

Department of Chemistry

Mech - A

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN (For Mechanical A)			
Course Title	Chemistry II		
Course Code	CHIR 12(B) CHEMISTRY - II	No. of Credits	4 (Theory - 3 + Lab - 1)
Department	Chemistry - II	Faculty	Dr. S. ANANDAN
Pre-requisites Course Code	NIL		
Lab Course Coordinator(s) (if, applicable)	Dr. S. VELMATHI		
E-mail	sanand@nitt.edu velmathis@nitt.edu	Mobile No.	+91-9444052074
Course Type	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		
COURSE OVERVIEW			
<p>This is a four credit course offered to I year B.Tech Civil, Mechanical and Production students. This course is a combination of theory (3 credit) and practicals (1 credit). Three theory classes will be conducted per week and one lab session (3 h) will be held during alternate week. This course provides a thorough understanding of the subject through lectures, tutorials, course work and demonstrations.</p>			
COURSE OBJECTIVE			
<p>To introduce the basic principles, importance and applications of Electrochemistry, Corrosion, Surface Chemistry, Engineering Materials and Polymers and Composites to the I year B.Tech. (Civil, Mechanical &amp; Production) students.</p>			
COURSE OUTCOMES (CO)			
<p>Students would become familiar with the</p> <ul style="list-style-type: none"> <li>✓ fundamentals of electrochemistry, its significance and applications.</li> <li>✓ mechanism and types of corrosion, factors affecting corrosion and methods of protection.</li> <li>✓ different types of adsorption and isotherms, phase rule and alloys</li> <li>✓ engineering materials – abrasives, refractories and cement.</li> <li>✓ Concept of macromolecules</li> </ul>			

COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week	Topic	Mode of Delivery
1	III week of January	A brief introduction about the course and syllabus will be discussed. <b>Unit-I</b> Conductivity of electrolytes, specific, molar and equivalent conductivity, Nernst equation, EMF series	C&T, PPT
2	IV week of January	Hydrogen, calomel & glass electrodes, electrolytic & Galvanic cells, cell EMF (measurement & applications)	C&T, PPT
3	I week of February	Weston standard cell, reversible and irreversible cells, concentration cell, electrode and electrolyte concentration cell.	C&T, PPT
4	II week of February	<b>Unit-II</b> Dry & wet corrosion, mechanisms, types of corrosion (DMC, DAC, stress, intergranular, atmospheric and soil)	C&T, PPT
5	III week of February	Passivity, polarization, over potential and its significance, factors affecting corrosion, protection from corrosion	C&T, PPT
6	IV week of February	Electroplating, electrolessplating, cathodic protection, chemical conversion and organic coatings	C&T, PPT
7	I week of March	<b>Unit-III</b> Adsorption types, adsorption of gases on solids, adsorption isotherms, Freundlich and Langmuir isotherms. Adsorption of solutes from solutions, role of adsorbents, activated carbon in pollution abatement of air and waste water.	C&T, PPT
8	II week of March	Phase rule: Statement and explanation of the terms involved, one component water system, condensed phase rule, construction of phase diagram by thermal analysis.	C&T, PPT
9	III week of March	Simple eutectic systems (Pb - Ag system only). Alloys – importance, ferrous alloys – nichrome, and stainless steel, nonferrous alloys – brass and bronze – heat treatment of alloys.	C&T, PPT
10	IV week of March	<b>Unit-IV</b> Abrasives – Moh's scale of hardness – natural abrasives (diamond, corundum, emery, garnets and quartz) and synthetic abrasives (silicon carbide, boron carbide)	C&T, PPT
11	I week of April	Refractories – characteristics, classification (acidic, basic and neutral refractories) – properties (refractoriness, refractoriness under load,	C&T, PPT

		dimensional stability, porosity, thermal spalling) – manufacture of alumina magnesite and zirconia bricks.		
12	II week of April	Cement - Important Parameters for Manufacturing Cement Clinkers. Chemical Constituents and Composition of Cement. Methods of Manufacture of Cement - Wet and Dry Processes. Additives for Cement. Properties of Cement - Setting and Hardening. Types of Portland cement.	C&T, PPT	
13	III week of April	<b>Unit-V</b> Polymers, nomenclature, tacticity, polymerization processes, mechanisms, types of polymerization, classification	C&T, PPT	
14	IV week of April	Effect of structure on properties, moulding, important polymers, synthesis & properties	C&T, PPT	
15	I week of May	Molecular mass determination, Synthesis & applications of some commercially important polymers, conducting polymers. Composite materials – Reinforced composites and processing	C&T, PPT	
<b>COURSE ASSESSMENT METHODS</b>				
<b>S.No.</b>	<b>Mode of Assessment</b>	<b>Week/Date</b>	<b>Duration</b>	<b>% Weightage</b>
<b>Theory</b>				
1	Group Task (Quiz/working model)/Assignment/Surprise test	I week of Feb	50 minutes	5
2	Test I	III week of Feb	60 minutes	20
3	Group Task (Quiz/working model)/Assignment/Surprise test	III week of March	50 minutes	5
4	Test II	III week of March	60 minutes	20
5	End semester	II week of May	3 hours	50
<b>Practical</b>				
6	Regular class experiments	All practical classes	3 hours per experiment	25
<b>Theory (75) + Practical (25) = Total (100)</b>				
<b>ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc</b>				
<b>Text Books</b>				
1. P. C. Jain & M. Jain, 'Engineering Chemistry', Dhanpat Rai Publishing Company, New Delhi, 2005.				
2. B.R. Puri, L.R. Sharma, M.S. Pathania, 'Principles of Physical Chemistry', Vishal Publishing Company, 2008.				
<b>Reference Books</b>				
1. F.W. Billmeyer. 'Textbook of Polymer Science', 3rd Edn, Wiley. N.Y. 1991.				

2. S. S. Dara, S. S. Umare, 'A Text Book of Engineering Chemistry', S. Chand Publishing, 2011

**COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)**

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

**COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)**

1. Test I and II will be conducted during assessment period II and IV respectively.
2. Each lab experiment will be evaluated for 5 marks.
4. There will be no final assessment for practical.
5. One extra class will be conducted for those who missed any experiment due to ill health or any other genuine reasons.
6. Retest will be conducted for students who do not appear for the test I & II due to ill health or any other genuine reasons.
7. 75% attendance is compulsory for writing the end semester exam.
8. No formative assessment only Redo if students are absent for examination.

**ADDITIONAL COURSE INFORMATION**

The faculty will be available for consultation at times as per the intimation by the faculty. Students can get prior permission either through email: sanand@nitt.edu or mobile no.: +91-9444052074

Faculty-in-charge  12/1/17 CC-Chairperson  18/1/17 HOD  12/1/17