DEPARTMENT OF CHEMISTRY
NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR

Subject: Engineering Chemistry (Code-CYL-100)	Syllabus for B.Tech.-1st Year Common for all branches		Total CourseCredit:5 Theory-4, Lab-1		
Mid-Term	Class Assessment	Final-Term	L	T	P
30 (Marks)	10 (Marks)	60 (Marks)	3	1	2

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

Course Outcomes (COs)

CO1: To learn the basic concepts of water chemistry and softening methods.

CO2: To understand the properties and uses of polymeric materials.

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 (10 Hrs)** 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	**Corrosion and its Prevention** **(10 Hrs)** 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.

Books Recommended:

Text Books	1. P. C. Jain: Engineering Chemistry, 16th. Edition, Dhanpat Rai Publishing Company, India. 2. Dara S.S., A Text Book of Engineering Chemistry, 12th. Edition, S. Chand and Company, India. 3. J. C. Kuriacose and J Rajaraman; Chemistry in engineering and Technology, Volumes I and II, Tata Mc Graw Hill Publishing Co. Limited, New Delhi
Reference Books	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, Varsnasi). 3. R. M. E. Diamand: Applied Chemistry for engineers (Pitman).

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ENGINEERING CHEMISTRY LAB COURSE

Subject: Engineering Chemistry Lab Code-CYP-100	**Syllabus for B.Tech-1st Year Common for all branches**	
Mid-Term	Final-Term	Total
30 (Marks)	70 (Marks)	100 (Marks)

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.