



RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
OUTCOME BASED CURRICULUM

NAME OF THE PROGRAMME: ELECT, E&TC, EEE, ELECT&INST, OPTO-ELECT., CIVIL, CTM, REF&PETROCHEMICAL, PLASTIC, PRINTING, AND TEXT TECH

Name of Scheme : OCBC-2019
COURSE TITLE : CHEMISTRY

COURSE CODE :6803
SEMESTER-I

	Course outcomes	Mapping with POs
CO103.1	Illustrate and summarize the structure and properties of matter and phenomenon involved in engineering.	PO1, PO7
CO103.2	Classify, compare and infer some essential engineering materials.	PO1, PO2, PO3
CO103.3	Describe and interpret industrial processes	PO1, PO2, PO3
CO103.4	Analyze the contents of essential raw materials utilized in industrial procedures	PO2, PO3
CO103.5	Provide the required prerequisite knowledge to understand technical subjects.	PO1, PO2, PO4

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PEO1	PEO2
CO103.1	3	1		1	1	1	2		
CO103.2	1	3	2	3	1	2	2		
CO103.3	3	2	1	2	2	2	2		
CO103.4	2	1	2	2	2	1	2		
CO103.5	3	1	1	1	2	1	2		
CO-PO MAPPING FOR PRACTICALS									
CO103.1	2	2	1	3	2	1	2		
CO103.2	2	2	1	3	2	1	2		
CO103.3	2	2	1	3	2	1	2		
CO103.4	2	2	1	3	2	1	2		
CO103.5	2	2	1	3	2	1	2		

COURSE CONTENTS

UNIT	TOPIC	CONTENTS	Mapped CO'S
1	ATOMIC STRUCTURE AND CHEMICAL BONDING	Elementary idea of fundamental particles of atom –their mass, charge, location. Rutherford's and Bohr's model of an atom. Bohr-Bury scheme of filling the electrons in various orbits. Idea of s, p, d, f orbital. Hund's rule and filling of orbitals by Aufbau principle. (atomic no upto 30) Pauli's exclusion principle.. Alpha, Gamma and Beta rays, theory of radio activity, Group displacement law, half life period, fission and fusion. Bonding:	CO103.1, CO103.5



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		Nature of bonds- Electrovalent, Co-valent, coordinate and hydrogen bond.	
2	THEORIES OF IONISATION, ELECTROCHEMISTRY, FUEL CELLS. WATER	Arrhenius theory of ionization, factors affecting ionization. pH meaning (numerical), Buffer solutions and Buffer actions, choice of indicators (acidimetry and alkalimetry). Electrolytes and non-electrolytes, Electrolysis, Electrolytic cell, Electrodes. Mechanism of electrolysis, Electrochemical series. General idea of fuel cells and its application. Solar cells and panels. Faraday's laws of electrolysis, Numerical problems on Faradays Law, Applications of electrolysis-electroplating, Electro refining. Sources of water, types of water, hardness of water, its causes, types and removal, Boiler feed water, harmful – effects of hard water in boiler. Determination of hardness of water by O. Hehner's method, EDTA and soap solution method.	CO103.2, CO103.3, CO103.5
3	METALS AND ALLOYS, CORROSION	Physical and chemical properties of metals, copper, iron, aluminum. General principal of metallurgy, minerals/ ores, ore dressing, roasting, smelting, bassemmerisation, fluxes, purification. Explanation of alloying purposes, composition and uses of alloy like brass, bronze, duralium, German silver, gun metal, solder, stainless steel, casting and bearing alloys. Corrosion, types of corrosion, factors effecting corrosion, corrosion control (protection against corrosion), metal and organic coating for corrosion control.	CO103.2, CO103.3, CO103.5



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4	ENGINEERING MATERIALS	<p>Glass: Basic raw materials and composition of glass, varieties of glass and annealing of glass.</p> <p>Cement : Constituting compounds in cement, Composition of Portland Cement, its manufacture, setting and hardening of cement.</p> <p>Refractories : Meaning, characteristics , use of common refractory materials.</p> <p>Lubricants: Meaning , type and theory of lubricants, properties of a good lubricants, Flash and fire point and cloud point, emulsification number, viscosity.</p> <p>Nano materias: Introduction and applications</p>	CO103.2, CO103.3, CO103.4 CO103.5
5	NON METALLIC COMPOUNDS AND FUELS	<p>Polymerization and condensation, classification of plastics, Compounding and Moulding constituents of plastics. Preparation Properties and uses of PVC, polyethene, polystyrene, polyamides, polyesters , Bakelite. Synthetic fibers – nylon, rayon, decron, and polyesters.</p> <p>Definition ,characteristics , classification and properties of insulators. Glass, wool and thermocole. Idea about rubber and vulcanization. Classification of fuel, gross and net calorific value, Determination of a solid fuel by bomb calorimeter , octane and cetane number. Proximate analysis of fuel, its utility, crude petroleum, products of fractional distillation. Fire extinguishers – Description and use.</p>	CO103.2, CO103.3, CO103.4 CO103.5

SUGGESTED SPECIFICATION FOR QUESTION PAPER DESIGN

UNIT NO	TITLE	TEACHING HRS	TENTATIVE DISTRIBUTION OF MARKS			
			R LEVEL	U LEVEL	A LEVEL	TOTAL
1	ATOMIC STRUCTURE AND CHEMICAL BONDING	18	02	08	04	14
2	THEORIES OF IONISATION, ELECTROCHEMISTRY , FUEL CELLS. WATER	18	04	04	06	14



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3	METALS AND ALLOYS , CORROSION	18	06	06	02	14
4	ENGINEERING MATERIALS	18	02	08	04	14
5	NON METALLIC COMPOUNDS AND FUELS	18	02	08	04	14

LIST OF EXPERIMENTS

S.NO.	NAME OF THE EXPERIMENT	CO
1	To identify one Anion and Cation in a given sample solution (atleast 5 samples)	CO 103.1, CO 103.4, CO 103.5
2	Determination of flash point and fire point of a given sample of oil by any apparatus	CO 103.4, CO 103.5
3	Determination of viscosity by Red Wood Viscometer no. 1 or no.2.	CO 103.4, CO 103.5
4	Volumetric Analysis: Acid base titration Determination of strength of ferrous ammonium sulphate.	CO 103.1, CO 103.4, CO 103.5
5	Determination of hardness of water by any two methods: (i)EDTA Method (ii)Soap Solution Method. (iii)Determination of hardness of water by O. Hehner's method.	CO 103.1, CO 103.4, CO 103.5
6	Determination of solid content in the given sample of water.	CO 103.1, CO 103.4, CO 103.5
7	Determination of percentage of moisture in the given sample of coal by proximate analysis	CO 103.1, CO 103.4, CO 103.5

SUGGESTED TOPICS FOR SURVEY/ASSIGNMENT

1. List of commercially available (different brands) lubricants and their use in different areas
2. Protective coatings- survey of commercially available coating materials
3. Survey of different brands of cements . Compare the setting time and strength.
4. Survey the different types of plastics with pictures and sample materials.
5. Survey of fibres . Compare the appearance and properties.



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6. List out the raw materials and their sources used by the cement industries in Madhya Pradesh
7. List out some useful metals in electrical industry and their properties.
8. Classify and compare chemical cells and on the basis of their working .
9. list the manufacturing units of paints and the raw materials used.
10. Tabulate the description of at least ten elements with the following information-name, electronic configuration, who discovered, where is it found and uses and industrial applications

REFERENCES

PHYSICAL CHEMISTRY

BAHL AND TULI

APPLIED CHEMISTRY

DR. G. C. SAXENA, DEEPAK PRAKASHAN, GWALIOR

INORGANIC CHEMISTRY

SATYAPRAKASH

APPLIED CHEMISTRY

SHRIVASTAVA & SINGHAL, PBS PUBLICATION, BHOPAL

MODERN TEXT BOOK OF APPLIED CHEMISTRY

DR. G. C. SAXENA, JAIN PRAKASHAN, INDORE

ENGINEERING CHEMISTRY

UPPAL

ENGINEERING CHEMISTRY

RAO AND AGARWAL

ENGINEERING CHEMISTRY

P.C. JAIN

POLYMER CHEMISTRY

O.P. MISHRA

पोली० रसायन विज्ञान – डा० शर्मिला जैन

प्रायोगिक रसायन विज्ञान – डा० शर्मिला जैन

NANOTECHNOLOGY: FUNDAMENTALS AND APPLICATIONS -MANASI KARKARE

PRINCIPLES OF NANOSCIENCE AND NANOTECHNOLOGY: M.A.SHAH

INTRODUCTION OF NANOTECHNOLOGY: CHARLES P.POALE &FRANK J. OWENS