# Rajiv Gandhi University Of Knowledge Technologies-AP

Constituted under the Act 18 of 2008

NUZVID - RK VALLEY-SRIKAKULAM-ONGOLE

**B. Tech Civil Engineering, Admitted Batch: 2020-21**

| Course Code | Course Name | Category | L-T-P | Credits |
|---|---|---|---|---|
| 20CE 2102 | CONCRETE TECHNOLOGY | PCC | 3-0-0 | 3 |

**Course Learning Objectives:** The student will able

1. Define the concepts of Concrete production and its behavior in various environments.
2. Distinguish about different types of concrete
3. Identify the production and quality control of concrete
4. Analyze the test procedures for the determination of properties of concrete.
5. Demonstrate durability properties of concrete in various environments.
6. Evaluate the mix design of concrete

**Course Content:**

**UNIT I: Concrete-Significance –Constituents (Contact Hours:8)**

History and significance of concrete as a sustainable construction material, Concrete Constituent Materials: Cement- Manufacturing –Basic Cement Chemistry – Hydration – Classification - Tests Aggregate – Classification – Characteristics & Properties of aggregates – Tests on aggregates and their significance – Grading – Fineness Modulus Water – Mixing water, Curing Water – Tests of water

**UNIT II: Admixtures & Fresh Concrete (Contact Hours:8)**

Admixtures – Classifications – Mineral Admixtures, Chemical Admixtures - Functions – Applications Fresh Concrete: Workability – definition, tests and interpretation, Rheology of fresh concrete, Effect of constituent materials on workability

**UNIT III: F Hardened Concrete (Contact Hours:6)**

Strength criterion, behavior under compressive strength. Factors affecting strength of hardened concrete: porosity, gel-space ratio, total voids in concrete, w/c ratio, degree of compaction, age etc. Elasticity, Shrinkage and creep of concrete Introduction to durability issues in concrete

**UNIT IV: Production of concrete and quality control (Contact Hours:8)**

Batching of materials, Mixing of concrete materials, transpiration, RMC, placing, compaction, finishing and curing, form work. Factors causing variations in concrete quality, field control, advantages of quality control, statistical quality control.

**UNIT V: Proportioning of concrete mixes (Contact Hours:8)**

Basic considerations, factors influencing choice of mix design proportions, methods of concrete mix designing – IS method (as per IS 10262: 2019), ACI method, British DoE method

**UNIT VI: Special Concretes** **(Contact Hours:7)**

Lightweight Concrete – Vacuum Concrete - Mass Concrete – Roller Compacted Concrete – Self Compacting Concrete - Fibre Reinforced Concrete – High Performance Concrete – Pre-Cast Concrete – 3D Printing of Concrete -Functions & Applications

**Learning Resources:**

**Text Books:**

1. M.L. Gambhir "*Concrete Technology Theory and Practice*" 5th Edition, 2017, McGrah Hill Education (India) Private Limited, 5th Edition.

**Reference Books:**

1. M.S SHETTY " *Concrete Technology Theory and Practice*" 8th Edition, 2018,S Chand Publications
2. A.M. Niveli& JJ Brooks "*Concrete Technology*" Pearson Education, 2nd Edition, 2010.

**Web Resources:**

1. NPTEL course on "*Concrete technology*"
   URL; **http://nptel.ac.in/courses/105/102/105102012/**
2. NPTEL course on "*Concrete Engineering technology*"
   URL; **http://nptel.ac.in/courses/105/104/105104030/**

**Course Outcomes:** Upon successful completion of the course, the student will be able to

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| CO1 | Understand the basic concepts of concrete and realize the importance of quality of concrete. |
| CO2 | Familiarize the basic ingredients of concrete and their role in the production of Concrete. |
| CO3 | Test the fresh concrete properties and the hardened concrete properties and evaluate the ingredients of concrete through lab test results. |
| CO4 | Familiarize the basic concepts of special concrete and their production. |
| CO5 | Understand the behavior of concrete in various environments |
| CO6 | Design the concrete mix by IS method |

| **Course Nature** | | **Theory** | | |
|---|---|---|---|---|
| **Assessment Method** | | | | |
| Assessment Tool | Weekly tests/Assignments (In Semester) | Monthly tests (In Semester) | End Semester Test | Total |
| Weightage (%) | 10% | 30% | 60% | 100% |

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