

No	Course Information for Engineering Chemistry	
1	Unit name:	Engineering Chemistry I
2	Code:	E.Ch-11011, E.Ch-12011
3	Classification:	Supporting Subject
4	Credit value:	4.5
5	Semester/Year Offered:	1
6	Pre-erquisite:	E.Ch-11011, E.Ch-12011 ,Engineering Chemistry I,II
7	Mode of delivery:	Lecture, Tutorial, Practical
8	Assessment system and breakdown of marks:	
	Test (Tutorial)	15%
	Practical	15%
	Mid-term & final Examination	70%
9	Academic staff teaching unit:	Engineering Chemistry
10	<p>Course outcome of unit:</p> <p>In this course, students will be able</p> <ol style="list-style-type: none"> 1 ♦ To indicate atomic structure , <ul style="list-style-type: none"> ♦ To write orbitals , quantum mechanical model, & electronic configuration of the atom ♦ To demonstrate and identify molecular structures by using lewis and VSEPR theory. 2 ♦ To interpret and solve principle of chemical equilibrium involving equilibrium constants (K , K_c & K_p) and reaction quotient (Q_c) , <ul style="list-style-type: none"> ♦ To relate altering equilibrium conditions by using Le Chatelier's principle. 3 ♦ To explain and classify seven broad categories of engineering materials including characteristics, properties , processing routes and applications in construction and manufacturing of equipment tools. 4 ♦ To distinguish the extraction , isolation , purification , and utilization of metals from their ores by metallurgical field especially for Zinc, Iron & Steel , Copper , Aluminium and Silver. 5 ♦ To apply VSEPR Theory and build the molecular model using a model building kit. <ul style="list-style-type: none"> ♦ To practice the effect of an applied stress an chemical systems at equilibrium. ♦ To apply the method for preparation of the glue from skimmed milk powder. ♦ To identify the different types of basic radicals of an inorganic salt. 6 ♦ To interpret and demonstrate mechanism of corrosion , <ul style="list-style-type: none"> ♦ To classify type of corrosion , ♦ To recognize the rate of corrosion and preventive methods. 7 ♦ To describe and classify the separating of chemical species such that external circuit , electrochemical effects can be measured 	

	<p>◆To recognize and concept of applied in electrochemistry including batteries.</p> <p>8 ◆To demonstrate & apply about true solutions & different modes of expressing the concentrations of chemical solutions with different units ,</p> <p>◆To estimate & summarize water technology by RWH , hardness , softening methods & bad effects of hard water in boilers and</p> <p>◆To classify & illustrate solid state with type of packaging .</p> <p>9 ◆To identify & measure the type of polymer ,</p> <p>◆To classify polymer & polymerization according to their occurrence , structure & mode of basis</p> <p>◆To distinguish preparing plastics on the basic of manufacturing conditions.</p> <p>10 ◆To Demonstrate the Corrosion of iron and Investigate Conditions related to Corrosion</p> <p>◆To Apply the Nernst Equation to Determine Cell Potentials at Nonstandard Conditions</p> <p>◆To Determine the Amount of Total Hardness present in the given Sample of Water</p> <p>◆ To Investigate the Preparation of Urea Formaldehyde Resin</p>
11	<p>The course introduce the basics principles of atomic and molecular structure, chemical equilibrium, significant of chemistry of engineering materials, importance of metals and their application.</p>
12	<p>Topic:</p> <p>1 Atomic and Molecular Structure</p> <p>1.1 Atomic Structure</p> <p>1.2 Nature of light and electromagnetic waves</p> <p>1.3 Quantum mechanical model of the atom</p> <p>1.4 Orbitals and quantum numbers</p> <p>1.5 Electronic configuration of atoms</p> <p>1.6 Writing Lewis structures</p> <p>1.7 The Structure of molecules</p> <p>2 Principle of Chemical Equilibrium</p> <p>2.1 Dynamic equilibrium</p> <p>2.2 The equilibrium constant expression</p> <p>2.3 Relationships involving equilibrium constants</p> <p>2.4 The Reaction Quotient</p> <p>2.5 Altering equilibrium conditions</p> <p>2.6 Equilibrium calculation :Some Illustrative examples</p> <p>3 Chemistry of engineering materials</p> <p>3.1 Introduction</p>

3.2 Refractories

3.3 Abrasives

3.4 Adhesives

3.5 Lubricants

3.6 Ceramics

3.7 Composites

4 Metals and their application

4.1 Introduction

4.2 Metallurgy

4.3 Zinc

4.4 Iron and steel

4.5 Copper

4.6 Aluminium

4.7 Silver

5 Corrosion and its prevention

5.1 Introduction

5.2 Corrosion

5.3 Mechanism of dry and wet Corrosion

5.4 Type of corrosion

5.5 Factors affecting the rate of corrosion

5.6 Preventive measures of corrosion

6 Electrochemistry

6.1 Introduction

6.2 Electrochemical cell

6.3 Differences between a voltaic cell and electrolytic cell

6.4 A Daniel cell

6.5 Cell potentials

6.6 Electromotive force

6.7 E_{cell} as a function of concentrations

6.8 Batteries

7 Solutions, Technology of Water and Solid State

7.1 Solutions

7.2 Technology of water

7.3 Solid State

8 Polymers and polymerization

8.1 Introduction

8.2 Classification of polymer and polymerization

8.3 Classification of Plastics	
14	<p>Main references:</p> <ol style="list-style-type: none"> 1. O G Palanna (PhD); Engineering Chemistry; First reprint 2011, Tata McGraw Education Private Limited, New Delhi. 2. Dr. B.K. Ambasta; Chemistry for Engineering(For B.E./B.Tech.I and II Semesters)4th Edition, © 2010 by Laxmi Publication Pvt. Ltd., New Delhi(India) 3. S.C.Bhatia; Engineering Chemistry; 1st Edition 2001, CBS Publisher & Disbutors Pvt. Ltd.,New Delhi(India) 4. Lucio Gelimini; Robert W. Hiltz; Robert K Wismer; General Chemistry (Principles and Modern Applications); 8 th Edition, © 2002 by Prentice Hall, Inc., Petrucci, Harwood, Herring Printed in the United Stats of America 5. Dr. Vedavalli Sivaprakasam; Engineering Chemistry;A Textbook for first Year B.E./B.Tech.Engineering Students Laxmi Publications,(P) LTD, New Delhi,USA. 6. N.Krishanmurthy; P.Vallinayagam; D. Madhavan; Engineering Chemistry; Eastern Economy Edition, ©2007 by Prentice Hall of India Private Limited, New Delhi.
15	<p>Additional references:</p> <p>-</p>

Prepared by

Approved

by.....