

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

<b>PART-A: Introduction</b>			
Program: Bachelor in Science (Degree/Honors)		Semester VI	Session: 2024-2025
1	Course Code	ICSE-04T	
2	Course Title	INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE	
3	Course Type	DSE	
4	Pre-requisite(if,any)	As per program	
5	Course Learning Outcomes(CLO)	<ul style="list-style-type: none"> <li>➤ To address the student about the inorganic materials which is important in industries.</li> <li>➤ To understand the preparation, type and use of silicates.</li> <li>➤ To understand the types of fertilizer as inorganic compound.</li> <li>➤ To understand the alloy formation and batteries in industries.</li> </ul>	
6	Credit Value	3 Credits	Credit = 15 Hours -learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks:40

**PART -B: Content of the Course**

Total No. of Teaching-learning Periods(01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics(Course contents)	No.of Period
I	<b>Silicate Industries</b> <i>Glass:</i> Glassy state and its properties, classification (silicate and non-silicate glasses). Manufacture and processing of glass. Composition and properties of the following types of glasses: Soda lime glass, lead glass, armoured glass, safety glass, borosilicate glass, fluorosilicate, coloured glass, photosensitive glass. <i>Ceramics:</i> Important clays and feldspar, ceramic, their types and manufacture. High technology ceramics and their applications, superconducting and semiconducting oxides, fullerenes, carbon nanotubes and carbon fibre.	12
II	<b>Fertilizers:</b> Different types of fertilizers. Manufacture of the following fertilizers: Urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphates; polyphosphate, superphosphate, compound and mixed fertilizers, potassium chloride, potassium sulphate.	11
III	<b>Alloys</b> Classification of alloys, ferrous and non-ferrous alloys, Specific properties of elements in alloys. Manufacture of Steel (removal of silicon decarbonization, demanganization, desulphurization dephosphorisation) and surface treatment (argon treatment, heat treatment, nitriding, carburizing). Composition and properties of different types of steels.	11
IV	<b>Batteries</b> Primary and secondary batteries, battery components and their role, Characteristics of Battery. Working of following batteries: Pb acid, Li-Battery, Solid state electrolyte battery. Fuel cells, Solar cell and polymer cell.	11

**Keywords** Silicates, fertilizers, Alloy Primary and secondary batteries, Fuel cell.

**Signature of Convener & Members (CBoS):**

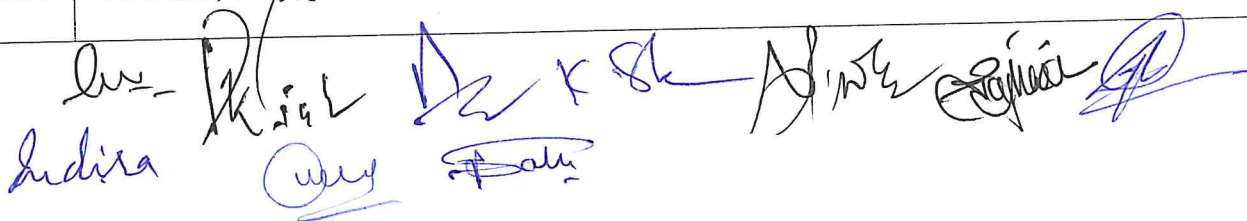
<b>PART-C: Learning Resources</b>		
<b>Text Books, Reference Books and Others</b>		
<b>Text Books Recommended –</b>		
<ol style="list-style-type: none"> <li>1. Jain, P. C., &amp; Jain, M. (2010). <i>Engineering chemistry</i>. Dhanpat Rai &amp; Sons.</li> <li>2. Gopalan, R., Venkappayya, D., &amp; Nagarajan, S. (2016). <i>Engineering chemistry</i>. Vikas Publishing House Pvt Ltd.</li> <li>3. Sharma, B. K. (2005). <i>Engineering chemistry</i>. Goel Publishing House.</li> </ol>		
<b>Reference Books Recommended –</b>		
<ol style="list-style-type: none"> <li>1. Stocchi, E. (Vol. 1). <i>Industrial chemistry</i>. Ellis Horwood Ltd.</li> <li>2. Felder, R. M., &amp; Rousseau, R. W. (2007). <i>Elementary principles of chemical processes</i>, Wiley.</li> <li>3. Kingery, W. D., Bowen, H. K., &amp; Uhlmann, D. R. (2008). <i>Introduction to ceramics</i>, Wiley India Pvt. Ltd.</li> <li>4. Kent, J. A. (Ed.). (1993). <i>Riegel's handbook of industrial chemistry</i>. CBS Publishers &amp; Distributors.</li> </ol>		
<b>Online Resources:</b>		
<ul style="list-style-type: none"> <li>• <a href="https://www.usgs.gov/centers/national-minerals-information-center/silica-statistics-and-information">https://www.usgs.gov/centers/national-minerals-information-center/silica-statistics-and-information</a> -</li> <li>• <a href="https://www.fertilizer.org/">https://www.fertilizer.org/</a> <a href="https://www.asminternational.org/">https://www.asminternational.org/</a> -</li> <li>• <a href="https://www.nrel.gov/">https://www.nrel.gov/</a> -</li> <li>• <a href="https://www.energy.gov/batteries">https://www.energy.gov/batteries</a></li> </ul>		
<b>PART-D: Assessment and Evaluation</b>		
<b>Suggested Continuous Evaluation Methods:</b>		
<b>Maximum Marks: 100 Marks</b>		
<b>Continuous Internal Assessment(CIA):30 Marks</b>		
<b>End Semester Exam(ESE):70 Marks</b>		
<b>Continuous Internal Assessment(CIA): (By Course Teacher)</b>	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
<b>End Semester Exam (ESE):</b>	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit- 4x10=40Marks	

**Name and Signature of Convener & Members of CBoS:**

Indira, Anu, Balu, [unintelligible], [unintelligible], [unintelligible]

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

<b>PART-A: Introduction</b>			
Program: Bachelor in Science (Degree/Honors)		Semester VI	Session: 2024-2025
1	CourseCode	ICSE-04P	
2	CourseTitle	INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE LAB COURSE	
3	CourseType	DSE	
4	Pre-requisite(if,any)	<i>As per program</i>	
5	Course Learning Outcomes(CLO)	<ul style="list-style-type: none"> <li>➤ To learn the analysis of components of fertilizers.</li> <li>➤ To learn the analysis of alloy</li> <li>➤ To perform the sample analysis of ore to find the metal percentage.</li> <li>➤ To demonstrate the metallic coating on ceramics.</li> </ul>	
6	CreditValue	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	TotalMarks	Max.Marks:50	Min Passing Marks:20
<b>PART -B: Content of theCourse</b>			
TotalNo.of learning-Training/performancePeriods:30 Periods (30 Hours)			
Module	Topics(Coursecontents)	No.ofP eriod	
Lab./Field Training/ Experiment Contents of Course	1. Determination of free acidity in ammonium sulphate fertilizer. 2. Estimation of Calcium in Calcium ammonium nitrate fertilizer. 3. Estimation of phosphoric acid in superphosphate fertilizer. 4. Electroless metallic coatings on ceramic and plastic material. 5. Determination of composition of dolomite (by complexometric titration). 6. Analysis of Cement. 7. Preparation of pigment (zinc oxide). 8. Determination of percentage of metal in alloy.	<b>30</b>	
Keywords	<i>Fertilizer, alloy, plastic, cement, zinc oxide .</i>		



**Signature of Convener & Members (CBoS):**

**PART-C: Learning Resources**

Text Books, Reference Books and Others

**Text Books Recommended –**

1. Sharma, S. K., & Sharma, R. K. (2018). *Practical manual for fertilizer analysis*. Directorate of Agricultural Research.
2. Sinha, S. K. (1972). *A handbook of analysis of soil and plant products*. Oxford & IBH Publishing Company.
3. Sparks, D. L. (1996). *Physico-chemical and biological methods for soil analysis*. Kluwer Academic Publishers.

**Reference Books Recommended –**

1. Stocchi, E. (Vol. 1). *Industrial chemistry*. Ellis Horwood Ltd.
2. Felder, R. M., & Rousseau, R. W. (2007). *Elementary principles of chemical processes*, Wiley.
3. Kingery, W. D., Bowen, H. K., & Uhlmann, D. R. (2008). *Introduction to ceramics*, Wiley India Pvt. Ltd.
4. Kent, J. A. (Ed.). (1993). *Riegel's handbook of industrial chemistry*. CBS Publishers & Distributors.

**Online Resources–**

- o <https://echa.europa.eu/substance-information/-/substanceinfo/100.029.076>
- o <https://pubs.acs.org/doi/abs/10.1021/acs.jchemed.2c00764>
- o <https://www.sciencedirect.com/science/article/abs/pii/S0016706121002883>
- o : <https://pubs.acs.org/doi/abs/10.1021/acs.jchemed.2c00764>
- o : <https://www.astm.org/>
- o <https://www.sciencedirect.com/science/article/abs/pii/S0272884218302165>
- o <https://pubs.acs.org/doi/10.1021/acsreagents.2001>

**PART-D: Assessment and Evaluation**

**Suggested Continuous Evaluation Methods:**

**Maximum Marks: 50 Marks**

**Continuous Internal Assessment(CIA):15 Marks**

**End Semester Exam(ESE):35Marks**

<p><b>Continuous Internal Assessment(CIA):</b> (By Course Teacher)</p>	<p>Internal Test / Quiz-(2): 10 &amp; 10 Assignment/Seminar + Attendance- 05 Total Marks -15</p> <p style="text-align: center;">05 ←</p>	<p>Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks</p>
<p><b>End Semester Exam (ESE):</b></p>	<p><b>Laboratory / Field Skill Performance: On spot Assessment</b></p> <p>J. Performed the Task based on lab. work - 20 Marks</p> <p>K. Spotting based on tools &amp; technology (written) – 10 Marks</p> <p>L. Viva-voce (based on principle/technology) - 05 Marks</p>	<p><b>Managed by</b> Course teacher as per lab. status</p>

**Name and Signature of Convener & Members of CBoS:**