University of Mumbai			
CLASS: F.E (All Branches of Engineering)		**Semester - II**	
SUBJECT: Applied Chemistry II			
Periods per week 01 Period of 60 min.	Lecture	3	
	Practical	1	
	Tutorial		
		Hours	Marks
Evaluation System	Theory Examination	2	75
	Practical	--	--
	Oral Examination	--	--
	Term Work	-	25
	Total		100

Details of the Syllabus:-

Sr.No.	Details	Hrs
Module 01	**Corrosion:** • Nernst theory, Standard Electrode potential, Types of corrosion Dry or chemical corrosion wet or electrochemical corrosion, Electrochemical, Galvanice cell, Concentration cell, Intergranular Stress cell corrosion. Polarization, Over voltage, Factors affecting rate of corrosion. • Methods to decrease the rate of corrosion, Cathodic and Anodic Protection, Cathodic and Anoidic coatings. Advanced coatings and protection methods, Only constituents and their function of : (a) Paints (b) Varnishes (c) Lacquors (d) Enamels. • Metallic Coatings : Methods of coating and study only electroplating method. Corrosion Engineering of electronic and photonic devices.	**(8)**
Module 02	**Alloys :** • Alloys, Types of alloys, Alloys of Al, Cu and Pb. Their Composition properties and uses. Recent advances in alloy related materials. • Powder Metallurgy, Methods of metal powder formation, Metal Ceramic powders. Technology of Powder metallurgy, Applications of powder metallurgy.	**(6)**
Module 03	**Fuel :** • Definition, Classification, Characteristic properties of a good fuel. Calorific value, Cross and Net calorific value, Conversion. Peoximate and altimate analysis of fuels, Combustion calculators for requirement of oxygen and air for given solids, liquid gaseous fuel.	**(10)**

	• **Liquid fuels:** Crude Petroleum oil, classification. Separation and purification of Gasoline from crude oil. Thermal cracking Catalytic cracking. Fixed bed, moving method for obtaining gasoline. • Diesel, Bio diesel, methods to obtain bio diesel, production of ethanol using bio-mass. Production of hydrocarbons from plants, Knocking, Octane value, Cetane Value, antiknocking agents and their function recent technology for catalytic converter.	
Module 04	**Composite Materials :** • Introduction, Constitution, Characteristic properties classification. Particle, fiber, reinforced composites structural composites. • Application of composite materials.	**(5)**
Module 05	**Green Chemistry :** • Introduction, Goals Significance, Basic ideas in the field of green chemistry research with 3 examples. • Industrial applications of green chemistry.	**(5)**
Module 06	**Catalysis:** • Introduction, Importance of catalysts and adsorbents in industry, Activation energy and catalysts. • Molecular design for catalysts and adsorbents, Molecular design by nature-zeolites, zeotypes, pillard clays, Metal complexes and cluster, Oxide materials carbon materials, membrances.	**(6)**

Theory Examination :

1. Question paper will comprise of total 7 questions, each of 15 marks.
2. Only five questions need to be solved.
3. Question 1 will be compulsory and based on entire syllabus.
4. Remaining questions will be mixed in nature (for example suppose Q.2 has part (a) from module 3 then part (b) will be form any module other than module 3

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

Term work:

Term work shall consist of minimum five experiments and a written test.The distribution of marks for term work shall be as follows:

Laboratory Work (Experiments and jornal)	:	10 marks
test (at least one)	:	10 marks
Attendance (Practical and Theory)	:	05 marks
Total	**:**	**25 marks**

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

List of Expts:

1. Estimation of Cu iodometrically
2. Estimation of Zn complexometric titration.
3. Estimation of Ni complexometric titration.
4. Estimation of Al complexometric titration.
5. Calorific value of solid or liquid fuel using Bomb calorimeter.
6. Preparation of membranes for filter anyone. Demon.
7. CO2 from air by orsat method.
8. Estimation of Fe by gravimetric method.
9. Estimation of Ni by gravimetric method.
10. Estimation of Sn iodometrically
11. Estimation of iodometrically
12. Preparation of biodiesel from edible oil.
13. Synthesis of simple layered materials and their characterization.
14. Preparing simple composites and their characterization.

Recommended Books:

1. Engineering Chemistry – Jain & Jain, Dhanpat Rai
2. Basic Inorganic Chemistry, Cotlon, WileyIndia, 3rd edi.
3. Engineering Chemistry – Dara & Dara, S Chand
4. Materials Science & Engg. – William Callister,
5. Chemistry of advanced materials – CNR Rao, RSC Pbl
6. Membrane Filtration - Gutman, Adam Hilger Bristol.
7. Physical Metallurgy – B. K. Agarwal