Course Content & Grade

Branch	Subject Title	Subject code	Grade for End Sem		CGPA at the end of every even semester
B.TECH. Common	Engineering Chemistry	BT- 1001	Theory	Practical	
			Min."D"	Min."D"	5.0

Unit I WATER - ANALYSIS, TREATMENTS AND INDUSTRIAL APPLICATIONS :
Sources, Impurities, Hardness & its units, Determination of hardness by EDTA method, Alkalinity & its determination, Boiler troubles (Sludge & Scale, Priming & Foaming, Boiler Corrosion, Caustic Embrittlement), Softening of water by Lime-Soda, Zeolite and Ion Exchange methods, Internal treatment methods of Boilers, Numerical problems based on softening methods, hardness and alkalinity.

Unit II FUELS & COMBUSTION:
Fossil fuels & classification, Calorific value & its types, Determination of calorific value by Bomb calorimeter Proximate and Ultimate analysis of coal and their significance, calculation of calorific value by Dulong's formula, Knocking, relationship BTtween' knocking & structure of hydrocarbon, Octane numBTr,Cetane numBTr, combustion and it related numerical problems.

Unit III
A. LUBRICANTS: Introduction, Mechanism of lubrication, Classification of lubricants, significance & determination of Viscosity ,Viscosity Index, Flash & Fire Points, Cloud & Pour Points,Carbon Residue, Aniline Point,Acid NumBTr, Saponification NumBTr, SEN .
B. CEMENT: Manufacture of Portland Cement by wet process, Setting and hardening of cement, Preparation , properties and uses of Plaster of Paris.

Unit IV POLYMERS & POLYMERISATION :
Introduction, types of polymerisation, classification of polymers, Natural & Synthetic RubBTrs; Vulcanization of RubBTr, Preparation, properties & uses of the following polymers- Polythene, PVC, PMMA, Teflon, Poly acrylonitrile, PVA, Nylon 6, Nylon 6:6, Phenol formaldehyde, Urea – Formaldehyde, Buna N, Buna S.

Unit V
A. INSTRUMENTAL TECHNIQUES IN CHEMICAL ANALYSIS :
LamBTrt's and BTer's Law and its applications, Introduction, Principle, Instrumentation and applications of IR& UV spectroscopy, Gas Chromatography & its applications.
B. REFRACTORIES : Introduction, classification and properties of refractories .

Reference Books:
1. Chemistry for Environmental Engineering & Science- Sawyer, McCarty and Parkin – McGraw Hill, Education Pvt. Ltd., New Delhi
2. Engineering Chemistry - B.K. Sharma, Krishna Prakashan Media (P) Ltd., Meerut.
3. Basics of Engineering Chemistry - S. S. Dara & A.K. Singh, S. Chand & Company Ltd., Delhi
4. Applied Chemistry -Theory and Practice, O.P. Viramani,A.K. Narula, New Age Int. Pvt. Ltd.Pub,N. Delhi
5. Polymer Science – Ghosh, Tata McGraw Hill.
6. Engg. Chemistry –Shashi Chawla, Dhanpat Rai & company pvt. Ltd, Delhi.
7. Engg. Chemistry –Jain & Jain, Dhanpat Rai & company pvt. Ltd, New Delhi
8. A Text book of Engg. Chemistry- Agrawal, C.V, Murthy C.P, Naidu, A, BS Pub.Hyderabad.

Engineering Chemistry Practical

NOTE: At least 8 of the following core experiments must BT performed during the session.

1. **Water Testing**

(i) Determination of Total hardness by Complexometric titration method.

(ii) Determination of mixed alkalinity

(a) OH & $C0_3$

(b) CO_3 & HCO_3

(iii) Chloride ion estimation by Argentometric method.

2. **Fuels & lubricant testing:**

(i) Flash & fire points determination by

(a) Pensky Martin Apparatus,

b) ABTl's Apparatus,

c) Cleveland's open cup Apparatus.

d) Calorific value by bomb calorimeter

(ii) Viscosity and Viscosity index determination by a)

Redwood viscometer No.1

b) Redwood viscometer No.2

(iii) Proximate analysis of coal

a) Moisture content

b) Ash content

c) Volatile matter content

c) Carbon residue

(iv) Steam emulsification No & Anline point determination

(v) Cloud and Pour point determination of lubricating oil

3. **Alloy Analysis**

(i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.

(ii) Determination of Cu and or Cr in alloys by Iodometric Titration.

(iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.