



GUJARAT TECHNOLOGICAL UNIVERSITY

Minor Degree : Construction Technology

Subject Code: N114AC01

Semester – IV (w.e.f. AY 2024-25)

Subject Name: Contemporary Materials for Construction

Prerequisite: Engineering Materials, Concrete Technology

Rationale: With extreme expansion in limits of structures, the demand on the materials has enhanced exponentially. This course includes application of high performance concrete, aluminum, steel, fiber reinforced polymers and special chemical used in modern construction practices. The applications of these materials and chemicals are increasing in practice to meet the demands of current time.

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits C | Examination Marks | | | | Total Marks |
|-----------------|---|---|--------------|-------------------|--------|-----------------|--------|----------------|
| L | T | P | | Theory Marks | | Practical Marks | | |
| | | | | ESE (E) | PA (M) | ESE (V) | PA (I) | |
| 3 | 0 | 2 | 4 | 70 | 0 | 30 | 0 | 100 |

Content:

| Unit No | Course Content | No of Hours |
|------------|--|-------------|
| 1 | NON-CEMENTOUS CONCRETE: Materials and methods used to produce non-Cementous concrete, challenges in production, durability aspects of non-Cementous concrete, challenges in using non-Cementous concrete in RCC. | 8 |
| 2 | METALS: Types of Steel, Manufacturing process, Benefits of new alloy steels, advantages and properties of aluminum and its products, types and application of Coatings to reinforcements. | 8 |
| 3 | COMPOSITES: Types of Plastics and its properties & manufacturing process, advantages of Reinforced polymers, types of FRP, its application and suitability on various structural elements. | 8 |
| 4 | OTHER MATERIALS: Water Proofing Compounds, Types of Non-weathering Materials and its uses, Types of Flooring and Facade Materials and its application, concrete admixtures and construction chemicals. | 8 |
| 5 | SMART AND INTELLIGENT MATERIALS: Types & Differences between Smart and Intelligent Materials, Special features, Case studies showing the applications of smart & Intelligent Materials. | 6 |
| Total Hrs. | | 42 |

Suggested Specification table (Theory):

| Distribution of Theory Marks (%) | | | | | |
|----------------------------------|---------|---------|---------|---------|---------|
| R Level | U Level | A Level | N Level | E Level | C Level |
| 10 | 35 | 35 | 10 | 5 | 5 |

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)



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Course Outcome :

| No | Course Outcomes | RBT Level* |
|----|---|------------|
| 01 | Impart the knowledge about the characteristics, sources and properties of high strength and high performance concrete | RM, UN |
| 02 | Explain the importance and use of various metals in construction industry | UN, AP |
| 03 | Identify the use of FRP and other composite materials in construction industry | UN, AP, CR |
| 04 | Describe the application of waterproofing materials, concrete admixtures, and smart materials as per modern construction scenario | UN, AP, CR |

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Reference Books :

1. Building Materials, P. C. Varghese, Prentice Hall India.
2. Building & Construction materials : Testing & quality control by M. L. Gambhir & Neha Jamwal.
3. Building materials by S. K. Duggal.
4. The Science and Design of Engineering Materials, J. P. Schaffer, A. Saxena, S.D. Antolovich, T. H. Sanders and S.B. Warner, Irwin, 1995.
5. Construction materials: Their nature and behaviour, Eds. J.M. Illston and P.L.J. Domone, 3rd ed., Spon Press, 2001.
6. Properties of Engineering Materials, R.A. Higgins, Industrial Press, 1994.
7. Concrete: Microstructure, properties and materials, P. K. Mehta and P.J.M. Monteiro, McGraw Hill, 2006.
8. Properties of concrete, A.M. Neville, Pearson, 2004.
9. Building material and construction by S. S. Bhavikatti.

List of Experiments/Tutorials :

1. Special concretes – types and methods.
2. Metals to be used in construction.
3. Composites – types and application.
4. Construction chemicals and compounds.
5. Testing of Metals.
6. Properties of Non- cementous Concrete.
7. Application of admixture & additive.

List of Open Source Software/learning website :

<https://nptel.ac.in/>