

|| Jai Sri Gurudev||
Sri Adichunchanagiri Shikshana Trust (R)
ADICHUNCHANAGIRI UNIVERSITY
BGS Institute of Technology

B. E. CIVIL ENGINEERING
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)

18CV44	Course Code	CONCRETE TECHNOLOGY	Course Title	IV	Semester
03	Credits	03 – 0 – 0 – 01	L – T – P – TL*	50 Hours	Teaching Period
100 Marks	Total	60 Marks	SEE*	40 Marks	CIE*
*NOTE: L – Lecture; T – Tutorial; P – Practical; TL – Total; CIE – Continuous Internal Evaluation; SEE – Semester End Examination					

<p>Course Learning Objectives: This course will enable students to:</p> <ol style="list-style-type: none"> 1. Recognize the importance of material characteristics and their contributions to strength development in concrete. 2. Proportion ingredients of Concrete to arrive at most desirable mechanical properties of Concrete. 3. Ascertain and measure engineering properties of concrete in fresh and hardened state which meet the requirement of real time structures. 	Teaching Hours
<p>Module-1 Concrete Ingredients Cement – Cement manufacturing process, chemical composition and their importance, hydration of cement, types of cement. Testing of cement. Fine aggregate: Functions, requirement, Alternatives to River sand, M-sand introduction and manufacturing. Coarse aggregate: Importance of size, shape and texture. Grading and blending of aggregate. Testing on aggregate, requirement. Recycled aggregates. Water – qualities of water. Chemical admixtures – plasticizers, accelerators, retarders and air entraining agents. Mineral admixtures – Pozzolanic and cementitious materials, Flyash, GGBS, silica fumes, Metakaolin and rice husk ash.</p>	10Hours
<p>Module-2 Fresh Concrete Workability-factors affecting workability. Measurement of workability–slump, Compaction factor and Vee-Bee Consistometer tests, flow tests. Segregation and bleeding. Process of manufacturing of concrete- Batching, Mixing, Transporting, Placing and Compaction. Curing – Methods of curing – Water curing, membrane curing, steam curing, accelerated curing, self-curing. Good and Bad practices of making and using fresh concrete and Effect of heat of hydration during mass concreting at project sites.</p>	10Hours
<p>Module-3 Hardened Concrete Factors influencing strength, W/C ratio, gel/space ratio, Maturity concept, Testing of hardened concrete, Creep – factors affecting creep. Shrinkage of concrete – plastic</p>	10Hours

<p>shrinking and dryingshrinkage, Factors affecting shrinkage. Definition and significance of durability. Internal and external factors influencing durability, Mechanisms- Sulphate attack – chloride attack, carbonation, freezing and thawing. Corrosion, Durability requirements as per IS-456, In-situ testing of concrete- Penetration and pull out test, rebound hammer test, ultrasonic pulse velocity.</p>	
<p>Module-4 Concrete Mix Proportioning Concept of Mix Design with and without admixtures, variables in proportioning and Exposure conditions, Selection criteria of ingredients used for mix design, Procedure of mix proportioning. Numerical Examples of Mix Proportioning using IS-10262</p>	10Hours
<p>Module-5 Special Concretes RMC- manufacture and requirement as per QCI-RMCPCS, properties, advantages and disadvantages. Self-Compacting concrete- concept, materials, tests, properties, applications. Fiber reinforced concrete - Fibers types, properties, application of FRC. Light weight concrete-material properties and types, applications</p>	10Hours
<p>Course outcomes:</p> <ol style="list-style-type: none"> 1. Knowledge of the ingredients of good concrete. 2. Ability to analyse the properties of fresh concrete. 3. Evaluate hardened properties of concrete. 4. Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes. 	
<p>Question paper pattern:</p> <ul style="list-style-type: none"> • Total number of Questions to be set is 10. Two full questions are to be set from each module. • Not more than 3 sub questions are to be set under any main question • Questions are to be set such that the entire module is covered and further, should be answerable for the set marks. • Each question should be set for 16 marks • Students should answer 5 full questions selecting at least 1 from each module. 	
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Neville A.M. “Properties of Concrete”-4th Ed., Longman. 2. M.S. Shetty, Concrete Technology - Theory and Practice Published by S. Chand and Company, New Delhi. 3. Kumar Mehta. P and Paulo J.M. Monteiro “Concrete-Microstructure, Property and Materials”, 4th Edition, McGraw Hill Education, 2014 4. A.R. Santha Kumar, “Concrete Technology”, Oxford University Press, New Delhi (New Edition) <p>Reference Books:</p> <ol style="list-style-type: none"> 1. M L Gambir, “Concrete Technology”, McGraw Hill Education, 2014. 2. N. V. Nayak, A. K. Jain Handbook on Advanced Concrete Technology, ISBN: 978-81- 8487-186-9 3. Job Thomas, “Concrete Technology”, CENGAGE Learning, 2015 4. IS 4926 (2003): Code of Practice Ready-Mixed Concrete [CED 2: Cement and Concrete] 5. Criteria for RMC Production Control, Basic Level Certification for Production Control of Ready Mixed Concrete-BMTPC 6. Specification and Guidelines for Self-Compacting Concrete, EFNARC, Association House 	