

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Diploma Programme				Branch/Spec.	CIVIL / ELECTRICAL			
Semester	I				Version	1.0.0.0			
Effective from Academic Year	2018-19				Effective for the batch Admitted in : June-2018				
Subject code	1BS102			Subject Name	CHEMISTRY				
Teaching scheme					Examination scheme (Marks)				
(per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	-	4	Theory	40	60	100
Hours	3	0	2	-	5	Practical	30	20	50
Pre-requisites:									
None									
Learning Outcome:									
The course content should be taught and implemented with the aim to develop different types of skills leading to									
<ul style="list-style-type: none"> • Develop the habits of identifying the problems related to the engineering materials. • Establish the cause and effects of Chemical phenomenon. • Help students to cope up with continues flow of Development in Engineering Chemistry. 									
Theory Syllabus									
Unit	Content								Hrs.
1	Chemical Bondings and Catalysis: Theory of Valency, Types and characteristics of Chemical bond, Intermolecular force attraction, Molecular arrangement , unit cell & it's structure (BCC, FCC and HCP). Definition and Types of catalysis & Catalyst, Catalytic promoter and inhibitor.								06
2	Concepts of Electro Chemistry: Introduction, Arrhenius theory of ionization, Degree of ionization, Factors affecting the degree of ionization, Concepts of acid & base. Definition of pH , importance of pH in various fields, Numerical based on pH. Definition and Types of Buffer solution, Electrolytes and non-Electrolytes, Construction and working of electrochemical cell, Standard Hydrogen Electrode, Half-cell potential, Industrial application of Electrolysis (Electro refining, Electroplating, Electro-typing).								08
3	Corrosion of metals & its prevention: Definition of corrosion, Types of corrosion (Pitting , Waterline , Crevice), Factors affecting the rate of corrosion (Nature of film, Nature of Environment, pH of solution, Temperature, Purity of metal) Method of prevention of corrosion (protective coating, Anodic and cathodic protection, Modification in design and choice of material)								06
4	Water Treatment: Hard water and soft water, Types of hardness, Salt producing hardness. Methods express the hardness, Calculation based on hardness, Effect of hard water in Boiler operation (Scale and sludge formation and it's prevention, Priming and foaming and it's prevention) Softening of water (Permutit process, Ion Exchange process, Soda-lime process), Treatment of Drinking water (screening, sedimentation, Coagulation, Filtration, chlorination)								06
5	Lubricants: Introduction and definition of lubricants and lubrication, Function of lubricants, Classification of lubricants (solid, semi-solid, liquid, synthetic oil), Physical Properties (viscosity and viscosity index, flash and fire point, pour and cloud point, oiliness) Chemical Properties (Saponification value, Neutralization number, Emulsification number) Selection of lubricants for Gears, Cutting tools, Steam turbine.								06

6	Polymer & Insulating Materials: Introduction and Definition of polymer and Monomer, Classification of polymer, Introduction to plastics: Thermoplastics and thermosetting plastic, Synthesis, properties and applications of (polyethylene, polypropylene, PVC, PTFE, polystyrene, Phenol formaldehyde, Acrylonitrile, Epoxy Resin, Nylon, polyester, Polycarbonate) Definition of Elastomer , Natural rubber, Vulcanization of rubber, Properties of rubber Definition, Classification and Properties of insulating materials: Glass wool and Thermocole.	07
7	Engineering Materials: Cement, constituting compound in cement, Manufacturing of Portland cement, setting and hardening of cement, Glass and its general properties Definition, classification, Properties and Applications of refractories. Definition, classification, Properties and Applications of Paints and Varnish. Definition, classification, Properties and Applications of Adhesives.	06

SUGGESTED LIST OF EXPERIMENTS

The experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency -

Sr.No.	Unit no.	Experiment
1	1	General Laboratory Rules and Safety Measurement & demonstration of equipments.
2	2	Volumetric Analysis (Strong Acid-Strong Base Titration)
3	3	Volumetric Analysis (Strong Acid-Weak Base Titration)
4	4	To determine pH-Values of given samples of Solution by using Universal Indicator and pH-meter.
5	5	Study of corrosion of metals in medium of different pH.
6	6	Study of Corrosion of Metals in the different mediums.
7	7	To determine the hardness of water samples.
8	8	To determine the viscosity of given liquid.
9	9	To determine Flash & Fire point of given lubricating oil.
10	10	Study of Construction and working of electrochemical cell.
11	11	Preparation of polystyrene, urea formaldehyde, phenol-formaldehyde (any one)
12	12	Study of Cement & Concrete.
13	13	To Study Of Metallurgical Microscope.
14	14	Study of different structures of metals by using Metallurgical Microscope.
15	Note	Minimum Ten Experiments should be performed by the students from the above given list or experiment related to above topics

SUGGESTED LEARNING RESOURCES

List of Books

Sr. No	Title of Books	Author	Publication
1	Engineering Chemistry	JAIN & JAIN	Dhanpat Rai and Sons
2	A Text Book of Polytechnic Chemistry	V.P. Mehta	Jain Brothers
3	A Text Book of Applied Chemistry	J. Rajaram	Tata McGraw Hill Co. New Delhi
4	Engineering Chemistry	S.S.Dara	S. Chand Publication
5	Industrial Chemistry	B.K.Sharma	Krishna Publication

List of Major Equipment/ Instrument

- pH - meter
- Red wood Viscometer
- Pesky Martin Apparatus / Abel's Apparatus
- Cleveland open cup apparatus.
- Glass wares
- Metallurgical Microscope.

SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

- Teacher guided self learning activities.
- Course/topic based internet based assignments.
- Library survey regarding Engineering Material used in different industries.
- Industrial Visits of one or Two Industries.
- Quiz & Brain storming session related to Polymeric materials.
- Sampling & Testing of water collected from different places.