Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Tut.	Pract.	Total
FEC103	Engineering Chemistry-I	02	-	-	02	-	-	2

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
FEC103	Engineering Chemistry-I	15	15	15	60	2	--	--	75

Objectives

1. The concepts developed in this course will aid in quantification as well as understand the applications of several concepts in Chemistry that have been introduced at the 10 + 2 levels in schools.

Outcomes: Learners will be able to…

1. Explain the concept of microscopic chemistry in terms of atomic and molecular orbital theory and relate it to diatomic molecules.
2. Describe the concept of aromaticity and interpret it with relation to specific aromatic systems.
3. Illustrate the knowledge of various types of intermolecular forces and relate it to real gases.
4. Interpret various phase transformations using thermodynamics.
5. Illustrate the knowledge of polymers, fabrication methods, conducting polymers in various industrial fields.
6. Analyze the quality of water and suggest suitable methods of treatment.

Module	Detailed Contents	Hrs.
01	**Atomic and Molecular Structure** Atomic orbitals (s,p,d,f) orbital shapes, Electronic Configuration, Molecular orbital theory (MOT), bonding and anti-bonding orbitals, Molecular orbital diagrams of Homonuclear and Heteronuclear diatomic molecules-Be_2, O_2, CO, NO their bond order and magnetic properties,	**04**
02	**Aromatic systems &their molecular structure** Define Aromaticity, Huckel's rule, Structure and bonding of benzene and pyrrole.	**02**
03	**Intermolecular Forces & Critical Phenomena** Ionic, dipolar and Vander Waal's interactions, Equations of state of real gases and critical phenomena	**03**
04	**Phase Rule-Gibb's Phase Rule** Statement of Gibbs' Phase Rule, Terms involved with examples, One Component System (Water), Reduced Phase Rule, Two Component System (Pb-Ag), Advantages and Limitations of Phase Rule. Numerical problems on Phase Rule.	**05**
05	**Polymers** Introduction: Definition- Polymer, polymerization, Properties of Polymers-Molecular weight (Number average and Weight average), Numerical problems on molecular weight, effect of heat on polymers (glass transition temperature),	**05**

	Viscoelasticity,Conducting Polymers, Classification-Thermoplastic and Thermosetting polymers; Compounding of plastic, Fabrication of plastic by Compression, Injection, Transfer and Extrusion moulding, Preparation, properties and uses of PMMA and Kevlar.	
06	**Water** Introduction - Impurities in water, hardness of water- units (no conversions), types and numerical problems, determination of hardness of water by EDTA method and numerical problems.Softening of water by Ion Exchange process and numerical problems, BOD, COD- definition, significance and Numerical problems. Water purification-membrane technology- Electrodialysis, Reverse osmosis, and Ultra filtration.	**05**

Assessment

Internal Assessment Test

Assessment consists of two class tests of 15 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 35% syllabus is completed. Duration of each test shall be one hour.

End Semester Examination

In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

1. Question paper will comprise of 6 questions, each carrying 15 marks.
2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be mixed in nature (for example, if Q.2 has part (a) from module 3 then part (b) will be from other than module 3)
4. Total four questions need to be solved.

References

1. Engineering Chemistry - Jain & Jain (DhanpatRai)
2. Engineering Chemistry – Dara &Dara (S Chand)
3. Engineering Chemistry - Wiley India (ISBN – 9788126519880)
4. A Text Book of Engineering Chemistry – ShashiChawla (DhanpatRai)
5. Engineering Chemistry – Payal Joshi &Shashank Deep (Oxford University Press)
6. Concise Inorganic Chemistry – J D LEE
7. Essentials of Physical Chemistry—B S BahlArunBahl G D Tuli.