Department of Civil Engineering

VISION

To become a pioneer in the field of civil engineering by providing high quality education and research to serve the public consistently with competitive spirit professional ethics.

MISSION

- M1: Provide quality knowledge and advance skills to the students in order to expertise theoretically and practically in the areas of civil engineering.
- M2: Improve the professional potentiality of the students and staff through educational programs to expand the knowledge in the field of civil engineering
- M3: Inculcate healthy competitive spirit towards the higher education and successful career in the field of civil engineering to serve the nation ethically.

PROGRAMME EDUCTIONAL OBJECTIVES(PEOs)

- PEO 1: Employ a practicing civil engineer in construction, design, testing, and allied fields.
- PEO 2: Engaging in self-directed learning research or undertaking higher studies in the rapidly changing civil engineering environment.
- PEO 3: Create new methods/processes to meet the needs of society with their civil engineering knowledge.

MAPPING OF MISSION STATEMENTS WITH PEOs

MS/PEO	PEO 1	PEO 2	PEO 3
MS 1	3	3	2
MS 2	3	3	2
MS 3	3	3	2

1-Slight, **2**- Moderate, **3**- Substantial

PROGRAM OUTCOMES

Graduates of Civil Engineering Will:

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with

	appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSOs)	
PSO 1: Analyze, design and execute the civil engineering structures with good knowledge in engineering, mathematics & basic sciences.	
PSO 2: Follow the economic, environmental and safety factors involved in the construction industry.	

Mapping of PEOs with POs and PSOs

PEO/PO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
PEO 1	3	3	3	2	3	2	2	2	3	3	3	3	3	3
PEO 2	3	3	3	2	3	2	2	1	3	3	3	3	3	2
PEO 3	3	3	3	3	3	1	1	1	2	3	2	3	3	2

1-Slight, **2**- Moderate, **3**- Substantial

23ES110 BUILDING MATERIALS AND CONCRETE TECHNOLOGY							
(Civil Engineering)							
Programme & Branch	B.Tech & CIVIL	Sem	Category	L	T	P	Credit
Prerequisites	Basics of Civil Engineering	4	Engineering Science	3	0	0	3

Course Objectives :

1. To provide information on fundamental construction materials utilised in effective construction techniques.
2. To introduce fundamental Engineering techniques and ideas that are relevant to Concrete technology and Civil Engineering.

Preamble :	The primary focus of this subject is the research and progress of materials that serve as the fundamental basis of contemporary infrastructure, particularly in the field of concrete technology.

Course Contents:

Unit-1	Stones, Bricks, Masonry & Wood:	Contact Hours: 9

Stones: Properties of building stones –classification of stones – stone quarrying – precautions in blasting, dressing of stone,

Bricks: Composition of good brick earth, various methods of manufacturing of bricks.

Masonry: Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry.

Wood: Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber.

Unit-2	Cement, Aggregates & Admixtures	Contact Hours: 9

Cement: Portland cement- Chemical Composition – Hydration, setting and fineness of cement, various types of cement and their properties, various field and laboratory tests for Cement.

Aggregates

Classification of aggregates – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate Bulking of sand – Sieve analysis

Admixtures – Mineral and Chemical Admixtures – Accelerators, Retarders, Air Entertainers, Plasticizers, Super Plasticizers

Unit-3	Concrete - Mix Design	Contact Hours: 9

Ingredients of cement concrete and their importance; Water - Cement ratio

Mix Design: Factors in the choice of mix proportions – Durability of concrete –Quality Control of concrete – Statistical methods – Acceptance criteria – Concepts, Proportioning of concrete mixes by various methods – BIS method of mix design.

Unit-4	Fresh Concrete & Hardened Concrete	Contact Hours: 9

Fresh Concrete

Steps in Manufacture of Concrete–proportion, mixing, placing, compaction, finishing, curing, Properties of fresh concrete-Workability – Factors affecting workability – Measurement of workability by different tests, Segregation & bleeding – Mixing and vibration of concrete

Hardened Concrete:

Abram's Law – Gel space ratio –Maturity concept – Strength in tension & compression –Factors affecting strength Compression tests, Split Tensile strength test and Flexure tests.		
Unit-5	Elasticity, Creep & Shrinkage	Contact Hours: 9
Modulus of elasticity, Dynamic modulus of elasticity, Poisson's ratio, Creep of concrete, Factors influencing creep, Relation between creep & time, Nature of creep, Effects of creep – Shrinkage – types of shrinkage.		
		Total Hours: 45

Text Books:	
1	Building Materials by S.S. Bhavikatti, Vices publications House private ltd.
2	Concrete Technology by M. S. Shetty. – S. Chand & Company
3	Building Materials by B.C. Punmia, Laxmi Publications private ltd.
Reference Books:	
1	Building Materials by S.K.Duggal, New Age International Publications.
2	Building Materials by P.C.Verghese, PHI learning (P) ltd.
Web References :	
1	https://nptel.ac.in/courses/105/102/105102088/
2	https://nptel.ac.in/courses/105/102/105102012/

COURSE OUTCOMES: Upon completion of the course, students shall have ability to		BT Mapped (Highest Level)
CO 1	Identify different building materials and expected to differentiate brick masonry, stone masonry	L2
CO 2	Identify different types of cements, aggregates & admixtures	L2
CO 3	Familiarize with ingredients of concrete and design the concrete mix by BIS method	L2
CO 4	Gain knowledge of Fresh concrete & Hardened concrete	L2
CO 5	Determine the behavior of concrete	L3

Mapping of Cos with POs and PSOs														
COs/POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO 1	1	2	1	-	-	2	2	2	1	-	-	1	2	1
CO 2	2	1	1	1	-	2	1	2	0	1	-	1	1	1
CO 3	2	2	2	2	1	2	2	2	2	2	1	1	2	2
CO 4	2	1	-	1	-	2	1	2	0	1	1	-	1	1
CO 5	2	1	-	1	-	2	1	2	-	1	1	-	1	1
1 – Slight, 2 – Moderate, 3 – Substantial														

ASSESSMENT PATERN - THEORY							
TEST	Remembering (K2)%	Understanding (K2)%	Applying (K2)%	Analyzing (K2)%	Evaluating (K2)%	Creating (K2)%	Total%
MID-1	6	9	85				100
MID-2	6	9	75	5	5		100
SEE	10	10	70	5	5		100
*± 3% may be varied							