

परीक्षा नियंत्रण प्रकोष्ठ, जबलपुर इंजीनियरिंग महाविद्यालय, जबलपुर (म.प्र.)

क्रमांक/प.नि.प्र./2024/2682

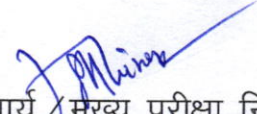
जबलपुर, दिनांक 18/10/2024

सूचना

महाविद्यालय में अध्ययनरत B.Tech. (AICTE) / B.Tech. (PTDC) [AICTE] [Regular/Ex.] विद्यार्थियों को सूचित किया जाता है कि वे नवम्बर 2024 की परीक्षा एवं आगामी सत्र की परीक्षाओं में सम्मिलित होने से पूर्व अपने पेपर/विषय का Equivalence Syllabus महाविद्यालय के पोर्टल से Download कर प्राप्त कर सकते हैं अथवा महाविद्यालय के परीक्षा नियंत्रण प्रकोष्ठ में संपर्क कर सकते हैं। नवम्बर 2024 परीक्षा एवं आगामी सत्र की परीक्षा में उन्हें अपने पेपर/विषय में Equivalence Syllabus में ही सम्मिलित होना है। अतः Equivalence Syllabus की जानकारी न होने की दशा में सम्पूर्ण जिम्मेदारी स्वयं छात्र/छात्राओं की होगी।

Equivalence Syllabus हेतु निम्नानुसार Link का उपयोग कर सकते हैं:-


https://www.jecjabalpur.ac.in/UploadContent/frm_ViewScheme.aspx


प्राचार्य/मुख्य परीक्षा नियंत्रक
जबलपुर इंजीनियरिंग महाविद्यालय
जबलपुर

पृ.क्रमांक/प.नि.प्र./2024/
प्रतिलिपि:-


जबलपुर, दिनांक /10/2024

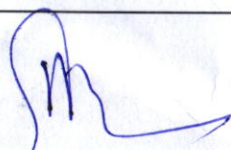
01. समस्त विभागाध्यक्ष, जबलपुर इंजीनियरिंग महाविद्यालय, जबलपुर।
02. पीटीडीसी कार्यालय, जबलपुर इंजीनियरिंग महाविद्यालय, जबलपुर।

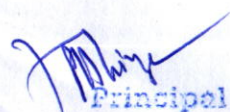

प्राचार्य/मुख्य परीक्षा नियंत्रक
जबलपुर इंजीनियरिंग महाविद्यालय
जबलपुर


**EQUIVALENCE OF SUBJECTS OF DIFFERENT SCHEMES OF UNDER GRADUATE COURSES (B.Tech.)
OF Applied Chemistry**

S.No.	Schemes	Subject Code & Subject Name (Semester) Having Equivalence in Syllabus	Final Subject code & subject (after equivalence)
1	AICTE	BT101 Engineering Chemistry B.Tech. I / II Sem.	BT11 Engineering Chemistry B.Tech. I / II Sem.
	Scheme 2023	BT11 Engineering Chemistry B.Tech. I / II Sem.	
2	AICTE	CH302 Energy & Environmental Engineering B.Tech. III Sem.	CH32 Energy & Environmental Engineering B.Tech. III Sem.
	Scheme 2023	CH32 Energy & Environmental Engineering B.Tech. III Sem.	


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(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) I/II Semester
Branch- Common to All Disciplines
COURSE CONTENTS

w.e.f. July 2023

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
BT11	Engineering Chemistry						150	L	T	P	4
		End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work					
		70	20	10	30	20		3	-	2	

Course Contents:

Module -1 Water – Analysis, Treatments, Boiler problem & softening methods

Sources, Impurities, Hardness & its units, Determination of hardness by EDTA method, Alkalinity & It's determination and related numerical problems. Boiler troubles (Sludge & Scale, Priming & Foaming, Boiler Corrosion, Caustic Embrittlement), Softening methods (Lime-Soda, Zeolite and Ion Exchange Methods) and related numerical problems.

Module -2 Fuels & Combustion

Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter. Proximate and Ultimate analysis of coal and their significance, calorific value. Carbonization, Manufacturing of coke. Cracking of higher Hydrocarbons & mechanism of cracking, Knocking, relationship between knocking & Structure of hydrocarbon, improvement of anti-knocking. Characteristics of IC engine fuels & Diesel engine fuels, Octane number, Cetane number, combustion and its related numerical problems. Gaseous and bio fuels.

Module -3 Lubricants and Lubrication

Introduction, Mechanism of lubrication, Classification of lubricants, significance & determination of Viscosity and Viscosity Index, Flash & Fire Points, Cloud & Pour Points, Iodine Value, Aniline Point, Acid Number, Saponification Number, Steam Emulsification Number and related numerical problems. Solid lubricants, Semi-solid lubricants.

Module -4 Polymer & Polymerization

Introduction, types of polymerisation, Classification, mechanism of polymerisation (Free radical & Ionic polymerization). Thermoplastic & Thermosetting polymers, Elementary idea of Biodegradable polymers, preparation, properties & uses of the following polymers- PVC, PMMA, Teflon, Nylon 6, Nylon 6:6, Polyester Phenol formaldehyde, Urea- Formaldehyde, Buna N, Buna S, Vulcanization of Rubber.

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Module -5 Spectroscopic and Chromatographic techniques

Principle, Instrumentation & Applications, Electronic spectroscopy, Vibrational & Rotational spectroscopy. Gas chromatography and its applications.

Cement and Refractories:

Classification of Cements, Manufacture of Portland cement. Chemical composition and ISI specifications, Setting and Hardening. Decay of Cement, Gypsum, Plaster of Paris, Concrete & RCC. Definition, Classification & Properties of Refractory materials. Properties & uses of Silica bricks, Fire clay, Carborundum & Dolomite.

Practical List

NOTE: At least 8 of the following core experiments must be performed during the session.

1. Water testing

(i) Determination of Total hardness by Complexometric titration method.

(ii) Determination of mixed alkalinity

(a) OH^- & CO_3^{2-} (b) CO_3^{2-} & HCO_3^-

(iii) Chloride ion estimation by Argentometric method.

2. Fuels & Lubricant testing:

(i) Flash & fire points determination by

a) Pensky Martin Apparatus,

b) Abel's Apparatus

c) Cleveland's open cup Apparatus

d) Calorific value by bomb calorimeter.

(ii) Viscosity and Viscosity index determination by

a) Redwood viscometer No.1

b) Redwood viscometer No.2

(iii) Proximate analysis of coal

a) Moisture content

b) Ash content

c) Volatile matter content

d) Carbon residue

(iv) Steam emulsification No & Aniline point determination

(v) Cloud and Pour point determination of lubricating oil

3. Alloy Analysis

(i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.

(ii) Determination of Cu and or Cr in alloys by Iodometric Titration.

(iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.

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Reference Books :

1. Chemistry in Engineering and Technology - Vol.1 &2 Kuriacose and Rajaram , McGraw Hill Education
2. Fundamental of Molecular Spectroscopy C.N. Banwell , McGraw Hill Education
3. Engineering Chemistry – B.K. Sharma, Krishna Prakashan Media (P) Ltd., Meerut.
4. Basics of Engineering Chemistry – S.S. Dara & A.K. Singh, S. Chand & Company Ltd., Delhi.
5. Applied Chemistry – Theory and Practice, O.P. Viramani, A.K. Narula, New Age International Pvt. Ltd. Publishers, New Delhi.
6. Elementary Spectroscopy ,Y .R. Sharma , S. Chand Publishing
7. Polymer Science, Vasant R. Gowariker, N. V. Viswanathan, Jayadev Sreedhar, New Age International Pvt. Ltd
8. Theory and Practicals of Engineering Chemistry, Shashi Chawla, Dhanpat Rai & Co. (Pvt.) Ltd.
9. Engineering Chemistry (NPTEL Web-book) B.L. Tembe, Kamaluddin and M.S. Krishna
10. Engg. Chemistry, Jain & Jain, Dhanpat Rai Publishing Company (P) Ltd.

COURSE OUTCOME: At the end of the course the student will be able to

CO1	Identify the quality of water for industrial and municipal applications
CO2	Determine the use of fuels for engineering applications
CO3	Determine the use of Lubricants for engineering applications
CO4	Select the appropriate polymers for desired applications
CO5	Apply the fundamentals of spectroscopic and chromatographic techniques , to acquire knowledge of engineering materials like Cement and Refractories

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Mapping of course outcome with program outcome

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	-	-	-	-	-	-	-	-	-
CO2	3	1	-	-	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-
CO4	3	1	-	-	-	-	-	-	-	-	-	-
CO5	3	1	-	-	-	-	-	-	-	-	-	-

COURSE OUTCOME: At the end of the course the student will be able to

CO1	Determine the concentration of an unknown solution using redox titration
CO2	Determine the total hardness of a given water sample
CO3	Identify and determine the type and amount of alkalinity
CO4	Proximate analysis of coal. Determine viscosity, flash and fire point of various lubricating oil using popular techniques


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(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) III Semester
Branch- Common to (CE/EE/EC/CSE/IT/IP/AI&DS /MT)
COURSE CONTENTS

w.e.f. July 2023

Subject Code	Subject Name	Maximum Marks Allotted			Total Marks	Hours/Week			Total Credits
CH32	Energy & Environmental Engineering	Theory			100	L	T	P	4
		End Sem	Mid-sem Exam	Quiz/ Assignment		3	1	-	
		70	20	10					

Module 1:

A. Introduction to Energy Science:

World & Indian Energy Scenario, Overview to Energy Systems, Energy sustainability and Environment. Fossil Fuels. Alternatives for fossil fuels: biomass, wind, solar, nuclear, wave, tidal, hydrogen & geothermal energy.

B. Batteries:

Classification of Batteries, Important Applications, Lead-Acid battery, Ni-Cd battery & Li battery. Fuel Cell: Hydrogen-Oxygen Fuel cell.

Module2: Environmental Pollution A:

I. Air Pollution

Causes, Effects & Control Measures of Air Pollution: Primary and Secondary air pollutants and photo-chemical smog. Climate changes, Global warming, Ozone layer depletion. Pollution case studies: Bhopal gas Disaster and London smog Disaster.

II. Water Pollution

Definition, Causes, Effects and Control Measures (Primary & Secondary waste water treatment), Acid Rain and Marine pollution. Pollution case studies: Minamata Tragedy, Ganga Action Plan, Major oil spills of the 20th & 21st century. Water conservation, Rain water harvesting and Water Shed Management.

III. Noise Pollution

Causes, Effects & Control Measures.

Module3: Environmental Pollution B:

- I.** Sources, Adverse effects and Control measures of Soil Pollution, Thermal Pollution, Nuclear Pollution & Nuclear hazards. Major case studies.
- II.** Solid waste management: Municipal Solid Waste (MSW), Collection and disposal methods. Disaster Management.
- III.** Introduction to carbon footprint, ways to reduce carbon footprint, Carbon trading.

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Module 4: Ecosystem & Biodiversity:

Concept of an ecosystem; Structure and function of an ecosystem; Producers, consumers and decomposers; Energy flow in the ecosystem; Ecological succession; Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of the following ecosystem (a.) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Introduction, Definition: genetic, species and ecosystem diversity; Bio-geographical classification of India; Value of biodiversity: Biodiversity at global & National levels; India as a mega-diversity nation; Hot-spots of biodiversity; Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; Endangered and Endemic species of India; Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity. Environment Protection Act.

Module 5: Corrosion & its prevention:

Theories of Corrosion and Mechanism – Dry (Direct Chemical attack), Wet (Electro Chemical Theory) Atmospheric corrosion, Galvanic Series, Galvanic and Concentration Cell Corrosion, Corrosion by sea water. Factors Influencing and Control of Corrosion – Proper Design, Use of pure metal and metal alloys, passivity, cathodic protection – Sacrificial anode and Impressed Current. Modifying the environment, Use of inhibitors.

Protective coatings:

Hot dipping, Electroplating, Metal spraying metal cladding & cementation.

TEXT BOOKS

1. A text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, New Delhi
2. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS Publication Hyd.
3. A text book of Environmental Chemistry and Pollution control by S.S. Dara & Dr. D. D. Mishra, S. Chand & Co, New Delhi
4. Energy, Environment Ecology and Society by Dr. Pushpendra, Vayu Education of India New Delhi
5. Energy, Environment Ethics and Society, by Dr. S. Deswal & Dr. A. Deswal Dhanpat Rai Publishing Company, New Delhi

REFERENCE BOOKS


1. J.C. Kuriakose and J. Rajaram, "Chemistry in Engineering and Technology", Vol.1 & 2, Tata McGraw Hill Publishing Company (P) Ltd., New Delhi
2. Mars G. Fontana, "Corrosion Engineering", Tata McGraw Hill Publishing Company (P) Ltd., New Delhi.
3. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
4. J.P. Gupta, A Text book of Energy, Environment Ethics & Society" Dhanpat Rai Publishing Company.

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COURSE OUTCOME: At the end of the course the student will be able to

CO1	Apply the concept of sustainability of renewable energy to overcome the shortcoming of energy from non-renewable sources. Understanding of Energy devices.
CO2	Develop an understanding related to Water, Air and Noise pollution.
CO3	Understand the importance of Soil, Thermal and Nuclear pollution. Illustrate municipal practices in solid waste management. Define carbon footprints.
CO4	Understand the interrelationship of different species in variety of ecosystems. Conservation of Biodiversity & awareness of Environmental protection Act.
CO5	Recognize the origin as well as types of corrosion and apply appropriate protection mechanism to control corrosion.


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