रसायन विभाग
मोतीलाल नेहरु राष्ट्रीय प्रौद्योगिकी संस्थान इलाहाबाद, प्रयागराज-211004
Department of Chemistry
Motilal Nehru National Institute of TechnologyAllahabad, Prayagraj-211004

ANNEXURE-IV

B.Tech. Ist/IInd Semester [Branch: Civil Engineering]

Course Name: Engineering Chemistry-IV **Course Code:** CY11104 **L:T:P :** 2:1:2 **Credit:** 04

1. Chemical Kinetics & Adsorption: Rate of a chemical reaction, factors affecting the rate of reactions: concentration, temperature, pressure and catalyst; elementary and complex reactions, order and molecularity of reactions, rate law, rate constant and its units. Adsorption. [5]

2. Colloidal Chemistry: Colloidal and suspension, sol-gel process. Introduction to nano materials. [4]

3. Engineering Materials: Polymers, Composites, Magnetic Materials, Thermoplastic & Thermosetting Plastics. [5]

4. Corrosion and its control: Theories of corrosion, type of corrosion, its prevention and control, Case study on corrosion control in industry. [5]

5. Analytical Chemistry:Conservation of mass and charge,balancing of chemical reaction, pH, alkalinity, hardness of water, Volumetric analysis, Colorimetry, Gravimetric analysis, Instrumental Analysis. [4]

6. Chemistry of Cement & its uses: Manufacturing of cement, composition, setting and hardening process, RCC and its Deteriorations. [5]

Practical: List of Experiments

1. To determine the alkalinity of the supplied water sample.
2. To determine the total, permanent hardness, $Ca^{2+}$and Mg^{2+} hardness in supplied water sample by titrating with standard EDTA solution.
3. Kinetic study of hydrolysis of ethyl acetate by volumetric titration method.
4. Determination of viscosity average molecular weight of a polymer sample by Viscometer.
5. To study the adsorption of acetic acid by activated charcoal from an aqueous solution.
6. Estimation of Iron using thiocyanate by colorimetric method.
7. Synthesis of nano particle (by metal oxide sol-gel processand its characterisation by XRD)
8. Estimation of Iron in Cement by gravimetric method.
9. Identification of eutectic composition of binary mixture.

Text Books:

1. *Engineering Chemistry*, Jain & Jain, DhanpatRai Publishing Co., New Delhi.
2. *Engineering Chemistry*, ShashiChawla, DhanpatRai Publishing Co., New Delhi.

Reference Books:

1. *Engineering Chemistry- A Textbook*, Harish Kumar Chopra, AnupamaParmar, Narora, New Delhi.
2. *Elements of Physical Chemistry,* Peter Atkins, Julio D. Paula, Oxford, UK.
3. *Polymer Science*, V R Gowariker, N V Viswanathan, JayadevSreedhar, New Age International Private Limited, New Delhi.
4. *Inorganic Chemistry: Principles of Structure and Reactivity*, By James E. Huheey, Ellen A. Keiter, Richard L. Keiter, Okhil K. Medhi, Pearson.
5. *Advanced Polymer Chemistry -A Problem Solving Guide*, Manas Chandra, Marcel Dekker Inc., New York.
6. *A Textbook of Analytical Chemistry*, Y. Anjaneyulu, K. Chandrasekhar, ValliManickam, Pharma Book Syndicate, Hyderabad.
7. *Online Resources.*