

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE -I Year (Common to all branches) Semester- 1 or 2			
Subject Code & Name	Instructions Hours per Week			Credits			
ACR1C2: Applied Chemistry & Environmental Science	L	T	P	L	T	P	Total
	3	1	2	3	1	1	5
Duration of Theory Paper: 3 Hours							

Learning Objectives:

- To learn chemistry of various engineering materials and processes, their importance, properties, testing, structure-property relationship, tailoring and their applications in various technologies.
- To understand and aware with various environmental issues and pollution and control studies in modern society for sustainable development.

Prerequisite: Nil

COURSE OF CONTENTS

UNIT-I WATER AND ITS APPLICATIONS

Sources, impurities, applications, Hardness- its expression and determination; Boiler troubles and their causes; Industrial water requirement, Treatment of water for industrial purpose; De-ionization of water; Analysis of water; Water quality parameters, Numerical problems on water analysis and water treatment processes.

UNIT-II ENGINEERING MATERIALS AND TESTING

Introduction, classification and requirement of engineering materials. Material testings.

Polymers: Chemistry of polymer materials and their diversification; Types of polymerization and their brief account; Examples of polymers.

Cement, Glass and Refractories: Different types, composition, properties and uses.

UNIT-III LUBRICANTS

Introduction, Principle and functions of lubrication, Types of lubricants, Properties, tests and applications of solid, semi-solid and liquid lubricants; Synthetic lubricants and lubricating emulsions.

UNIT-IV INSTRUMENTAL TECHNIQUES IN MATERIAL CHARACTERIZATION

Classification, Lamberts and Beers Law; Introduction, Principle and applications of Colorimetry, IR, UV-Vis, NMR and Mass spectroscopy; Chromatographic Techniques and applications, Numerical Problems on spectroscopic techniques.

UNIT-V ENVIRONMENTAL SCIENCE

Components of Environment and their interactions, Natural resources, Ecosystem, Impacts of development of environment, Environment protection act, EIA, Sustainable development.

Pollution and its types, Description, effects and control measures of Air, Water, Land and Noise pollution, Chemical toxicology, Global warming, Depletion of ozone layer, Acid rains, Eutrophication, Rain water harvesting, Pollution case studies.

Learning Outcomes:

Upon completing the course, students will be able to:

- Apply applications of various engineering materials in different technologies.
- Relate structure-property-uses relationship of engineering materials and tailoring of materials for technology development.
- Use of material testing and material characterization required in different engineering applications.
- Understand the components of Environment and their interactions with modern world. Also to analyse factors affecting, causes of Environmental Pollution and to apply possible control measures for Sustainable development.

BOOKS RECOMMENDED:

- [1] Jain & Jain, Engineering Chemistry, DhanpatRai Publications, 2007.
- [2] S. S. Dara, A Text Book of Engineering Chemistry, S. Chand & Company, 2007.
- [3] B. Joseph, Environmental Studies, Tata McGraw Hill.
- [4] A.K. De, Environmental Chemistry, New Age International, 1996.
- [5] ShashiChawala, A Text Book of Engineering Chemistry, DhanpatRai Publications, 2006.