

**SRI VENKATESWARA UNIVERSITY**  
**B.Sc. DEGREE COURSE IN INDUSTRIAL CHEMISTRY**

**FIRST YEAR - SECOND SEMESTER**  
**(Syllabus under CBCS w.e.f. 2020-21)**

**Core Course Paper-II: INORGANIC MATERIALS**  
(Total hours of teaching – 60 @ 04 Hrs./Week)

**Course Outcomes**

At the end of the course student will be able to

- CO1 Describe the composition of different types of glasses.
- CO2 Write down different types of ceramics and their uses.
- CO3 Describe the steps involved in the manufacturing of cement
- CO4 Write down manufacturing of different fertilizers
- CO5 Describe the classification of alloys
- CO6 Demonstrate the manufacture of steel.
- CO7 Describe the differences between paints and pigments
- CO8 Write down about different types of paints

**UNIT-I**

**12 Hours**

**Silicate Industries-1**

**Glass:** 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.

**UNIT-II**

**14 Hours**

**Silicate Industries-2**

1. **Ceramics:** Important clays and feldspar. Ceramics-types, uses and manufacture. High technology ceramics and their applications.
2. **Cements:** Classification of cement, ingredients and their role, Manufacture of cement and the setting process, quick setting cements.

**UNIT-III**

**10 Hours**

**Fertilizers**

Different types of fertilizers. Manufacture of the following fertilizers: Urea, Ammonium nitrate, Calcium ammonium nitrate, Ammonium phosphates; Polyphosphate, Super phosphate, Compound and mixed fertilizers, Potassium Chloride, Potassium sulphate.

**UNIT-IV**

**10 Hours**

**Alloys**

Classification of alloys, Ferrous and Non-Ferrous alloys, Specific properties of elements in alloys. Manufacture of Steel (removal of silicon, decarbonization, demagnetization, desulphurization, dephosphorisation) and surface treatment (argon treatment, heat treatment, nitriding, carburizing). Composition and properties of different types of steels.

## UNIT-V

14 Hours

### Surface Coatings

Objectives of coatings surfaces, preliminary treatment of surface, classification of surface coatings. Paints and pigments-formulation, composition and related properties. Oil paint, modified oils, Pigments, toners and lake pigments, fillers, thinners, enamels, emulsifying agents. Special paints (Heat retardant, Fire retardant, Eco-friendly paint, Plastic paint), Dyes, Wax polishing, Water and Oil paints, additives, Metallic coatings (electrolytic and electroless), metal spraying and anodizing.

### Co-curricular activities and Assessment Methods

1. **Assessment of Learning:** Summative assessment- Conduct of semester end exams.
2. **Assessment for Learning:** Formative assessment-Different assessment tools like Minute paper, Muddiest point, Think-Pair-Share, 3-2-1 chart etc.,
3. **Assessment as learning:** Self-assessment-assignments, slip tests etc.,
4. **Quizzes, Guest Lecture, Student seminar, educational tour, field trip etc.**

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**PRACTICAL PAPER-II**

(Total hours of laboratory exercises 30 Hrs. @ 02 Hrs./Week)

**Course Outcomes**

**50Marks**

At the end of the course student will be able to

- CO1 Determine the free acidity in a given ammonium sulphate fertilizer
- CO2 Estimate calcium present in Calcium ammonium nitrate fertilizer.
- CO3 Carry out the analysis of cement
- CO4 Estimate phosphoric acid in superphosphate fertilizer.

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. Analysis of Cement.

**Reference Books**

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK
2. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: *Introduction to Ceramics*, Wiley Publishers, New Delhi.
3. J. A. Kent: *Riegel's Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
4. P. C. Jain, M. Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
5. R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry*, Vikas Publications, New Delhi.
6. B. K. Sharma: *Engineering Chemistry*, Goel Publishing House, Meerut
7. S. C. Bhatia: *Chemical Process Industries*, Vol. I & II, CBS Publishers, New Delhi.
8. O. P. Vermani, A. K. Narula: *Industrial Chemistry*, Galgotia Publications Pvt. Ltd., New Delhi.

**SRI VENKATESWARA UNIVERSITY**  
**B.Sc. DEGREE EXAMINATION IN INDUSTRIAL CHEMISTRY**

**FIRST YEAR - SECOND SEMESTER**  
**(Revised Syllabus under CBCS w.e.f. 2020-21)**

**Core Course Paper– II: INORGANIC MATERIALS**

**MODEL QUESTION PAPER**

Time: 3 hours

Maximum Marks: 75

**PART- A**

5 X 5 = 25 Marks

Answer any **FIVE** of the following questions. Each question carries **FIVE** marks.

1. Write a note on composition and properties of coloured glass.
2. Describe about important clays.
3. Write the applications of High technology ceramics.
4. What are quick setting cements? Explain briefly.
5. How do you distinguish compound fertilisers from mixed fertilisers? Explain briefly.
6. What are ferrous and non-ferrous alloys? Explain briefly.
7. Write a note on 'oil paints'.
8. Describe in brief about water paints.

**PART- B**

5 X 10 = 50 Marks

Answer **ALL** the questions. Each carries **TEN** marks

9. (a) Explain the different steps involved in the manufacturing of glass.  
(or)  
(b) Describe the composition and properties of (i) Borosilicate glass (ii) Lead glass.
10. (a) What are ceramics? Write about different types of ceramics and their properties.  
(or)  
(b) Describe steps in the manufacturing of Portland cement.
11. (a) Explain about different types of fertilizers.  
(or)  
(b) Explain the manufacturing of (i) Urea and (ii) Super Phosphate
12. (a) Write a note on desulphurization and dephosphorisation of steel.  
(or)  
(b) Describe the composition and properties of different types of steels.
13. (a) What are metal coatings. Differentiate between electrolytic and electroless coatings.  
(or)  
(b) Explain in detail about special paints.