 MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES																
COURSE NAME : CHEMICAL ENGINEERING GROUP																
COURSE CODE : CH																
DURATION OF COURSE : 6 SEMESTERS										WITH EFFECT FROM 2009-10						
SEMESTER : FOURTH										DURATION : 16 WEEKS						
PATTERN : FULL TIME - SEMESTER										SCHEME : E						
SR. NO.	SUBJECT TITLE	Abbreviation	Subject Code	TEACHING SCHEME			EXAMINATION SCHEME									
				TH	TU	PR	PAPER HRS	TH (01)		PR (04)		OR (08)		TW(09)		SW (16004)
								MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
1	Technology of Organic Chemicals	TOC	12127	03	--	02	3	100	40	50#	20	--	--	25@	10	50
2	Fluid Flow Operation	FFO	12128	03	01	02	3	100	40	50#	20	--	--	25@	10	
3	Plant Utilities	PUT	12129	02	--	02	3	100	40	--	--	--	--	25@	10	
4	Mechanical Technology	MTE	12130	03	--	--	3	100	40	--	--	--	--	--	--	
5	Electrical Engineering & Electronics	EEE	12131	04	--	02	3	100	40	--	--	--	--	25@	10	
6	Visual Basic 6.0	VBI	12132	01	--	02	--	--	--	--	--	--	--	50@	20	
7	Professional Practices-III	PPR	12133	--	--	05	--	--	--	--	--	--	--	50@	20	
TOTAL				16	01	15	--	500	--	100	--	--	--	200	--	50

Student Contact Hours Per Week: **32 Hrs.**
THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.
Total Marks : **850**
@ Internal Assessment, # External Assessment, No Theory Examination.

Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Termwork, SW- Sessional Work.

- Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is to be converted out of 50 marks as sessional work (SW).
- Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms.
- Code number for TH, PR, OR and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.

Course Name : Chemical Engineering Group

Course Code : CH

Semester : Fourth

Subject Title : Technology of Organic Chemicals

Subject Code : 12127

Teaching and Examination Scheme: Scheme E

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50#	--	25@	175

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Curriculum for first test and second test shall be approximately 40% and 60% respectively.

- Question paper for test:

Q1: 3 bits of 3 marks each, option 3/4

Q2: 3 bits of 3 marks each, option 2/3

Q3: 3 bits of 4 marks or 2 bits of 8 marks each, option 2/3 or 1/2

Total of test marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

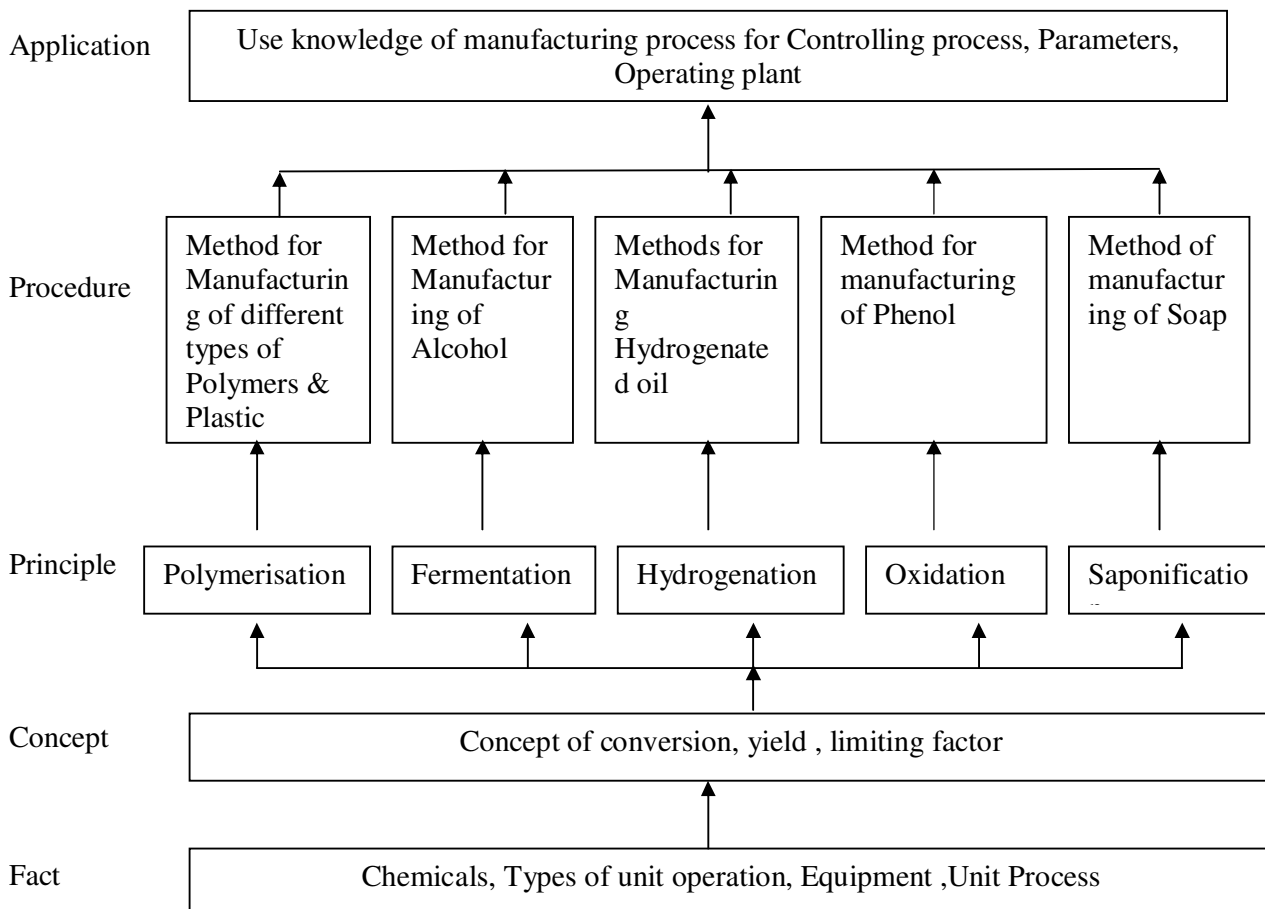
This subject is related with the process for manufacture of various organic chemicals with their kinetics.

Objectives:

The student will be able to:

1. To know about raw materials, properties, chemical reaction required for the manufacture of various chemicals.
2. To know manufacturing process of various chemicals.
3. To understand properties & uses of various chemicals included in the curriculum.

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks
1	Alcohol Based Industries. Properties , Uses , Reactions , flow sheets and manufacturing processes of <ul style="list-style-type: none"> • Alcohol by Corn and Molasses. • Acetic Acid. • Ethyl Acetate. • Butanol 	06	16
2	Paint Industry. <ul style="list-style-type: none"> • Properties of constituents and their use. manufacturing process of : Paints , Industrial paints, Varnishes. And Lacquers. 	05	12
3	Oil soap, Detergents. Properties , Uses , Reactions , flow sheets and manufacturing processes of 3.1- Edible oil. <ul style="list-style-type: none"> • Manufacturing of oil • Hydrogenation of oil 3.2- Manufacturing of <ul style="list-style-type: none"> • Soaps • Detergents. 	08	20
4	Pulp and Paper Industry. Properties , Uses , Reactions , flow sheets and manufacturing processes of <ul style="list-style-type: none"> • Pulp. • Paper. • Rayon. 	05	12
5	Polymer/ Plastic Industry. Properties , Uses , Reactions , flow sheets and manufacturing processes of 5.1- Manufacturing of Poly Vinyl Chloride. 5.2- Manufacturing of <ul style="list-style-type: none"> • Polyethylene.(Ziegler process) • Polystyrene. • Polyester. 5.2- Manufacturing of <ul style="list-style-type: none"> • Plastic (Poly Carbonate) • Thermocol 	15	24
6	Phenol 6.1 Introduction to various processes of manufacturing Phenol. 6.2 Properties , Uses , Reactions , flow sheets and manufacturing of Phenol by <ul style="list-style-type: none"> • Cumene Process • Toluene oxidation Process • Raschi/g Process 	09	16
Total		48	100

Practical:

Skills to be developed:

Intellectual Skills:

1. To select suitable process of manufacturing.
2. To select proper process condition for getting maximum yield.

Motor Skill:

1. To work on manufacturing plant.
2. To set proper temperature and pressure conditions
3. To handle reactor.
4. To set controlling steps in manufacturing process.

List of Practicals:

1. Estimation of strength of glacial acetic acid.
2. Analysis of paint, thinner, pigment.
3. Determination of iodine value of oil.
4. Determination of saponification value of oil.
5. Determination of acid value of oil.
6. Analysis of soap(moisture content)
7. Calculation of hiding power of paint.
8. Determination of Aniline point.
9. Preparation of red oxide.

Learning Resources:**Books:**

Sr. No.	Name of Book	Name of Author	Name of Publisher
1.	Dryden Outline of Chemical Technology	M. Gopala Rao	East West Publishers 1997, New Delhi.
2.	Shreve Chemical Process Industries	George Austin	Mc Graw Hill Publication 1984, Auckland
3.	Encyclopedia of Chemical Technology	Kerk & Othmer	John Wiley and Sons 1981, New York
4.	Chemical Process Organic Synthesis	P. H. Groggins	Mc Graw Hill 1958, Auckland.
5.	Handbook of Industrial Chemistry VOL. II	Davis. K. H	C.B.S Publication 2004, New Delhi
6.	Faith, Kaynes and Clark's Industrial Chemistry	Frederick A, Cowerntreim & Marguerites K. Moran	John Wiley and Sons 1935, New York

Course Name : Chemical Engineering Group

Course Code : CH

Semester : Fourth

Subject Title : Fluid Flow Operation

Subject Code : 12128

Teaching & Examination Scheme: Scheme E

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	01	02	03	100	50#	--	25@	175

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Curriculum for first test and second test shall be approximately 40% and 60% respectively.
- Question paper for test: Q1: 3 bits of 3 marks each, option 3/4
Q2: 3 bits of 3 marks each, option 2/3
Q3: 3 bits of 4 marks or 2 bits of 8 marks each, option 2/3 or 1/2
- Total of test marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

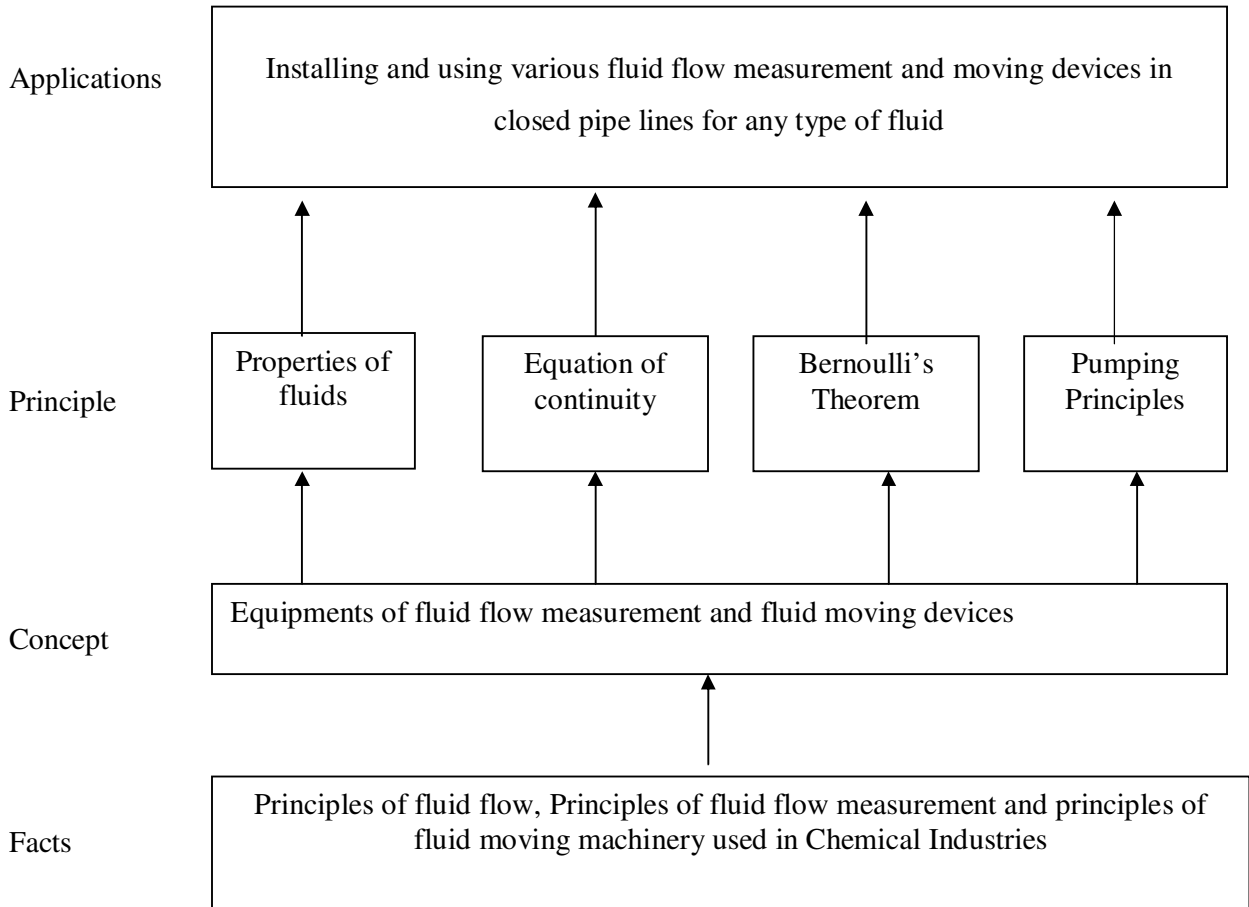
The subject gives the knowledge of measurement of fluid flow and various fluid transportation machinery. The knowledge gained by this subject is directly used in different subjects studied in Chemical Engineering. The knowledge of this subject helps in installation of different fluid flow and fluid transportation machinery.

Objectives: After studying the subject student will be able

1. To distinguish between different types of fluids.
2. To understand the concept of viscosity.
3. To Calculate flow rates.
4. To Calculate the power of pump required to do a certain pumping job.
5. To understand the principles behind different flow meters.
6. To be able to install and calculate the flow rate of fluid with different flow meters in closed pipe line.

7. To understand different flow control devices and to gain the knowledge of using different valves for different types of fluids and different flow situations.
8. To understand the principle and working of different fluid flow machinery.
9. To be able to install the fluid flow machinery in closed pipe lines.

Learning Structure:



Content: Theory

Chapter	Topic	Hours	Marks
1	Introduction to Fluids: (12)	04	12
	1.1 Properties of fluids 04		
	<ul style="list-style-type: none"> • Density & viscosity (absolute & kinematic) • Vapor pressure & partial pressure 		
	1.2 Principle of Hydrostatic Equilibrium 04		
1	<ul style="list-style-type: none"> • Atmospheric pressure • Vacuum • Pressure exerted by a liquid column • Various types of manometers • Pressure measurement by U- tube manometer 	04	12
	1.3 Types of fluids, 04		
	<ul style="list-style-type: none"> • Ideal and actual fluids • Compressible and incompressible fluids • Newton's law of viscosity • Newtonian and Non- Newtonian fluids with example of each type 		
2	<u>Flow of Fluids (Incompressible)</u> (40)	20	40
	2.1 Equation of continuity 04		
	<ul style="list-style-type: none"> • Derivation of equation of continuity • Concept of volumetric flowrate • Concept of mass flowrate • Interconversion of the above two • Average velocity • Mass velocity • Point velocity • Problems on calculations of above type of velocities 		
	2.2 Bernoulli's equation 08		
2	<ul style="list-style-type: none"> • Various types of energies by liquid • Derivation of Bernoulli's equation • Friction factor correction 	08	40

	<ul style="list-style-type: none"> • Work done by pump • Problems <p>Reynolds Number 04</p> <ul style="list-style-type: none"> • Reynolds experiment • Concept of laminar, turbulent and transient flow • Critical velocity • Formula for Reynolds Number <p>2.3 Friction 04</p> <ul style="list-style-type: none"> • Concept of friction in fluid flow • Forms of friction • Relation between pressure drop, wall friction and shear stress • Relation between average velocity and maximum velocity • Derivation of Hagen Poisculle's equation • Problems on above topics <p>Friction in pipes 04</p> <ul style="list-style-type: none"> • Fanning's friction factor in Laminar and Turbulent flow • Friction factor chart • Friction losses due to sudden expansion and sudden contraction <p>2.4 Measurement of fluid flow with flow meters 08</p> <p>Direct and indirect measurement</p> <ul style="list-style-type: none"> • Variable head meter and variable area meter • Construction, working principle, discharge coefficient, calibration, relative advantages and disadvantages, problems on - <p>Orifice meter</p> <p>Venturimeter</p> <ul style="list-style-type: none"> • Pitot tube, construction, advantages and formula to calculate point velocity 04 • Rotameter construction, principle, concept of variation in flow area calibration 04 		
3	<p>Pipe, fittings & valves 16</p> <ul style="list-style-type: none"> • Material of construction 	04	16

	<ul style="list-style-type: none"> • Standard sizes of pipes, wall thickness, Schedule number • Various types of Joints 04 • Various types of fittings • Equivalent length of pipe fittings Classification of valves <ul style="list-style-type: none"> • Construction, working, advantages and types of Regulating valve, Non- Regulating valve, 12 Non return valve, Safety valve and rupture disc 		
4	Transportation of Fluids 32 4.1 Pumps <ul style="list-style-type: none"> • Classification 04 • Positive displacement pumps, their types, single acting , double acting, duplex, triplex piston, plunger, Characteristics curves 08 Reciprocating pump, gear pump, Diaphragm pump 4.2 Centrifugal pump <ul style="list-style-type: none"> • Construction, various parts development of pressure, air binding, priming, suction head, discharge head, cavitation, NPSH 08 • Characteristics curves of Centrifugal pump 04 4.3 Fans, blowers & compressors: <ul style="list-style-type: none"> • Specific applications of each equipment • Range of pressure developed by each type 04 • Reciprocating & centrifugal blower 4.4 Vacuum creating equipments <ul style="list-style-type: none"> • Vacuum pump • Jet ejectors, its working & principle 04 	20	32
	Total	48	100

Practical:**Intellectual Skills**

1. Observations and interpretation of data.
2. Calculations.
3. Analysis.
4. Compensate for the error.

Motor Skills:

1. Equipment handling
2. Performing
3. Accuracy of measurement.

LISTS OF PRACTICALS:

1. Determination of coefficient of discharge of venturi meter & plot a calibration curve
2. Determination of coefficient of discharge of orifice meter & plot a calibration curve
3. To calibrate a rotameter for different liquids & plot the calibration curve.
4. To perform experiment on Bernoulli's Theorem and prove that the summation of pressure head, kinetic head and potential head is constant.
5. To perform Reynolds Experiment and determine the Reynolds number at the end of laminar region and beginning of turbulent region.
6. To determination of equivalent length of pipe fittings
7. To plot the characteristics curves of centrifugal pump
8. To determine the relationship between Fanning's friction factor & Reynolds Number
9. To measure the viscosity of different liquids (Ostwald's Viscometer or Redwood Viscometer)
10. To measure the flow rate of gases using flow meter.

Tutorial Assignments:

Sr. No.	Assignments	No. of Periods
1.	Calculate pressure at a specific point inside a liquid surface.	01
2	Conversion of pressure in terms of various other liquids	01
3	Conversion of volumetric flow rate into mass flow rate. Calculating average velocity, mass velocity.	01
4	5 Problems on use of equation of continuity for finding out volumetric flow rate in pipe systems of various diameters.	01
5	Problems based on Bernoulli's equation and related other energies.	03
6	Problems based on Reynolds's number given other quantities.	01
7	Problems based on calculating friction factor for Laminar and Turbulent flow.	01
8	Calculating pressure drop over certain length of pipe using above parameters.	01
9	Equivalent of different pipe fitting having these pipe fittings.	01
10	Calculating volumetric flow rate by Orificemeter, Venturimeter and Rotameter.	02
11	Calculating H.P. of pump for transporting liquid from one point to other point.	03

Learning Resources:**Books:**

Sr. No	Author	Title	Publisher
1.	McCabe, Smith	Unit Operations of Chemical Engineering	McGraw Hill
2.	Badger & Banchero	Introduction to Chemical Engineering	McGraw Hill
3.	Richardson & Coulson	Chemical Engineering Volume-I	Pergamon Press

Reference: www.flowmaster.com

www.pipeflow.co.uk

www.radcoind.com

Course Name : Chemical Engineering Group

Course Code : CH

Semester : Fourth

Subject Name: Plant Utilities

Subject Code : 12129

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
02	--	02	03	100	--	--	25@	125

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Curriculum for first test and second test shall be approximately 40% and 60% respectively.
- Question paper for test: Q1: 3 bits of 3 marks each, option 3/4
Q2: 3 bits of 3 marks each, option 2/3
Q3: 3 bits of 4 marks or 2 bits of 8 marks each, option 2/3 or 1/2
- Total of test marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

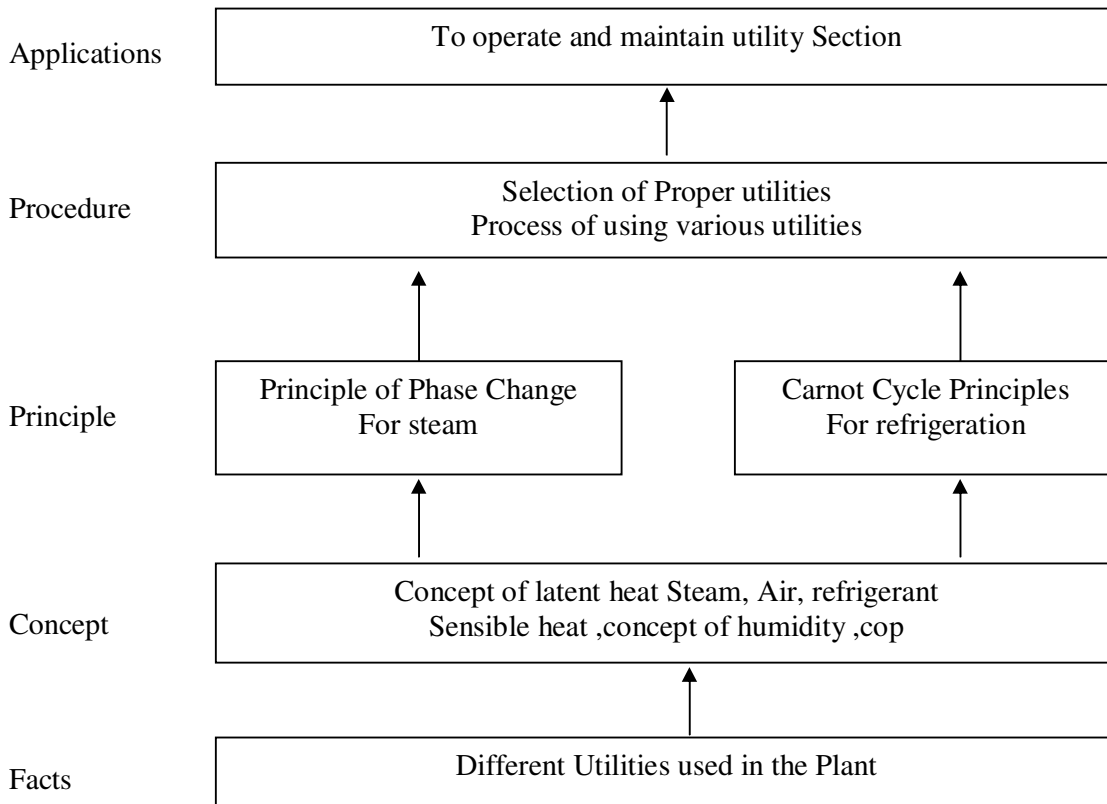
Rationale:

This subject covers the requirement of different utilities for the process plant, along with its generation and its effective utilization. Main utilities required for process plants are water, steam, air & refrigerants. Steam & non- steam heating media are important for conversion of raw material to products in reactors & to elevate the temperature in the chemical processes. Refrigeration is important to maintain the temperature in the process plant. Compressed air, process air is used in processes & instrument air is used in pneumatic devices & controls.

Objective: the student will be able to:

1. State the principles involved during water treatment, generation of steam and its uses, refrigeration cycles.
2. Select the different equipments used to run the process plant with different utilities.
3. Selection of different utilities as per requirement.
4. Understand basic calculation involved in steam generation, psychometric operation and refrigeration.

Learning Structure:-



CONTENTS: Theory

Chapter	Name of thwe Topic	Hours	Marks
1.	Importance of utilities :		
	1.1 Sources of water, hard and soft water	04	
	1.2 Requisites of industrial water and its uses		
	1.3 Methods of water treatment Chemical softening Demineralization SS		
	1.4 Resins used for water softening	12	06
	1.5 Reverse osmosis and membrane separation		
	1.6 Effects of impure boiler feed water & its treatments. Scale & sludge formation Corrosion Priming & foaming Caustic embrittlement	04	20
2.	Refrigeration :		
	2.1 Refrigeration cycles	04	
	2.2 Different methods of refrigeration used in industry Vapour compression	06	
	Vapour absorption: Lithium bromide (eco-Friendly)	06	
	2.3 Different refrigerants Monochlorodifluoro methane (R-22) Chlorofluorocarbons (CFC-Free)	04	07
	Secondary refrigerants: Brines		
	2.4 Simple calculation of C.O.P. Refrigerating effects. 2.5 Insulation and types of insulation	04	24
3.	Steam and steam generation :		
	3.1 Properties of steam		
	3.2 Problems based on enthalpy calculation for wet steam, dry saturated steam, superheated steam	12	
	3.3 Types of steam generator / boilers: water tube & fire tube Solid fuel fired boiler, waste gas fired boiler, Waste heat boiler. Fluidized bed boiler	12	10
	3.4 Scaling, trouble shooting, preparing boiler for inspection		
	3.5 Steam traps, boiler mountings and accessories	06	30
	3.6 Boiler Act		
4.	Psychrometry :		
	4.1 Properties of Air-water vapours.		
	4.2 Use of humidity chart	06	06
	4.3 Equipment used for humidification, dehumidification Evaporative cooling, spray ponds, cooling towers	10	16
5.	Air :		
	5.1 Use of Compressed air, process air and instrument air 5.2 Process of getting instrument air.		02
6.	Non steam heating system		
	Thermic fluid heater, Downtherm heater.		
	6.1 Temperature range 6.2 Principle, construction & working.		01
TOTAL		32	100

Practical:**Intellectual skills:**

1. Analysis of water.
2. Calculation of humidity & use of humidity chart
3. Calculation of heat load in cooling tower

Motor skills:

1. Measurement of pH
2. Handling of thermo pack or boiler
3. Handling of cooling tower

Lists of Experiments:

1. To determine the alkalinity of water.
2. To determine the hardness of water.
3. To determine the variation in PH with ion exchange bed.
4. Determination of humidity and use of humidity chart.
5. Operate the boiler / thermo pack using simulator.
6. Determination of outgoing temperature of water from any cooling tower.
7. Follow start up and shut down procedure of thermopack or boiler.
8. Identify various steam traps, draw it and give application.
9. Draw & prepare the report of steam traps.
10. Observation of use of instrument air in pneumatic control valve.
11. Measure the displacement of pneumatic control valve depending upon the air pressure.

Learning Resources:**Books:**

Sr. No	Author	Title	Publishers
1.	P. L. Balleney	Thermal Engineering	Khanna Publisher New Delhi
2.	S.T. Powel	Industrial water treatment	McGraw Hill, Newyork
3.	Chattopadhyya	Boiler operations	Tata McGraw Hill, New Delhi
4.	Perry R.H. Green D.W.	Perry's chemical Engineer's Handbook	McGraw Hill, Newyork
5.	R.C. Patel C.J. Karmchandani	Elements of Heat Engines Vol – II, III	Acharya Book Depot. Vadodara
6	P .N .Ananthanarayan	Refrigeration & Air conditioning	Tata McGraw Hill
7	JAIN & JAIN	Industrial chemistry	--
8.	B.K. Sarkar	Thermal Engineering	--

Reference: www.pso.siu.edu/utills
www.hvcc.edu/eit/put

Course Name : Chemical Engineering Group.

Course Code : CH

Semester : Fourth

Subject Name: Mechanical Technology

Subject Code: 12130

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	--	03	100	--	--	--	100

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Curriculum for first test and second test shall be approximately 40% and 60% respectively.**
- **Question paper for test: Q1: 3 bits of 3 marks each, option 3/4
Q2: 3 bits of 3 marks each, option 2/3
Q3: 3 bits of 4 marks or 2 bits of 8 marks each, option 2/3 or 1/2**

Total of test marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

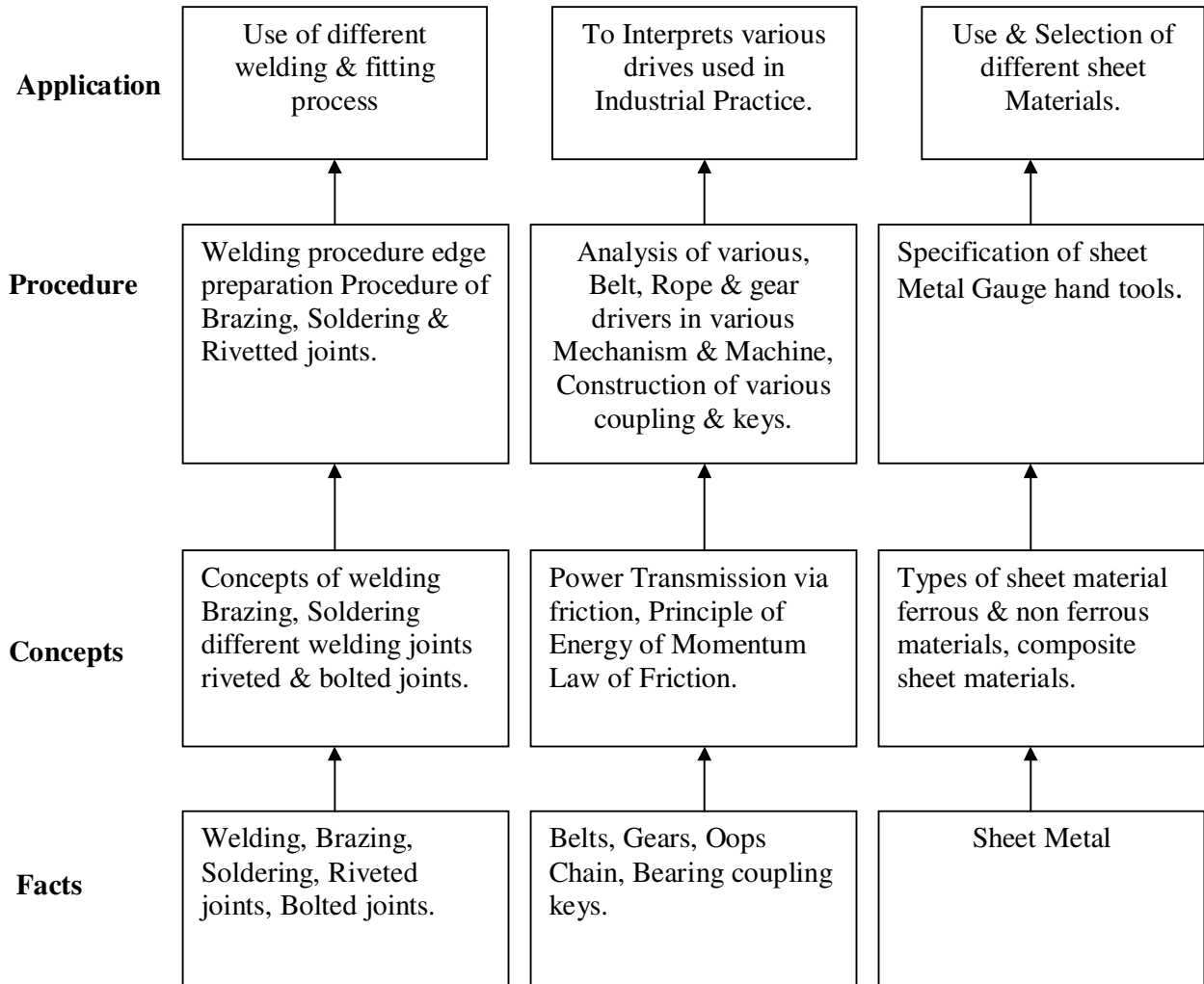
A student working in a Chemical Industry has to deal with many machines & Mechanical Operations. This subject deals with various metal joining processes and manufacturing techniques such as welding. Soldering brazing, Riveting, Bolting etc. Along with sheet metal forming like bending, rolling etc. & with manufacturing techniques the metal joining process is also important. Familiarization with different Mechanical drives, used for power transmission in Chemical Industry.

Objective:

Students will be able

- 1) To understand how the various parts are to be joined for different types of joints.
- 2) To handle different tools required for joining the parts and fabricating sheet metal by different processes.

Learning Structure:-



Contents: Theory

Sr.No.	Name of the Topic	Hours	Marks
1	Belt, Rope & Chain Drives 1.1 Selection, application and specification of flat belt, Vee Belt, rope and Pulleys. 1.2 Open and cross belt drives, belt length, various arrangements 1.3 Slip, Creep, reasons, methods to minimize slip, V.R. 1.4 Introduction to chain drivers, types, selection, application.	08	14
2	Gears 2.1 Types – Spur, Helical, Bevel, Spiral, Worm and rack 2.2 Terminology 2.3 Gear trains – Simple, Compound, epicyclic, reverted. Selection, application, and velocity ratio. 2.4 Calculations involving velocity ratio of a gear train.	08	14
3	Key & Couplings 3.1 Alignment of shafts and its significance 3.2 Keys, its function, types and applications 3.3 Couplings – need and types <ul style="list-style-type: none"> • Rigid (Muff, Clamp or Compression and Flanged) • Flexible (Bush type, Hook's joint) • Oldham 	04	10
4	Bearings. 4.1 Classification – Sliding and rolling 4.2 Solid Journal bearing, Bushed bearing. 4.3 Split bearing / plummer block. 4.4 Rolling contact bearing – Radial & thrust(Step & Collar)	04	10
5	Seals 5.1 Need, materials 5.2 Types – Static and Dynamic 5.3 Oil Seals, Mechanical seals, Gaskets.	03	04
6	Welding, Soldering & Brazing. 6.1 Definition of welding and Weldability, Basic requirements of welding 6.2 Classification of welding Processes, Principles & Process, accessories and technique, requirements of welding Application of – i) Oxy acetylene welding ii) Arc welding - carbon arc, submerged arc, TIG, MIG & CO ₂ welding iii) Resistance welding – spot, seam. 6.3 Weld edge preparation, Types of joints 6.4 Minimizing distortion in welding 6.5 Basic welding symbols 6.6 Soldering – process, types and application 6.7 Soldering consumables – solder, flux, compositions 6.8 Brazing – process, types, applications 6.9 Brazing fluxes, consumables 6.10 Comparison, advantages, disadvantages of above processes.	11	20
7	Sheet Metal Work 7.1 Sheet Metals - Ferrous, non Ferrous and their alloys, properties		

	and application. 7.2 Composit and cladded materials. 7.3 Specification and use of sheet metal gauge and hand tools.	03	08
8	Bending & Rolling. 8.1 Term associated with bending. 8.2 V-bending & U-bending, Bending Techniques. 8.3 Bending dishd end, ring and cone 8.4 Pipe & Conduit bending. 8.5 Manual & Power rolls, Rolling Techniques, Pinch & Pyramid	04	12
9	Rivetted and Bolted Joints. 9.1 Standard rivets heads. 9.2 Types of riveted joints. 9.3 Types of bolts, nuts, washers and lock nuts application.	03	08
Total		48	100

Learning Resources:-**Books:**

Sr. No.	Title	Authors	Publications
1	Elements of Workshop Technology Vol – I-II	S.K. Hajara Choudhary A.K. Hajara Choudhary	Media Promoters and Publishers
2	Welding Technology	O.P Khanna	--
3	Theory of Machine	R.S. Khurmi	--
4	Theory of Machine	R.S. Khurmi	--

Reference: www.idustrialpress.com
www.mechtech.com
www.amteam.com
www.mtiwi.com

Course Name : Chemical Engineering Group

Course Code : CH

Semester : Fourth

Subject Title : Electrical Engineering & Electronics

Subject Code : 12131

Teaching and Examination Scheme: E-Scheme

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	--	02	03	100	--	--	25@	125

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Curriculum for first test and second test shall be approximately 40% and 60% respectively.**
- **Question paper for test: Q1: 3 bits of 3 marks each, option 3/4
Q2: 3 bits of 3 marks each, option 2/3
Q3: 3 bits of 4 marks or 2 bits of 8 marks each, option 2/3 or 1/2**
- **Total of test marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

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.

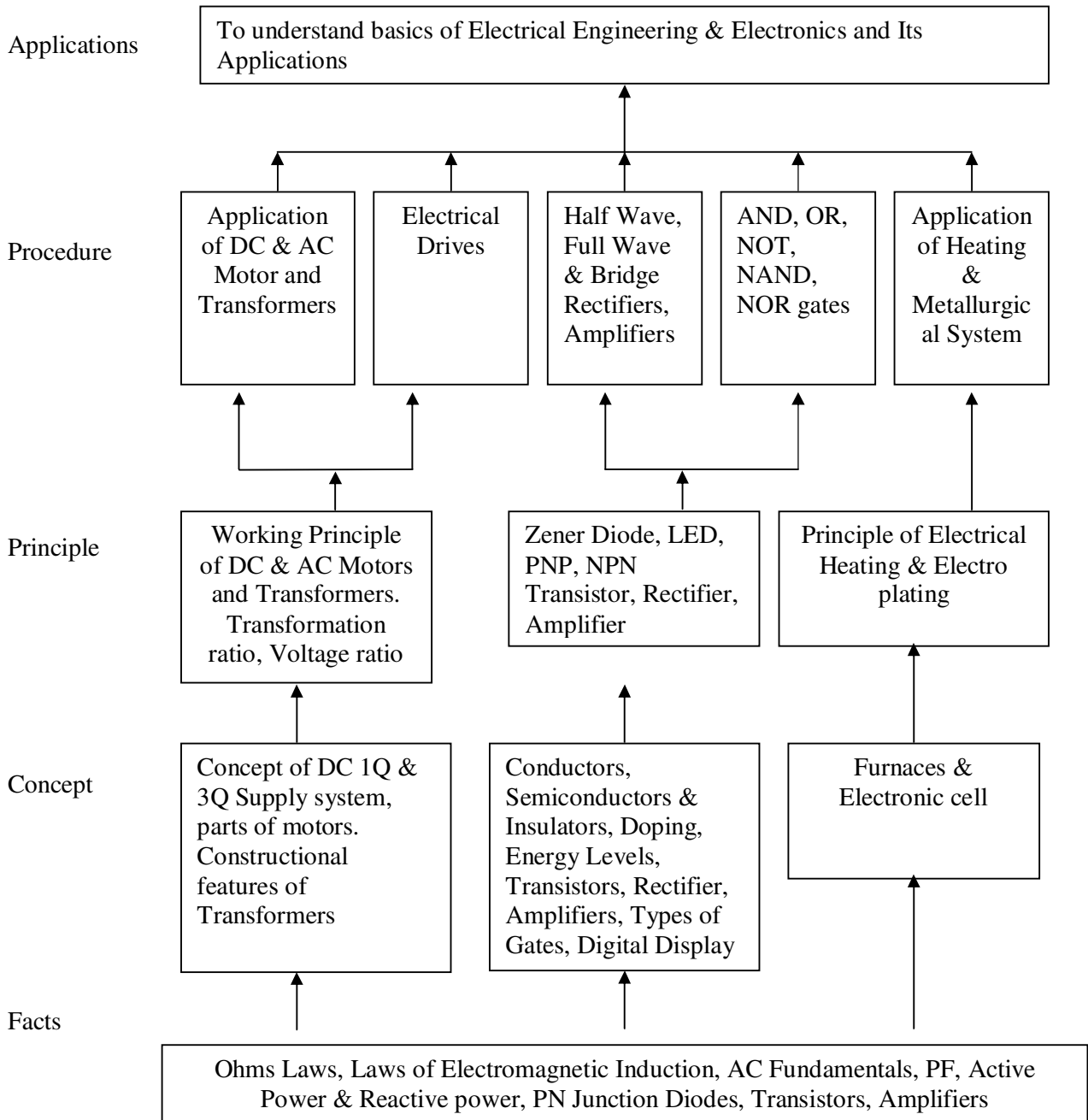
The subject will focus on the basic semiconductor technology, their use in analog and digital circuits. It is a theoretical subject, which will enable the students to develop cognitive skills.

Objectives:

The student will be able to

Identify various semiconductor devices & their use in analog and digital circuits.

Learning Structure:-



Section –I ELECTRICAL ENGINEERING

Chapter	Name of the Topic	Hours	Marks
1	BASIC CONCEPTS & PRINCIPLE OF ELECTRICAL ENGINEERING	04	06
	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. (Simple numerals)		
2	D-C MOTORS	04	06
	2.1 D.C. Motors working Principle		
	2.2 Types of D.C. Motor 2.3 Characteristics & Applications.		
3	TRANSFORMER	06	10
	3.1 Working Principle.		
	3.2 Construction.		
	3.3 Core type & Shell type transformer.		
	3.4 EMF Equation.		
	3.5 Turn ratio, Current ratio & Voltage ratio. 3.6 Concept of Auto transformer & 3 ϕ transformer. (Simple numerals)		
4	A.C. MOTORS	06	08
	4.1 Classification		
	4.2 3 ϕ induction Motor-Principle, Construction, Types & Application.		
	4.3 1 ϕ Induction Motors types & Applications. 4.4 Synchronous Motors Principle of Operation, Application.		
5	ELECTRICAL DRIVERS	04	08
	5.1 Advantages of Electrical Drivers.		
	5.2 Classification		
	5.3 Selection of Drive. 5.4 Different Enclosures & Methods of Mounting.		
6	ELECTRICAL HEATING	04	08
	6.1 Principle of Electrical Heating.		
	6.2 Resistance Heating, Induction Heating & dielectric Heating Principles. 6.3 Procedure to select furnace for Heating.		
7	AWARENESS TO ELECTRO METALLURGICAL SYSTEM	04	04
	7.1 Concept of Electrolysis & Electroplating 7.2 Electroextraction.		
TOTAL		32	50

Section –II ELECTRONICS

Chapter	Name of the Topic	Hours	Marks
1	INTRODUCTION TO ELECTRONICS	08	12
	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		
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	10
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	10
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) 5.5 Block diagram of mobile phone system and its operation.	06	10
TOTAL		32	50

LI ST OF EXPERIMENT:**SECTION –I**

- 1 Measurement of power and energy.
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

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.	Title	Author
1	Electrical Technology Vol. 1.1 and 1.2	B.L. Theraja
4	Electrical Power	S.L. Uppal
5	Electrical Power	Soni, Gupta, Bhatnagar
6	Electrical M/C	J.B. Gupta
7	Modern Digital Electronics	R.P JAIN
8	Basic Electronics	Bhargava ,
9	Operational Amplifiers	Ramakant Gayakwad

Course Name : Chemical Engineering Group**Course Code : CH****Semester : Fourth****Subject Title : Visual Basic 6.0****Subject Code : 12132****Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
01	--	02	--	--	--	--	50@	50

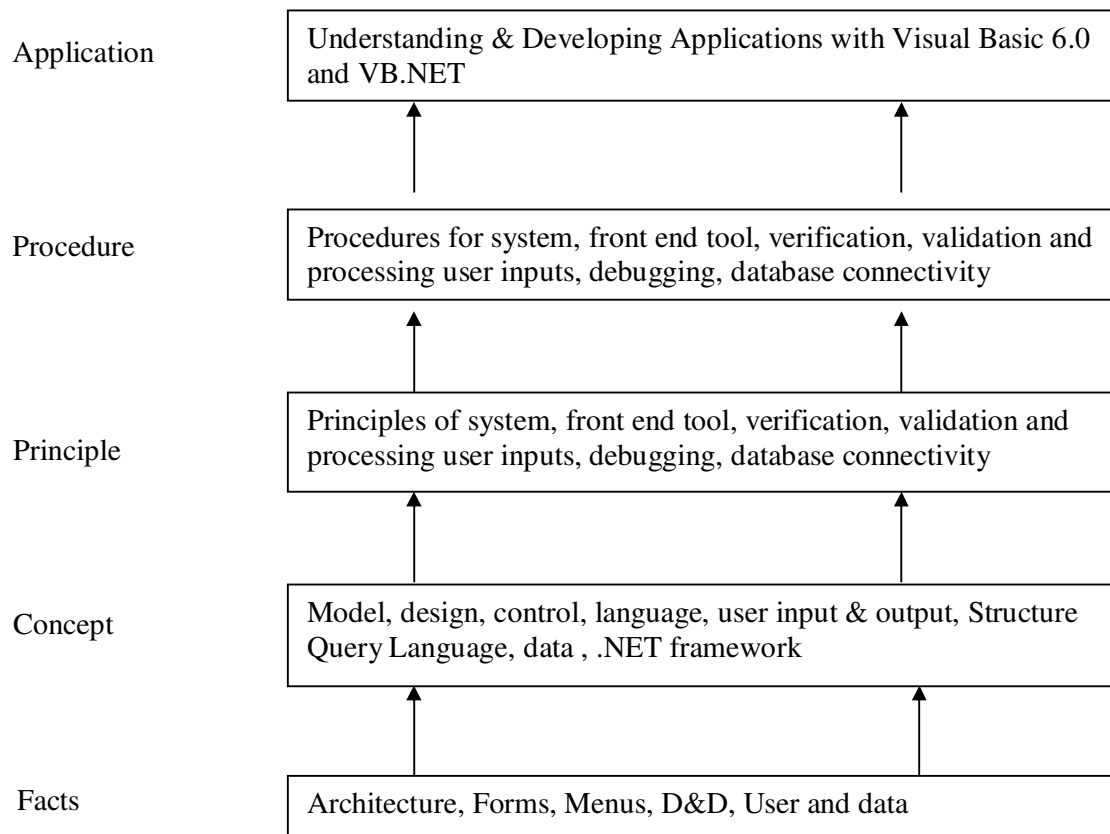
Rationale:

Visual Basic is the front end tool which is used for programming in applications like Microsoft office. VBA is used in creating Applications of types, including Active X controls, Client Applications, Internet Information, Server Application designer, Integrated visual database tools and Data Environment. ActiveX Data Objects (ADO) and the Dynamic HTML page designer. Concept of .NET Framework, Introduction to VB.NET

Objective: The student will be able to:

1. Students should understand the difference between procedure oriented language and object oriented language.
2. It revises the concept of events, methods.
3. They understand the procedure of working with validation.
4. They will learn about database connectivity.
5. They will be able to develop the VB program.
6. They will learn to develop a mini VB project by themselves.
7. Students will get an introduction to VB.net
8. They will be able to write a simple vb.net program.

Learning Structure:



Contents:

Chapter	Name of the Topic	Hours
1	PLANNING THE DESIGN OF AN APPLICATION 1.1 Using the Microsoft solution framework 1.1.1 Overview 1.1.2 Models 1.1.3 Design Phase 1.1.4 Role of developer 1.1.5 Logical design task 1.2 Designing a system architecture 1.2.1 Understanding application structure 1.2.2 Single tire 1.2.3 Two tire 1.2.4 Multi tire	02
2	INTRODUCTION TO VB 6.0 2.1 VB Environment 2.1.1 Menu Bar, Toolbars, Tool 2.1.2 Box 2.1.3 Project explorer 2.1.4 Properties window 2.1.5 Form designer 2.1.6 Form layout 2.2 VB The language 2.2.1 Variable , Constants 2.2.2 Arrays 2.2.3 Procedures, Functions 2.2.4 Control Flow Statements 2.2.5 Looping , nesting 2.3 Managing Forms 2.3.1 Form Basics 2.3.2 Form Events 2.3.3 Form Properties 2.3.4 Form Methods 2.4 Using ActiveX Controls 2.4.1 Working with Controls 2.4.2 Using Control Arrays 2.5 Managing Menus 2.5.1 Creating and modifying menu at Design time 2.5.2 Programming menu commands 2.5.3 Shortcut Keys 2.5.4 Menus at runtime 2.6 Drag & Drop operations 2.6.1 Drag mode property 2.6.2 Drag Drop & Drag Over Method 2.6.3 Mouse Conflicts 2.7 Managing Menus 2.7.1 Creating and modifying menu at Design time 2.7.2 Programming menu commands 2.7.3 Shortcut Keys 2.7.4 Menus at runtime 2.8 Drag & Drop operations	06

	2.8.1 Drag mode property 2.8.2 Drag Drop & Drag Over Method 2.8.3 Mouse Conflicts	
3	3.1 Advanced Controls and Events 3.1.1 Common Dialog Box Controls, Toolbar image list, status bar, Rich text box.	02
4	USING DEBUGGING TOOLS 4.1 Types of errors & debug menu 4.1.1 Types of errors 4.1.2 Debug menu 4.2 Testing the application 4.2.1 Immediate window 4.2.1 Using debug and local window 4.2.2 Setting watch expression 4.3 Implementing error handler 4.3.1 How VB Handles the runtime error 4.3.2 VB error handler 4.4 VB error handling options 4.4.1 How VB handles the runtime error 4.4.2 Disabling the error handler	02
5	VISUAL BASIC AND .NET PROGRAMMING 5.1 The Building Blocks of .NET 5.1.1 The .NET framework 5.1.2 .NET Enterprise Server 5.1.3 .NET Building block Services 5.1.4 Visual Studio.Net 5.2 Highlights of the .NET Framework 5.2.1 Common Language Runtime 5.2.2 Class Libraries 5.2.3 Language and Developer Tools 5.3 Visual Basic and .NET 5.3.1 Features of VB.NET 5.4 The VB.NET Language 5.5 The Structure of VB.NET Applications 5.6 Getting Started with VB.NET 5.6.1 WEB applications 5.6.2 Windows applications 5.6.3 Console applications	04
Total		16

List of Practicals:

1. Demonstration of how VB Project works.
2. Use of control flow statements in a VB application.
3. Program based on case statement.
4. How to use different control in a VB application.
5. How manage form properties for different application.
6. Select & deselect operations using drag & drop operation.
7. Program based on OLE control.

8. Design a Project using MDI form, common dialog control and rich text box.
9. Set database connectivity using Data controls.
10. Creating the simple program based on Chemical Engineering using VB. Net.

Learning Resources:**Books:**

Sr. No.	Author	Title	Edition	Year of Publication	Publisher
01	MCSD	MCSC Training Guide	1 st	Reprint	Techmedia Publication
02	Evangelous Petroustos	Mastering Visual Basic 6.0	1 st	Reprint	BPB Publication
03	IDG	VB 6.0 Programming Black Book	1 st	Reprint	IDG Book India Pvt. Ltd.
04	Kevin Hoffman & Jeff Gabriel	Professional .Net Framework	1 st	Reprint	Apress L.P. Shroff Publishers & Distributors Pvt. Ltd
05	Jesse Liberty	Learning Visual Basic .NET	1 st	Reprint	O'Reilly

Course Name : Chemical Engineering Group**Course Code : CH****Semester : Fourth****Subject Title : Professional Practices-III****Subject Code : 12133****Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	05	--	--	--	--	50@	50

Rationale:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and their attitude, in addition to basic technological concepts.

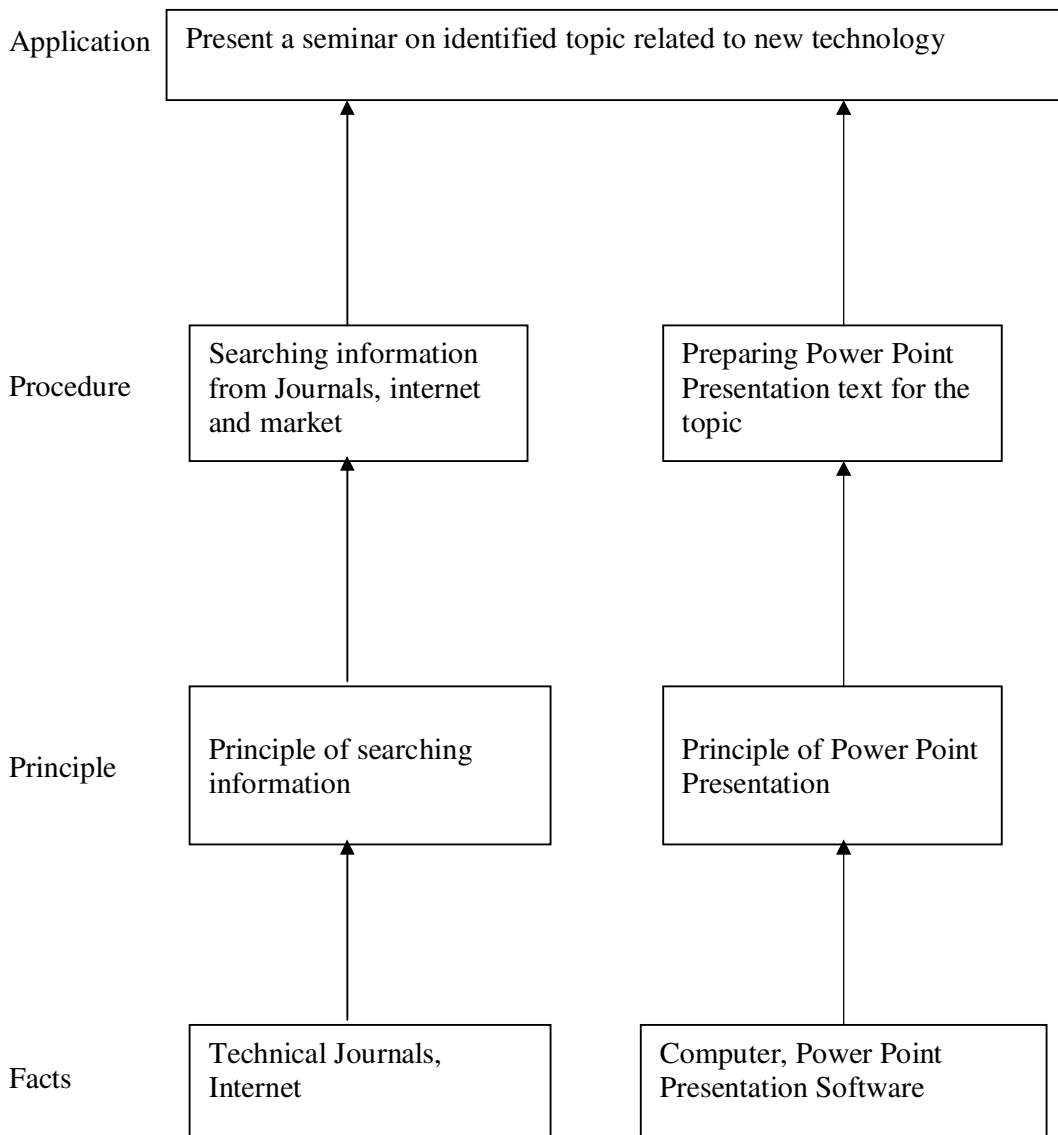
The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

Student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture.

Learning Structure:



Sr. No.	Activity
01	<p>Industrial Visits: Industrial visit be arranged and report of the same should be submitted by individual student to form part of term work: Visit to any two of the Following :</p> <ol style="list-style-type: none"> i. Petroleum Industry ii. Petrochemical industry iii. To a mechanical workshop electroplating unit. iv. Pump manufacturing company v. Visit to Foundry & Factory to study Heating System. vi. Visit to Electroplating workshop.
02	<p>Lectures: Lectures by professional/ Industrial expert /student Seminar based or information search to be organized from any THREE of the following areas:</p> <ol style="list-style-type: none"> i. Electronics engineering from a chemical industry. ii. Electrical engineering from a chemical; industry. iii. Safety in petrochemical industry iv. Safety in a petroleum industry. v. A expert working on an oil rig.
03	<p>Group Discussion: Student should discuss in a group of six to eight & write brief report on the same as a part of group discussion may monitored by faculty members.</p> <ol style="list-style-type: none"> i. Recent trends in manufacture organic chemical ii. Working of a centrifugal pump in institute. iii. Flow measurement in open channels. iv. Discussion on CAD
04	<p>Student Activity: The student group of 3 to 4 will perform any one of the following activity.</p> <ol style="list-style-type: none"> i. Collect different types of pipe fitting. ii. Collect five samples of pipes of different material and specific application. iii. Collects five types of valves and medium their specific application. iv. Electrical and electronics v. Collect transformer details in power home. vi. Collects information and specification about five electronics devices.