

GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Diploma Programme				Branch/Spec.	All				
Semester	I				Version					
Effective from Academic Year			2018-19		Effective for the batch Admitted in					
Subject code				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

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies.....

- To Develop the habits of identifying the problems related to the engineering materials.
- Ability to establish the cause and effects of Chemical phenomenon.
- To help students to cope up with continues flow of Development in Engineering Chemistry.

Theory Syllabus

Unit	Content	Learning outcomes	Hrs.
1	<p>Chemical Bondings and Catalysis:</p> <p>Theory of Valency, Types and characteristics of Chemical bond, Intermolecular force attraction,</p> <p>Molecular arrangement in solid, liquid and gases, unit cell BCC, FCC and HCP</p> <p>Definition and Types of catalysis, Types of Catalyst (positive, negative, auto, Catalytic promoter and inhibitor)</p>	<p>1.1 Students may understand how to bond forms.</p> <p>1.2 Students may understand types of bonds.</p>	06
2	<p>Concepts of Electro Chemistry:</p> <p>Introduction, Arrhenius theory of ionization, Degree of ionization, Factors affecting the degree of ionization.</p> <p>Definition of pH, pH of acid, base and neutral solution, importance of pH in various fields, pH Calculation of acid, base and salt solution at different concentration</p>	<p>2.1 To be aware of electrochemistry and their uses in industry.</p> <p>2.2 To get idea about pH and its importance.</p>	08

	Definition and Types of Buffer solution, Electrolytes and non-Electrolytes, Construction and working of electrochemical cell, Standard conditions, Standard Hydrogen Electrode, Half-cell potential, Industrial application of Electrolysis.		
3	<p>Corrosion of metals & its prevention:</p> <p>Definition of corrosion, Types of corrosion (Pitting,Waterline,Crevise),Factors affecting the rate of corrosion(Nature of film, Nature of Environment,pH of solution,Temperature,Purity of metal)</p> <p>Method of prevention of corrosion Modification of environment and properties of metal, Use of protective coating, Anodic and cathodic protection, Modification in design and choice of material</p>	<p>3.1 To get idea about different types of corrosion</p> <p>3.2 To know about the factors affecting corrosion</p>	05
4	<p>Water Treatment:</p> <p>Hard water and soft water, Types of hardness, Salt producing hardness. Method express the hardness, Examples to calculate the hardness, Effect of hard water in Boiler operation (Scale and sludge formation and it's prevention, Priming and foaming and it's prevention)</p> <p>Softening of water (Permutit process, Ion Exchange process),</p> <p>Treatment of Drinking water (screening,sedimentation,Coagulation,Filtration,chlorination)</p>	<p>4.1 To well aware about treatment of hard water in industry purpose</p> <p>4.2 To be aware of treatment of drinking water</p>	06
5	<p>Lubricants:</p> <p>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)</p> <p>Chemical Properties (Saponification value, Neutralization number, Emulsification number)</p> <p>Selection of lubricants for Gears, Cutting tools, Steam turbine</p>	<p>5.1 Students will know importance of lubrication and lubricants in industry.</p> <p>5.2 Students will be aware of how many types of lubricants are available</p>	05
6	<p>Polymer,Elastomer,Insulating Material:</p> <p>Introduction and Definition of polymer and Monomer, Classification of polymer, Thermoplastics and thermosetting plastic,Synthesis,properties and application of (polyethylene,polypropylene,PVC,PTFE,polystyrene,Phenol formaldehyde,Acrylonitrile,Epoxy Resin,Nylon,polyester)</p> <p>Definition of Elastomer, Natural rubber, Vulcanization of rubber, Properties of rubber</p> <p>Definition, Classification and Properties of insulating materials, Glass wool and Thermocole</p>	<p>6.1 To know about polymers</p> <p>6.2 To be aware of classification of polymers</p>	07
7	Cement,Glass,Refractories,paint and varnish, Adhesives:	7.1 To be aware of	05

<p>Cement, constituting compound in cement, Manufacturing of Portland cement, setting and hardening of cement, Glass and its general properties</p> <p>Definition and classification of refractories, Characteristics of refractories</p> <p>Definition, purpose and characteristics of Paints and Varnish, Definition, Characteristic and classification of Adhesives and their uses</p>	<p>different types of insulating materials</p> <p>7.2 To get idea about cement and its constituents</p>	
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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 & 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 total alkalinity of water sample.
8	8	To determine 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 (any one) polystyrene, urea formaldehyde, phenol formaldehyde and its Characterization
12	12	Study of Cement & Concrete.
13	13	To Study Of Metallurgical Microscope.
14	14	Examine the given specimen by use of 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

List of Major Equipment/ Instrument

- PH- Meter
- Red wood Viscometer
- Pesky Martin Apparatus / Abel's Apparatus
- Cleveland open cup apparatus.
- Glass wares

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 Fuel properties & Utilization of fuel for different purposes.
- Sampling & Testing of water collected from different places.
- These could be individual or group-based.