

DEPARTMENT OF CHEMISTRY
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Course Title	Chemistry-II		
Course Code	CHIR 14(C)	No. of Credits	4
Course Code of Pre-requisite subject(s)	Nil		
Session	January 2018	Section (if, applicable)	NA
Name of Faculty	Dr. A. Sreekanth	Department	Chemistry
Email	sreekanth@nitt.edu	Telephone No.	0431-2503642
Course Type	<input type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<u>Electrochemistry</u> Conductivity of electrolytes - Specific, molar and equivalent conductivity, Nernst equation for electrode potential, EMF series, hydrogen electrode, calomel electrode, glass electrode, Electrolytic and galvanic cells, cell EMF, its measurement and applications, Weston standard cell, reversible and irreversible cells, concentration cell, electrode (hydrogen gas electrode) and electrolyte concentration cell, concentration cell with and without transference, fuel cells, hydrox fuel cell.			
<u>Corrosion</u> Dry corrosion and wet corrosion, mechanisms, types of corrosion, DMC, DAC, stress, inter granular, atmospheric and soil corrosion, Passivity, Polarization, over potential and its significance, Factors affecting corrosion, protection from corrosion by metallic coatings, electroplating, electroless plating and cathodic protection, Chemical conversion coatings and organic coatings- Paints, enamels.			
<u>Spectroscopic Techniques</u> Interaction of Electromagnetic radiation with matter- Born–Oppenheimer approximation, IR Spectroscopy- Instrumentation and Applications-Franck–Condon Principle – Electronic Spectra-Theory of electronic transitions – Instrumentation- Beers Law- Applications – Woodward-Fieser rules for acyclic dienes and unsaturated ketones – NMR Spectroscopy – Shielding and deshielding-Chemical shift-Applications -Atomic absorption and Atomic Emission Fundamentals			
<u>Metals and Alloys</u> Physical Properties of Metals-Theories of Bonding in metals – Free Electron theory – Valance bond theory – MO theory -Metallurgy – different processes involved in isolation and purification of metals from ores-thermodynamics of reduction processes – Isolation of Nickel, Chromium, Tungsten, Uranium, and Iron- Heat Treatment of Steel-Powder metallurgy-Alloy steels – Thermal Analysis-Thermogravimetry-Differential Thermal Analysis-Differential Scanning Calorimetry			
<u>Polymers and Composites</u> Concept of macromolecules-Nomenclature of polymers-Tacticity- Polymerization processes-			

Mechanism-Types of Polymerization-Classification of Polymers-Effect of Polymer structure on properties-Moulding of plastics into articles-Important addition and condensation polymers – synthesis and properties – Molecular mass determination of polymers- Static and dynamic methods, Light scattering and Gel Permeation Chromatography-Rubbers –Vulcanization – Synthetic rubbers – Conducting polymers, Composite materials – Reinforced composites and processing.

COURSE OBJECTIVES

To introduce the students the basic principles of electrochemistry, importance of corrosion, spectroscopic techniques, metals, alloys, polymers and composites.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
The students would become familiar with the following:	
1. Electrochemistry and its applications	
2. Causes, consequences and protection of corrosion	
3. Various spectroscopic techniques for the characterization of small molecules	
4. Isolation and purification of metals	
5. Different types of polymers	

COURSE PLAN – PART II

COURSE OVERVIEW

This course is offered to I year B.Tech. Chemical & MME students. This 4 credit course is a combination of theory (3 credit) and practical (1 credit). Three theory classes will be conducted per week and one lab class (3 h) will be conducted in alternate week.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	II week of Jan	<u>Unit-I</u> Conductivity of electrolytes, Nernst equation, EMF series	C&T
2	III week of Jan	Different types of electrodes & cells, cell EMF	C&T
3	IV week of Jan	Fuel cells, hydrox fuel cell	C&T
4	I week of Feb	<u>Unit-II</u> Different types and mechanisms of corrosion	C&T
5	II week of Feb	Passivity, polarization, over potential, factors affecting corrosion	C&T
6	III week of Feb	Protection from corrosion	C&T
7	IV week of Feb	<u>Unit-III</u> Spectroscopy, Born-Oppenheimer approximation, IR spectroscopy, instrumentation & applications, Franck-Condon principle	

8	I week of March	Electronic spectroscopy, theory, instrumentation, Beers law, Woodward-Fieser rules	C&T
9	II week of March	NMR spectroscopy, shielding & deshielding, chemical shift, applications, AAS & AES, fundamentals	C&T
10	III week of March	Unit-IV Metals, properties, theories, metallurgy, isolation & purification of metals, thermodynamics of reduction processes	C&T
11	IV week of March	Isolation of Ni, Cr, W, U & Fe, heat treatment of steel, powder metallurgy, alloy steel, Thermal analysis, TG, DTA, DSC.	C&T
12	I week of April	Unit-V Polymers, nomenclature, tacticity, polymerization processes, mechanisms, types of polymerization, classification	C&T
13	II week of April	Effect of structure on properties, moulding, important polymers, synthesis & properties	C&T
14	III week of April	Molecular mass determination, rubbers, vulcanization, synthetic rubbers, conducting polymers, composites, reinforced composites	C&T

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Test 1	II week of Feb	50 min	15
2	Group activity/Assignment	II week of March	1 week	05
3	Test 2	II week of April	50 min	15
4	Lab	Throughout the semester	7 lab classes	25
CPA	Compensation Assessment*	III week of April	50 min	
5	Final Assessment *	IV week of April / I week of May	3 h	40

*mandatory; refer to guidelines on page 4

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

1. Feedback from students during class committee meetings.
2. Anonymous feedback through questionnaire at the end of the semester.

COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, , academic honesty and plagiarism etc.)

MODE OF CORRESPONDENCE (e-mail/phone etc): Through mobile phone

ATTENDANCE: 75% attendance is compulsory for both theory and lab components. Those who have <75% attendance (as on 19th April 2018) have to attend additional evening hour classes during the III week of April 2018 to become eligible to appear for Final assessment.

COMPENSATION ASSESSMENT: For those who missed Test I and Test II due to genuine reasons, retest will be conducted during the III week of April 2018.

ACADEMIC HONESTY & PLAGIARISM: Those who found to be involved in any malpractice during any assessment will be awarded zero mark in that particular assessment.

ADDITIONAL INFORMATION

Lab:

- a) Each experiment will be evaluated for 5 marks.
- b) There will be no final assessment for practical.
- c) One extra class will be conducted for those who missed any experiment due to ill health or OD reasons.

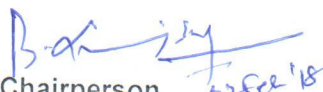
General:

The faculty will be available for consultation at times as per the intimation by the faculty.

FOR APPROVAL


2/2/2018

Course Faculty _____
Dr. A. Sreekanth


6/2/2018
CC-Chairperson _____
B. RANJAN


15/2/18
HOD _____