

**SYLLABUS FOR  
THE FOUR-YEAR UNDERGRADUATE PROGRAMME  
(FYUGP)**

**SESSION 2024-25**



**INDUSTRIAL CHEMISTRY**

**SEMESTER I - VI**

**GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE,  
RAJNANDGAON (C.G.)**

		Departmental members	
Chairperson /H.O D .....	<u>29/5/24</u>	1.....	8.....
Subject Expert ..... (University Nominee)	<u>AD Khan</u>	2..... <u>PL</u>	9.....
Subject Expert ..... <u>B...</u>	<u>AKJha</u>	3.....	10.....
Representative ..... (Industry)		4..... <u>CV</u>	11.....
Representative ..... (Alumni)	<u>Wibha</u>	5.....	12.....
Representative ..... (Professor Science Faculty Other Dept.)		6..... <u>Yadav</u>	13.....
		7.....	14.....

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**FYUGP (CBCS/LOCF Course)**

Department: -CHEMISTRY

Session: 2024-25	Program: B.Sc.
Semester: V	Subject: INDUSTRIAL CHEMISTRY
Course Type: DSC	Course Code: .....
Course Title: INDUSTRIAL CHEMISTRY	UNIT OPERATIONS IN CHEMICAL INDUSTRIES
Credit: 4	Lecture: 60
M.M. 100 = (ESE 80+IA 20)	Minimum Passing Marks: 40%

<b>Course Learning Outcome:</b>	<ol style="list-style-type: none"> <li>1. Students will learn about process of instruments in industries in case of temperature, pressure.</li> <li>2. Students will learn about process of instruments in industries in liquid level measurements.</li> <li>3. Students will learn about all types of filter equipments using in industry.</li> </ol>
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Units	Lectures	UNITS
I	15	<b>Process Instrumentation (Temperature)</b> Concept of measurement and accuracy, principle, construction and working of following measuring instruments. Glass thermometers, bimetallic thermometer, pressure spring thermometer, vapour filled thermometers, resistance thermometers, radiation pyrometers.
II	15	<b>Process Instrumentation (Pressure):</b> Concept of measurement and accuracy, principle, construction and working of following Pressure measuring instruments Manometers, barometers, bourdon pressure gauge, bellow type, diaphragm type pressure gauges, Macleod gauges, pirani gauges, etc.
III	15	<b>Liquid level:</b> Direct-indirect liquid level measurement, Float type liquid level gauge, ultrasonic level gauges, bubbler system, density measurement, viscosity measurement.
IV	15	<b>Other Important Instruments:</b> Bag filters, electrostatic precipitator, mist eliminators, wet scrubbers, absorbers, solid waste management Industrial safety.

## LIST OF REFERENCE BOOKS:

- Aerosol science & technology, Shepherd, H.R.
- Catalysis, Homogeneous & heterogeneous Delmon, Elsevier Science Publication.
- Catalysis, Science & Technology, Anderson, J.
- Catalysis in Macromolecular systems, Fendler & Fendler.
- Phase Transfer Catalysis Principle & Techniques, Strles, C.
- Surface Chemistry, J.J. Bikermann, Academic Press.
- Physical Chemistry of surfaces by A. W. Admson.
- Stoichiometry, B.I. Bhatt & S.M. Vora.
- Chemical Process Principle – Part I., B.A. Hougen, K.M. Waston & R.A. Ragats, Asia Publication.
- Unit process in Organic synthesis P.M. Groggins, McGraw Hill.
- Effluent Treatment in process Industries - Inst. of Chem. Engg.
- Effluent Treatment and waste Disposal –Inst. of Chem. Engg.
- Effluent Treatments and Disposal –Inst. of Chem. Engg.
- Unit process in organic synthesis, P.M. Groggins, Mc Graw Hill.
- Industrial Instrumentation, Bekmen, D. P. John Wileys.
- Applied Instrumentation in process Industries, Vol. I, II & III Andrew, W. G. Gulf Publication.
- Instrumentation and Control for the process Industries, Borer, S.E levier Applied Science Publishers.
- Chemical Engineer's Hand book, Perry, J.H. and Green, D. Mc Graw Hill.

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25/5/24

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		Departmental members	
Chairperson H.O D <i>29/5/20</i>			
Subject Expert ..... <i>A. Alwan</i> (University Nominee) <i>A. Alwan</i>	1.....	8.....	<i>[Signature]</i> <i>[Signature]</i>
Subject Expert <i>Buwan</i>	2..... <i>[Signature]</i>	9.....	
Representative ..... (Industry)	3.....	10.....	
Representative ..... <i>[Signature]</i> (Alumni)	4..... <i>[Signature]</i>	11.....	
Representative ..... (Professor Science Faculty Other Dept.)	5.....	12.....	
	6..... <i>[Signature]</i>	13.....	
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GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE, RAJNANDGAON (C.G.)

**FYUGP (CBCS/LOCF Course)**

Department: - CHEMISTRY

Session: 2024-25	Program: B.Sc.
Semester: VI	Subject: INDUSTRIAL CHEMISTRY
Course Type: DSC	Course Code: .....
Course Title:	ORGANIC SYNTHESIS AND INDUSTRIAL INSTRUMENTATIONS
Credit: 4	Lecture: 60
M.M. 100 = (ESE 80+IA 20)	Minimum Passing Marks: 40%

Title	ORGANIC SYNTHESIS AND INDUSTRIAL INSTRUMENTATIONS
Course Learning Outcome:	(i) Study about dimension of units in solid, liquid, gaseous mixture composition (ii) Student will learn about material physical process balancing with and without reactions (iii) Industrially waste water system plant working process (iv) Students know about standard dimesntion unit calculation procdure and surface chemistry and interfacial phenomena.

Units	Lectures	Lectures (15 x 4 = 60)
I	15	1. <b>Dimensions and units:</b> Basic chemical calculations- Atomic weight, molecular weight, equivalent weight, mole composition of (i) liquid mixture (ii) gaseous mixture. 2. <b>Material balance involving chemical reaction:</b> concept of limiting reactant, conversion, yield liquid phase reaction, gas phase reactions with / without recycle or by-pass.
II	15	<b>Effluent treatment and waste management:</b> Principles and equipments for aerobic, anaerobic treatment adsorption, filtration, sedimentation.
III	15	<b>Chromatography:</b> Introduction, types, principle, industrial uses Paper chromatography, TLC, HPLC, GLC, Ion chromatograpy
IV	15	<b>Surface chemistry &amp; Interfacial Phenomena</b> <b>Gels:</b> Classifications, preparations, properties, Application

		<p>Sols: Properties, Stability          Micelles: Types of micelles, structure, solubilization, uses          Aerosols: Type, Classification, properties</p> <p>Surfactants: Types, Detergent effect, Hydrotropes</p> <p>Adsorption: Types, Adsorption Isotherm</p>
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# ORGANIC SYNTHESIS AND INDUSTRIAL INSTRUMENTATIONS LAB

Duration of Examination: 04Hrs.

Max. Marks - 50

## UNIT PROCESS:

One to two examples of each of the following.  
Nitration, Sulphonation, Friedel-crafts reaction, Esterification, Hydrolysis, Oxidation, Halogenation, Chloro-Sulphonation, Reduction, Polymerisation, Reaction of diazonium salts.

## INSTRUMENTAL METHODS OF ANALYSIS:

Use of colorimeter, pH meter, Potentiometer, Conductometer, Refractometer, Polarimeter.

## MATERIAL TESTING :

Testing of alloys, Identification of plastics/rubber, estimation of yield point, Young's modulus, flaredness; Optical, Thermal, Mechanical and Electrical properties.

## PROCESS INSTRUMENTATION:

Transducers of different types, use of Transducers for measuring flow control. Determination of flash point and ignition points of liquids.

## WATER ANALYSIS:

Solid contents, hardness, COD and other tests as per industrial specifications.

## FLOW MEASURING DEVICES: Floats

Monographs of representative raw materials such as sulphuric acid, toluene, sodium carbonate, sodium hydroxide, carbon tetra chloride, benzoic acid (5-6 compounds).

Limit tests for heavy metals Pb, As, Hg, Fe and ash content.

## Scheme for the Examination

Major	15
Minor	10
Sessional	05
Viva	10
Internal	10
<b>Total =</b>	<b>50</b>

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		Departmental members	
Chairperson /H.O D. <u>[Signature]</u> 25/5/24			
Subject Expert ... <u>Arslan</u> (University Nominee)	1.....	8..... <u>[Signature]</u>	
Subject Expert <u>[Signature]</u> <u>[Signature]</u>	2... <u>[Signature]</u>	9.....	
Representative .....	3.....	10.....	
(Industry)	4... <u>[Signature]</u>	11.....	
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(Alumni) <u>[Signature]</u>	6... <u>[Signature]</u>	13.....	
Representative .....	7.....	14.....	
(Professor Science Faculty Other Dept.)			