FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF INDUSTRIAL CHEMISTRY
COURSE CURRICULUM

PART-A: Introduction				
Program:Bachelor in Science *(Honors/Honors with Research)*			**Semester - VIII**	Session: **2024-2025**
1	**CourseCode**	**ICSC-08T**		
2	**CourseTitle**	**PETROCHEMICALS AND POLYMERS**		
3	**CourseType**	**DSC**		
4	**Pre-requisite(if,any)**	*As per program*		
5	**Course Learning. Outcomes(CLO)**	➢ *Demonstrate knowledge of production methods for specific hydrocarbon derivatives, as well as aromatic hydrocarbons.* ➢ *Apply the concept of synthesis gas production to understand the generation of key petrochemicals* ➢ *Describe the manufacturing processes for important polymers* ➢ *Explain the manufacturing processes for various synthesis resins used in different applications*		
6	**CreditValue**	**3 Credits**	*Credit = 15 Hours -learning & Observation*	
7	**TotalMarks**	**Max.Marks: 100**		**Min Passing Marks:40**

PART -B: Content oftheCourse

TotalNo.of Teaching–learning Periods(01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics(Coursecontents)	No.ofPeriod
I	Production of Specific Hydrocarbon Derivatives with special emphasis on: - C1 Compound. - C2 Compound. - C3 Compound. - C4 Compound. - Aromatic hydrocarbons.	12
II	**Production of Petrochemicals**:- - Synthesis Gas, Acetylene, Butylene, Isopropanol, Phenol-Acetone, Hydrogen	11
III	**Manufacturing of Important Polymers**:- - Polyolefin, Vinyl, Acrylies, Polyamides, Polyesters, Polyurethanes, Polycarbonates, Current and Future Industrial Scope in India for Petrochemical and Polymer Industries.	11
IV	**Manufacturing of Synthesis Resins**:- - Alkyd resins. - Phenolic resins. - Amino resins. - Epoxy resins. - Unsaturated Polyesters. Building Block for Petrochemicals, Their separation and purification, manufacturing process of Aromatic and Napthhenes.	11
Keywords	***Hydrocarbons, Petrochemicals, Polymers, Resins, Manufacturing Process, Separation and purification***	

Signature of Convener & Members (CBoS):

PART–C:Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. *Jain, S. K. (2013). Chemical Kinetics. Vishal Publication.*
2. *Sharma, B. K. (2019). Industrial Analysis. Gael Publication.*
3. *Sharma, B. K. (2010). Hydrocarbons and petrochemicals (2nd ed.). Khanna Publishers.*
4. *Chakraborti, A. K. (2017). Polymer science. New Age International Publishers.*
5. *Srivastava, P. C. (2008). Resins: Chemistry, applications and technology. Studium Press.*

Reference Books Recommended –

1. *Perry, R. H. (Editor). (2018). Perry's chemical engineers' handbook (9th ed.). McGraw-Hill Education. (This is a classic reference by an international author, but highly relevant for the given topics)*
2. *Sharma, B. K. (2017). Industrial chemistry (2nd ed.). Khanna Publishers. (This book by an Indian author covers a broad range of industrial processes, including those relevant to your query)*
3. *Bhagat, S. D. (2012). A handbook of separation processes and techniques (2nd ed.). Academic Press.*
6. *Smith, J. M. (1981). Chemical engineering kinetics. McGraw Hill Book Co.*
4. *Parsania, P. H. (2006). Physico-chemical exercise.*

Online Resources–

- https://www.sciencedirect.com/topics/chemistry/hydrocarbon-derivatives
- https://www.chemguide.co.uk/organicprops/aromaticity/derivatives.html
- https://www.eolss.net/Sample-Chapters/C12/E6-76-02-01.pdf
- https://www.sciencedirect.com/topics/engineering/petrochemical-production
- https://www.chemeurope.com/en/encyclopedia/Petrochemicals.html
- https://www.sciencedirect.com/topics/chemistry/polymer-manufacturing
- https://www.researchgate.net/publication/337797150_Indian_Petrochemical_and_Polymer_Industry_An_Overview
- https://www.sciencedirect.com/topics/materials-science/alkyd-resin

Online Resources–

- **e-Resources / e-books and e-learning portals**

PART-D:Assessment andEvaluation

Suggested Continuous Evaluation Methods:
MaximumMarks: 100 Marks
ContinuousInternal Assessment(CIA):30 Marks
EndSemesterExam(ESE):70 Marks

Continuous InternalAssessment(CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 +20** Assignment/Seminar- **10** Total Marks -**30**	Better marks out of the two Test / Quiz**+** obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit- **4x10=40Marks**	

Name and Signature of Convener & Members of CBoS:

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DEPARTMENT OF INDUSTRIAL CHEMISTRY
COURSE CURRICULUM

PART-A: Introduction			
Program:Bachelor in Science *(Honors/Honors with Research)*		**Semester - VIII**	Session: **2024-2025**
1	**CourseCode**	**ICSC-08P**	
2	**CourseTitle**	**INDUSTRIAL CHEM. LAB. COURSE-VIII**	
3	**CourseType**	**DSC**	
4	**Pre-requisite(if,any)**	***As per program***	
5	**Course Learning. Outcomes(CLO)**	➢ **To understand concept of crystalline and amorphous state of polymers.** ➢ **To correlate flexibility with the glass transition temperature.** ➢ **To understand structure-property relationship of polymers.** ➢ **To apply mathematical formulae to depict polymer solution properties** ➢ **To apply the knowledge of latex manufacturing and compounding.** ➢ **To apply the knowledge of techniques used in monomer production**	
6	**CreditValue**	**1 Credits**	***Credit =30 Hours Laboratory or Field learning/Training***
7	**TotalMarks**	**Max.Marks:50**	**Min Passing Marks:20**

PART -B: Content of the Course		
TotalNo.of learning-Training/performancePeriods:30 Periods (30 Hours)		
Module	**Topics(Course contents)**	**No.ofPeriod**
Lab./Field Training/ Experiment Contents of Course	1. Chemical identification of polymers- • Unsaturation • Testing of functiona groups (associated with polymers). 2. To determine the melting point of crystalline polymers. 3. To check the solubility of the given polymeric sample in different solvents. 4. Determination of molecular weight by solution viscosity. 5. Fractional distillation of crude oil. 6. To calculate dry rubber content (DRC) of latex. 7. To determine the coagulation strength of latex.	**30**
Keywords	***Petrochemicals, Polymers, Functional group, Viscosity, Solution***	

SignatureofConvener&Members (CBoS):

PART–C:Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. *Gowarikar V.R., (2010) Polymer Science, New Age International Publishers Ltd.*
2. *Shah V., (1998) Handbook of Plastics Testing Technology, Wiley Interscience.*
3. *Kumar D., Chandra R., (2001) Latex Technology, DhanpatRai& Co.*
4. *Rao B.K.B., (2007) Text book on Petrochemicals, Khanna Publishers.*

Reference Books Recommended –

1. *Brydson J.A., (1999) Plastics Materials, Butterworth Heinemann.*
2. *Billmeyer F.W., (2007) Textbook of Polymer Science, Wiley, India.*

Online Resources–

- **https://www.sciencedirect.com/topics/chemistry/hydrocarbon-derivatives**
- **https://www.chemguide.co.uk/organicprops/aromaticity/derivatives.html**
- **https://www.eolss.net/Sample-Chapters/C12/E6-76-02-01.pdf**
- **https://www.sciencedirect.com/topics/engineering/petrochemical-production**
- **https://www.sciencedirect.com/topics/chemistry/polymer-manufacturing**
- **https://www.sciencedirect.com/topics/materials-science/alkyd-resin**

Online Resources–

- **e-Resources / e-books and e-learning portals**

PART-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
MaximumMarks: 50 Marks
Continuous Internal Assessment(CIA):15 Marks
End Semester Exam (ESE): 35Marks

Continuous InternalAssessment(CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **10 &10** Assignment/Seminar +Attendance- 05 Total Marks -**15**	Better marks out of thetwo Test / Quiz +obtained marks in Assignment shall be considered against **15** Marks

End Semester Exam (ESE):	**Laboratory / Field Skill Performance: On spot Assessment** **S. Performed the Task based on lab. work - 20 Marks** **T. Spotting based on tools& technology (written) – 10 Marks** **U. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS: