

NIRMA UNIVERSITY

Institute:	Institute of International Studies
Name of Programme:	Bachelor of Science (CSE) 2+2 Dual Degree
Course Code:	XXXXXX <u>ISP101</u>
Course Title:	Chemistry
Course Type:	Core
Year of introduction:	2022-2023

L	T	Practical component				C
		LPW	PW	W	S	
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Course Learning Outcomes (CLOs):

At the end of the course, students will be able to –

1. relate the fundamentals and their application in various field of engineering
2. select appropriate method of analysis and interpret its result
3. identify and apply the principles of green chemistry in improving the existing technology
4. classify the materials on the basis of their properties.

Syllabus:

Total Teaching hours: 30

Unit	Final Version of Syllabus	Teaching hours
Unit I	Water and its Treatment: Introduction, Sources of water impurities, Hardness of water, Softening of water, Desalination processes, Introduction to Waste-water treatments, Specifications for drinking water (BIS standards)	07
Unit II	Fuel: Calorific Value, Types of fuel, Selection of fuels, Analysis of coal:- Proximate and ultimate analysis, Flue gases: Orsat apparatus, Alternative fuels, Green hydrogen	05
Unit III	Lubricants: Introduction, Classification and functions of lubricants, Mechanisms of Lubrication, Properties:- Lubricating oil and Greases, Selection of lubricants	04
Unit IV	Corrosion Science: Introduction, Types of corrosion, Mechanism of corrosion, Factors Affecting Corrosion, Corrosion control and Preventions	05
Unit V	Green Chemistry: Overview, Set of Principles of Green Chemistry, Importance and application of Green Synthesis	04
Unit VI	Engineering Materials: High Temperature Polymers, Conducting Polymers, Foamed Plastics, Organic Electronic Materials, Explosives:- Introduction, Classification, Characteristics, Disarmament, Weapons of Mass Destruction (WMD), Peaceful uses of explosives, Fuel cells and Batteries	05

Self-Study:

Self-study contents will be declared at the commencement of the semester. Around 10 % of the questions will be asked from the self-study contents.

Laboratory Works:

Laboratory work will be based on above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings/ References:

1. P.C. Jain and Monika Jain, Textbook of Engineering Chemistry, Dhanpat Rai Publishing Co.
2. Shashi Chawla, Textbook of Engineering Chemistry, Dhanpat Rai Publishing Co.
3. S.S. Dara, Textbook of Engineering Chemistry, S. Chand and Company.
4. Mike Lancaster, Green Chemistry: An Introductory Text, Royal Society of Chemistry.
5. J.C. Kuriacose and J. Rajaram, Chemistry in Engineering and Technology, Tata Mc Graw Hill.
6. Prasanta Rath, Engineering Chemistry, Cengage Learning.
7. Sunita Rattan, A Textbook of Engineering Chemistry, S.K. Kataria & Sons.
8. O.G. Palanna, Engineering Chemistry, Tata Mc Graw Hill.

Chemistry
Suggested List of Practical

Sr.	Practical	Hours
1	Determine the amount of Fe^{2+} ions in $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ in the given sample by using 0.05N KMnO_4	2
2	Estimation of temporary, permanent, and total hardness of water sample	2
3	Determination of strength of Na_2CO_3 and NaHCO_3 in water sample by using standard HCl solution	2
4	Determination of moisture content in coal sample	2
5	Preparation of Urea-formaldehyde resin	2
6	pH metric titration of strong acid with strong base	2
7	Conductometric titration of strong acid and strong base	2
8	Determination of penetration index of lubricating grease	2
9	Determination of viscosity of lubricating oil by Redwood viscometer	2
10	Determination of the flash point and fire point of a lubricant or fuel	2
11	Determination of aniline point of an oil sample	2
12	Determination of the cloud point and pour point of a lubricant	2
13	Determination of the saponification number of an oil	2
14	Virtual Lab: Determination of hardness of various water samples	2
15	Virtual Lab: Determination of alkalinity of various water samples	2