



DEPARTMENT OF CHEMISTRY
NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR

Subject: Engineering Chemistry Course Code: CHT 101	Syllabus for B.Tech.-1 st Year (Common for All Branches)		Course Credit: 4		
			Contact Hours (Per Week)		
Mid-Term	Class Assessment	End-Term	L	T	P
30 (Marks)	10 (Marks)	60 (Marks)	3	1	0

Course Objective: To impart the knowledge of engineering chemistry and their applications in different engineering disciplines.

Course Outcomes (COs)

- CO1:** To understand properties and use of polymeric materials.
- CO2:** To learn the basic concepts of water chemistry and softening approach.
- CO3:** To gain knowledge about fuels, types of lubricants and their uses.
- CO4:** To learn fundamentals of corrosion and its prevention techniques.

UNIT-I	High Polymers (10Hrs) Introduction, classification, types of polymerization, mechanisms of polymerization (free radical, cationic, anionic), coordination polymerization and its mechanism, synthesis and applications of some important engineering polymers (Polyethylene, PVC, Polystyrene, Teflon, Polyesters, polyamides, Bakelite and silicones), conducting polymers; classifications, properties and applications in engineering field.
UNIT-II	Water Chemistry (10 Hrs) Introduction, sources of water, impurities in water, hard water, units of hardness, determination of hardness and alkalinity, softening of hard water; Lime-Soda process, Zeolite process and Ion Exchange process, numerical problems based on hardness, alkalinity and LS process, municipal treatment of water for drinking purposes; removal of suspended, dissolved and biological impurities-sterilization by chlorination (Effective and break-point chlorination).
UNIT-III	Fuels and Lubricants (10 Hrs) Fuels: Introduction, classification of fuels, characteristics of a good fuel calorific value; HCV and LCV, Dulong's formula, Determination of calorific value by Bomb Colorimeter, Numerical problems. Coal: analysis of coal - proximate and ultimate analysis, significance of the analysis.

	Lubricants: Introduction, mechanisms of lubrication, hydrodynamic, boundary and extreme pressure lubrication, classification of lubricants: liquid, semi solid and solid lubricants. Lubricating oils; fatty oils, mineral oils, blended oils, properties of lubricating oils with special reference to flash point, aniline point, viscosity and viscosity index.
UNIT-IV	<p>Corrosion and its Prevention (10 Hrs)</p> <p>Introduction, types of corrosion: Dry and wet corrosion (pitting corrosion, crevice corrosion, stress corrosion, inter-granular corrosion), corrosion prevention and control by proper design and material selection, cathodic protection, anodic protection, protective coatings.</p>

Books Recommended:

Text Books	<ol style="list-style-type: none"> 1. P. C. Jain: Engineering Chemistry, 16th Edition, Dhanpat Rai and Sons publications. 2. Dara S.S., A Text Book of Engineering Chemistry, Chand and Co. 3. J. C. Kuriacose and J Rajaraman; Chemistry in engineering and Technology, Volumes I and II (Tata McGraw Hill Publishing)
Reference Books	<ol style="list-style-type: none"> 1. V. R. Gowriker, N.V. Viswanathan and Jayadev Sreedhar: Polymer Science (Wiley Eastern Limited, New Delhi). 2. C.V. Agarwal: Chemistry of Engineering Materials (Tata Publishing Works, Varanasi). 3. R. M. E. Diamand: Applied Chemistry for engineers (Pitman).



DEPARTMENT OF CHEMISTRY
NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR

Subject: Chemistry Laboratory Course Code: CHL 101	Syllabus for B.Tech.-1stYear (Common for All Branches)		Course Credit: 1		
			Contact Hours (Per Week)		
Mid-Term	Class Assessment	End-Term	L	T	P
30 (Marks)	10 (Marks)	60 (Marks)	0	0	2

C01	To acquire practical knowledge of determination of various parameters of water.
C02	To experimentally learn about synthesis of polymeric materials.
C03	To acquire the knowledge about analysis of fuels, especially coal.
C04	To acquire the knowledge about analysis of lubricants.

Sr.No.	Experiments
1.	To determine the total, permanent and temporary hardness of water by EDTA method.
2.	To determine alkalinity of given water samples/alkali mixtures by warder's Method.
3.	To estimate percentage of available chlorine (free chlorine) in bleaching powder/water.
4.	Synthesis of Phenol formaldehyde resin.
5.	Synthesis of Urea formaldehyde resin.
6.	Proximate analysis of coal.
7.	To determine the acid value of given lubricating oils.
8.	To determine the aniline point of given lubricating oils.