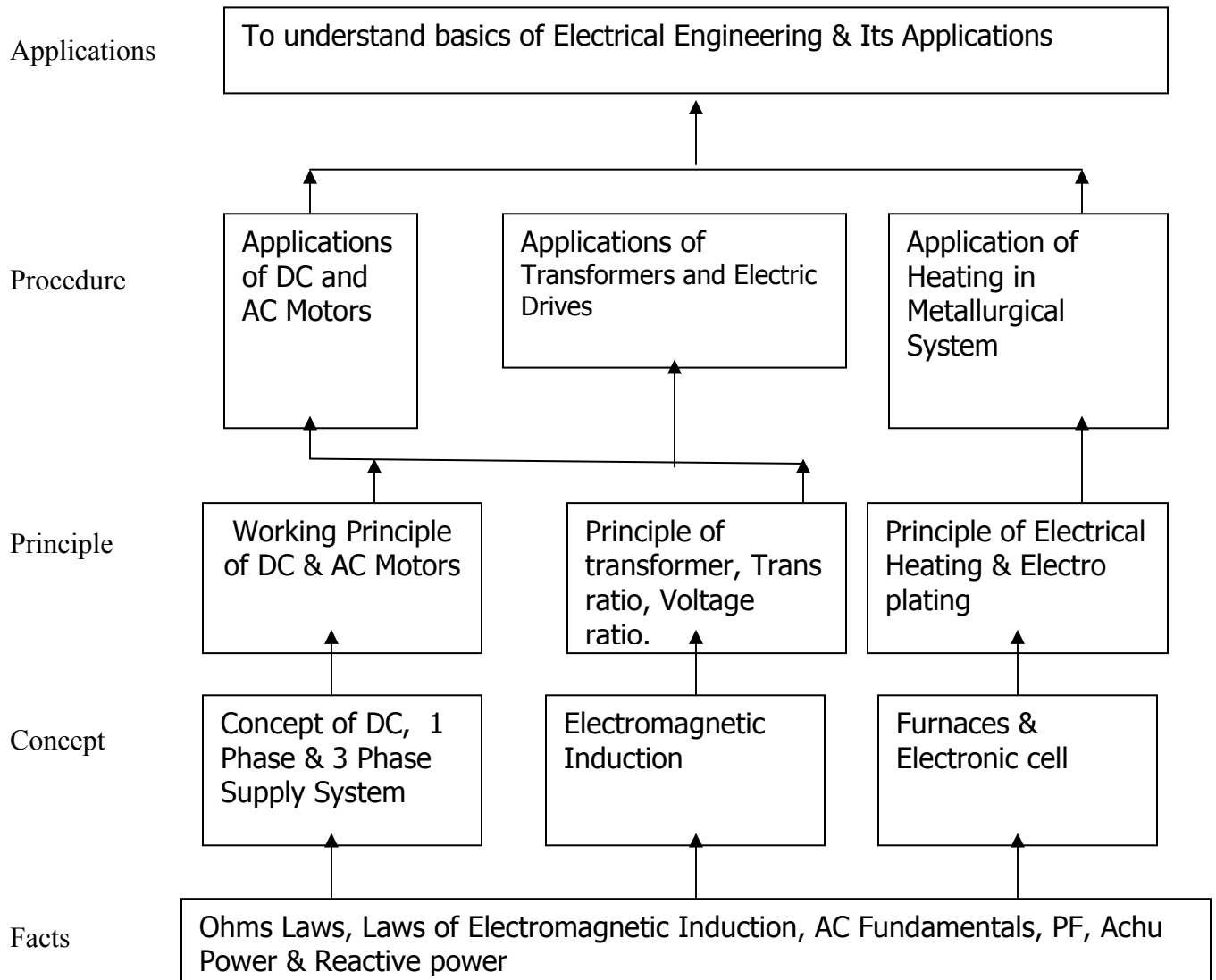
Rationale:

Automation is the key word in today's world. Most of the equipments used in the Chemical industry are automated by electronic devices. **Applied Electronics is a core technology subject which will help students to apply the use of electronic appliances in a chemical industry.** The subject will focus on the basic semiconductor technology, their use in analog and digital circuits. It is a theoretical subject, which will enable the students to develop cognitive skills.

Objectives : The student will be able to:

1. Identify various semiconductor devices
2. Use semiconductor devices in analog and digital circuits.
3. Use basic electrical engineering knowledge for normal repairs and maintenance

Learning Structure:-



Contents: Theory**Section –I : Electrical Technology**

Chapter	Name of the Topic	Hours	Marks
1	Basic Concepts & Principle Of Electrical Engineering 1.1 Ohm's Law, Laws of Electromagnetic Induction 1.2 A.C. fundamental Concept of 1 ϕ & 3 ϕ AC Supply, P.F, Active & Reactive Power.	04	04
2	D-C Motors 1.1 D.C. Motors working Principle 1.2 Types of D.C. Motor 1.3 Characteristics & Applications.	06	04
3	Transformer 1.1 Working Principle. 1.2 Construction. 1.3 Core type & Shell type transformer. 1.4 EMF Equation. 1.5 Turn ratio, Current ratio & Voltage ratio. 1.6 Concept of Auto transformer & 3 ϕ transformer.	04	06
4	A.C. Motors 1.1 Classification 1.2 3 ϕ induction Motor-Principle, Construction, Types & Application. 1.3 1 ϕ Induction Motors types & Applications. 1.4 Synchronous Motors Principle of Operation, Application.	06	08
5	Electrical Drivers 1.1 Advantages of Electrical Drivers. 1.2 Classification 1.3 Selection of Drive. 1.4 Different Encloses & Methods of Mounting.	04	06
6	Electrical Heating 1.1 Principle of Electrical Heating. 1.2 Resistance Heating, Induction Heating & di-electric Heating Principles. 1.3 Procedure to select furnace for Heating.	04	08
7	Awareness about Electro Metallurgical System 1.1 Concept of Electrolysis & Electroplating 1.2 Electroextraction.	04	04
TOTAL		32	40

Section –II – Applied Electronics

Chapter	Name of the Topic	Hours	Marks
1	Introduction To Electronics 1.1 Conductors, Semiconductors, Insulators. 1.2 Energy level diagram 1.3 Doping, P type & N types semiconductors 1.4 Active & Passive components 1.5 Resistors, inductors, capacitors- their symbol and their use only. 1.6 Diode PN junction diode- symbol, Construction, Working, Characteristics, Applications Zener diode - symbol, Construction, Working, Characteristics, Applications Light emitting diode - symbol, Construction, Working, Characteristics, Applications	08	08
2	Power Supply 2.1 Need for power supply. 2.2 Block diagram of a Power supply Rectifier – Half wave , Full wave Rectifier(centre tapped & Bridge Circuit diagram, Working, waveforms only Comparison on the basis of Circuit diagram, Working, waveforms only (No mathematical treatment) 2.3 Filter – Definition, & function (No Circuits)	06	08
3	Transistors 3.1 TRANSISTOR- Symbol, types(PNP, NPN), Working. Applications(NO Configurations, Characteristics) 3.2 Transistor as an Amplifier 3.3 Single stage CE amplifier – Circuit, Working principle. 3.4 2 Stage RC coupled Amplifier- Circuit diagram & function of various components used. (No freq response & working)	06	08
4	Operational Amplifier 4.1 Operational Amplifier – Symbol, Ideal characteristics, Block diagram, Applications. 4.2 Inverting Amplifier, Non inverting Amplifier(Only circuits, No Derivations) , Relationship between input, output & circuit components. 4.3 Voltage follower circuit & its applications.	06	08
5	Digital Circuits 5.1 Digital signal. 5.2 Logic gates AND, OR, NOT, NAND, NOR gates- Symbol, logical expressions, Truth table. 5.3 Universal gates- NAND & NOR gates as universal gates. 5.4 Digital display- 7 segment display, LCD display – Working principle & Applications only. (handset to handset) 5.15 Block diagram of mobile phone system and its operation.	06	08
TOTAL		32	40

Practicals:

Skills to be developed:

Intellectual Skills:

1. Select equipment such as motors, meters & components.
2. To interpret circuits.

Motor Skills:

1. draw circuits
2. measure various parameters accurately
3. Make connection

List of Practical:**SECTION –I Electrical Technology**

- 1 Identify different parts of D.C. Machine with their Functions.
- 2 Control Speed of D.C. shunt Motor below & above normal speed.
- 3 Determine Voltage & current ratio of transformer.
- 4 No load test on 1 ϕ transformer.
- 5 Brake test on 3 ϕ Induction motor & find efficiency & torques

SECTION-II – Applied Electronics

1. To Study the various laboratory equipments & measuring instruments like Power supply CRO, DMM.
2. To Study Diode Characteristics- Forward & Reverse characteristics.
3. To study Zener as a voltage regulator.
4. To study transistor as an amplifier- 2 stage RC coupled Amplifier.
5. Study of Logic gates.

Learning Resources:**BOOKS:**

Sr. No.	Author	Title	
1	B.L. Theraja	Electrical Technology - Vol 1.1	Nirja Construction & Development Co Ltd
2	B.L. Theraja	Electrical Technology - Vol 1.2	Nirja Construction & Development Co Ltd
3	H. Partab	Arts & Science of Utilization of Electrical Energy	
4	Soni, Gupta, Bhatnagar	Electrical Power	
5	J.B. Gupta	Electrical M/C	
6	R.P JAIN	Modern Digital Electronics	
7	Bhargava ,	Basic Electronics	