

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

Minor - BUILDING PLANNING & CONSTRUCTION TECHNOLOGY - Offered by Civil Department

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23MRBPC1	Construction Materials	3	-	-	3	30	70	100
2	23MRBPC2	Construction Methods	3	-	-	3	30	70	100
3	23MRBPC3	Building Planning And Drawing	3	-	-	3	30	70	100
4	23MRBPC4	Surveying	3	-	-	3	30	70	100
5	23MRBPC5	Concrete Technology	3	-	-	3	30	70	100
6	23MRBPC6	Concrete Technology Lab	-	-	3	1.5	30	70	100
7	23MRBPC7	Surveying Lab	-	-	3	1.5	30	70	100

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CIVIL Department
**BUILDING PLANNING &
CONSTRUCTION TECHNOLOGY**

23MRBPC1	CONSTRUCTION MATERIALS	L	T	P	C
		3	0	0	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

- To Understand the Types, Physical Characteristics, Testing, and Deterioration of Natural and Artificial Stones Used In Construction.(L2)
- To Explain and Classify Various Structural Clay Products Such As Bricks, Tiles, Terracotta, Porcelain, and their Manufacturing Processes and Applications.(L2)
- To Analyze and Apply the Knowledge of Cement, Aggregates, and Admixtures To Evaluate the Properties of Fresh and Hardened Concrete, Including Mix Design. (L3)
- To Evaluate and Apply the Knowledge of Wood and Timber—Its Properties, Preservation, Defects, Testing, and Uses In Building Construction. (L3)
- To Understand and Interpret the Composition, Application Techniques, and Properties of Paints, Varnishes, Enamels, and Surface Finishes.(L2)

UNIT –1: STONES: (9)

Introduction - Rock-Forming Minerals - Classification of Rocks - Quarrying of Stones - Seasoning of Stone - Dressing of Stone - Uses of Stones - Characteristics of Good Building Stones - Testing of Stones - Deterioration of Stones - Durability of Stones - Preservation of Stones - Selection of Stones - - Common Building Stones - Artificial Stones - Applications of Stones.

UNIT –2: STRUCTURAL CLAY PRODUCTS (9)

Introduction - Physical Properties of Clays - Classification of Bricks - Ingredients of Good Brick Earth - Characteristics of Good Brick - Manufacturing of Bricks - Different Forms of Bricks - Testing of Bricks - Defects of Bricks - Clay Tiles - Fire-Clay Bricks Or Refractory Bricks - Terracotta - Porcelain - Stoneware - Earthenware - Glazing - Majolica - Application of Clay Products.

UNIT –3: CEMENT & CONCRETE (9)

Introduction - Portland Cement - Chemical Composition - Hydration of Cement- Manufacture of Cement - Testing of Cement - Types of Cement – AGGREGATES - Classification of Aggregates - Fine Aggregate & Coarse Aggregate - Testing of Aggregates - Quality of Mixing & Curing Water – Admixtures For Concrete - Principles of Mix Design - Fresh and Hardened Properties .

UNIT –4: WOOD (9)

Introduction - Classification of Trees - Growth of Trees - Classification of Timber (IS: 399) - Structure of Timber - Characteristics of Good Timber - Seasoning of Timber - Defects In Timber - Diseases of Timber - Decay of Timber - Preservation of Timber (IS: 401) - Fire Resistance of Timber - Testing of Timber (IS: 1708) - Suitability of Timber For Specific Uses - Properties of Wood

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- Wood Products - Applications of Wood and Wood-Products

UNIT –5: Paints, Enamels and Varnishes

(9)

Introduction - Composition of Oil Paint - Characteristics of An Ideal Paint - Preparation of Paint - Covering Power of Paints - Pigment Volume Concentration (P.V.C.) - Painting Plastered Surfaces - Painting Wood Surfaces - Painting Metal Surfaces - Defects - Enamel - Distemper - Water Wash and Colour Wash - Varnish - French Polish - Wax Polish - Miscellaneous Paints

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course- students will be able to		Bloom's Level
CO1	Identify the Characteristics, Types, Deterioration, and Applications of Building Stones. (L2)	Understand (L2)
CO2	Classify and Evaluate the Quality and Suitability of Bricks, Tiles, and Other Structural Clay Products. (L3)	Apply (L3)
CO3	Analyze the Properties and Mix Design of Cement, Aggregates, and Concrete For Construction Use. (L4)	Analyze (L4)
CO4	Assess Timber Based On Its Properties, Preservation Methods, and Applications In Building Works. (L3)	Apply (L3)
CO5	Explain the Properties, Preparation, and Application of Paints, Varnishes, and Polishes For Surface Protection. (L2)	Understand (L2)

TEXT BOOKS:

- S.K. Duggal**, Building Materials, New Age International Pvt. Ltd., 3rd Revised Edition, 2008.
- P.C. Varghese**, Building Materials, PHI Learning Pvt. Ltd., 2nd Edition, 2015.

REFERENCE BOOKS:

- M. L. Gambhir**, Building Materials, Tata McGraw Hill Publishing Co. Ltd., 4th Edition, 2013.
- S. S. Bhavikatti**, Building Materials, Vikas Publishing House Pvt. Ltd., 3rd Edition, 2015.
- B. C. Punmia**, Building Materials, Laxmi Publications Pvt. Ltd., 2010.
- Jagadish, Venkatarama Reddy**, Alternate Building Materials and Technology, New Age International Publishers, 2010.
- Surendra Singh**, Engineering Materials, Vikas Publishing House Pvt. Ltd., 2014.
- P. D. Kulkarni et al.**, Civil Engineering Materials, Tata McGraw Hill Publishing Co. Ltd., 2008.

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	2	2	2	-	-	-	-	-	3	2
CO2	3	2	2	2	2	2	-	-	-	-	-	-	3	2
CO3	3	3	3	3	3	-	-	-	-	-	-	2	3	3
CO4	3	2	2	-	2	2	-	-	-	-	-	-	3	2
CO5	2	2	1	-	2	1	2	-	-	-	-	-	2	2

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3MRBPC2	CONSTRUCTION METHODS	L	T	P	C
		3	0	0	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

- To Understand the Importance, Types, and Selection of Foundations For Various Site Conditions. (L2)
- To Identify and Apply Construction Techniques of Different Types of Masonry and Structural Components.(L3)
- To Describe and Evaluate Different Types and Techniques of Plastering Used In Construction. (L2)
- To Examine the Properties, Applications, and Construction Methods of Various Flooring Types.(L4)
- To Analyze and Design Basic Components of Industrial Structures With Emphasis On Modern Techniques and Materials.(L4)

UNIT –1: FOUNDATIONS:

(9)

Introduction To Foundations - Importance of Foundations In Construction - Functions of A Foundation - Factors Affecting the Choice of Foundations - Types of Foundations - Shallow Foundations: Strip Footing, Isolated Footing, Combined Footing, Raft Foundation - Deep Foundations: Pile Foundations, Well Foundations - Site Investigation For Foundations - Soil Testing Methods, Bearing Capacity of Soils ,Methods of Improving Bearing Capacity.

UNIT –2: MASONRY

(9)

Introduction To Masonry Construction - Definition and Importance of Masonry - Comparison of Different Types of Masonry - Types of Masonry Construction - Brick Masonry: Stretcher, Header, English, Flemish Bonds - Stone Masonry: Random Rubble Masonry, Coursed Rubble Masonry, Ashlar Masonry -Concrete Block Masonry:Hollow Blocks, Solid Blocks, Interlocking Blocks - Composite Masonry: Brick-Stone Composite Masonry - Lintels, Arches, and Copings - Construction Techniques and Materials Used

UNIT –3: PLASTERING

(9)

Introduction To Plastering - Purpose and Importance of Plastering - Materials Used In Plastering (Cement, Lime, Gypsum) - Types of Plastering - Lime Plaster, Cement Plaster, Gypsum Plaster, Stucco Plaster - Methods of Plastering -Single Coat, Double Coat, and Three-Coat Plastering - Defects In Plastering and Remedies - Cracking, Peeling, Efflorescence, Blistering - Special Plastering Techniques -Waterproof Plastering, Decorative Plastering

UNIT –4: FLOORING

(9)

Introduction To Flooring - Importance and Requirements of Good Flooring - Types of Flooring - Hard Flooring: Stone (Marble, Granite, Kota), Concrete Flooring , Ceramic and Vitrified Tiles - Resilient Flooring: PVC, Linoleum, Rubber Flooring - Wooden Flooring: Solid Wood, Laminated Wood, Parquet Flooring - Special Flooring: Epoxy Flooring, Mosaic Flooring, Terrazzo Flooring - Construction Methods of Flooring - Laying of Different Floor Materials - Sub-Base Preparation and

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Finishing - Defects In Flooring and Repair Techniques -Cracking, Dampness, Uneven Settlement

UNIT –5: INDUSTRIAL STRUCTURES

(9)

Introduction To Industrial Structures - Requirements of Industrial Buildings - Structural Components - Types of Industrial Structures - Steel Structures: Components of Steel Buildings (Trusses, Columns, Girders) - Pre-Engineered Buildings (PEB): Concept, Advantages, and Applications - Portal Frames and Space Frames: Design and Construction Considerations - Roofing Systems In Industrial Buildings - Trusses, Shell Roofs, Domes, Vaults - Construction of Warehouses and Sheds : Material Selection, Structural Stability Considerations - Factories and Large-Span Structures, Construction Techniques For Long-Span Structures , Fire Resistance and Safety Measures - Special Considerations For Industrial Buildings - Ventilation and Lighting Requirements, Vibration Control and Noise Reduction Techniques

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course- students will be able to		Bloom's Level
CO1	Understand Various Types of Foundations, their Functions, and Methods To Improve Soil Bearing Capacity.(L2)	Understand (L2)
CO2	Apply Knowledge of Masonry Types, Bonds, and Composite Construction Methods In Practical Construction.(L3)	Apply (L3)
CO3	Identify Types of Plastering, Defects, and Special Techniques Used In Surface Finishing. (L2)	Understand (L2)
CO4	Analyze Different Flooring Materials, Laying Techniques, and Repair Methods. (L4)	Analyze (L4)
CO5	Design and Assess Components of Industrial Structures Such as Pebs, Trusses, and Roofing Systems.(L6)	Create (L6)

TEXT BOOKS:

1. B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, *Building Construction*, Laxmi Publications (P) Ltd., New Delhi, 2008.
2. P.C. Varghese, *Building Construction*, PHI Learning Pvt. Ltd., 2nd Edition, 2017.

REFERENCE BOOKS:

1. Sushil Kumar, *Building Construction*, Standard Publishers Distributors, New Delhi, 2013
2. S. S. Bhavikatti, *Building Construction*, Vikas Publishing House Pvt. Ltd., 2nd Edition, 2016.
3. Dr. S. C. Rangwala, *Building Construction*, Charotar Publishing House, 26th Edition, 2014.
4. R. L. Peurifoy, *Construction Planning, Equipment and Methods*, McGraw Hill Education, 8th Edition, 2010

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	–	–	2	2	2	–	–	–	–	2	3	2
CO2	3	3	2	–	2	2	–	–	–	–	–	2	3	3
CO3	3	2	–	–	2	1	–	–	–	–	–	2	2	2
CO4	3	3	2	2	3	1	–	–	–	–	–	3	3	3
CO5	3	3	3	3	3	2	2	–	–	–	–	3	3	3

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23MRBPC3	BUILDING PLANNING AND DRAWING	L	T	P	C
		3	0	0	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. To Understand the Principles of Building Planning and Regulatory Requirements For Residential and Public Structures. (L2)
2. To Apply Functional Planning Skills For Residential, Public, and Commercial Buildings Including Vastu and Barrier-Free Concepts. (L3)
3. To Analyze and Prepare Building Plans and Elevations For Industrial and Special-Purpose Structures. (L4)
4. To Utilize Computer-Aided Drafting Tools To Develop Architectural and Working Drawings. (L3)
5. To Evaluate Planning Strategies In Compliance With National Codes and Sustainability Standards. (L5)

UNIT -1: BUILDING PLANNING PRINCIPLES & REGULATIONS

(9)

Introduction To Building Planning - Objectives of Planning - Principles of Planning - Orientation of Buildings - Building Bye-Laws and Regulations - Necessity of Building Bye-Laws - National Building Code (NBC) Provisions - Local Municipal and Development Authority Regulations - Setbacks and Open Space Requirements - Floor Area Ratio (FAR) and Floor Space Index (FSI) , Height Regulations and Ground Coverage - Lighting, Ventilation, and Fire Safety Regulations - Natural Lighting and Ventilation Standards - Fire-Resistant Construction and Safety Measures - Concepts of Green Building and Sustainable Planning - Energy-Efficient Building Design - Passive Solar Architecture

UNIT -2: RESIDENTIAL BUILDINGS

(9)

Classification of Residential Buildings - Individual Houses, Duplex Houses, Apartments, Row Houses, Villas - Functional Requirements of A Residential Building - Zoning and Space Requirements For Different Rooms - Circulation and Connectivity - Types of Residential Plans - Single-Bedroom, Double-Bedroom, and Multi-Storey Residential Plans - Preparation of Building Plans - Plan, Elevation, and Section of A Simple Residential Building - Vastu Considerations In Residential Planning - Orientation of Rooms as Per Traditional Indian Architectural Practices.

UNIT -3: PUBLIC and COMMERCIAL BUILDINGS

(9)

Classification of Public Buildings - Educational Buildings (Schools, Colleges, Universities) - Institutional Buildings (Hospitals, offices, Banks) - Recreational Buildings (Theatres, Auditoriums, Stadiums) - Functional Requirements and Planning of Public Buildings - Planning of Commercial Buildings - Shopping Malls, Hotels, office Buildings - Preparation of Drawings For Public Buildings - Plan, Elevation, and Section of A Public/Commercial Building - Universal Design and Barrier-Free Planning - Provision For Differently-Abled Individuals - Ramps, Lifts, Tactile Paving, and Accessible Washrooms

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UNIT –4: INDUSTRIAL and SPECIAL STRUCTURES

(9)

Introduction To Industrial Buildings - Functional Planning of Industries - Layout of Factory Buildings - Types of Industrial Structures - Warehouses, Godowns, Cold Storage Facilities - Special Purpose Buildings - Parking Structures, Bus Terminals, Railway Stations, Airports - Planning of Multi-Storied Buildings - Structural Aspects and Service Provisions - Vertical Circulation (Lifts, Escalators, Staircases) - Preparation of Drawings For Industrial Buildings – Plan, Elevation, and Section of An Industrial Shed Or Warehouse

UNIT –5: COMPUTER-AIDED DRAWING (CAD) and WORKING DRAWINGS

(9)

Introduction To CAD In Building Drawing - Importance of CAD In Modern Construction - Software Used (Autocad, Revit, Sketchup) - Preparation of Working Drawings - Detailed Plans, Elevations, and Sections – Site Plan, Key Plan, and Service Plans - Structural Drawings and Detailing - Footing Details, Column Layouts, Slab Reinforcement - Preparation of Submission Drawings - Sanction Drawings as Per Municipal Regulations - Approval Process and Documentation - Service Drawings - Electrical, Plumbing, and HVAC (Heating, Ventilation, and Air Conditioning) Drawings.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course- students will be able to		Bloom's Level
CO1	Understand the Objectives and Principles of Building Planning, and Interpret National and Local Building Regulations. (L2)	Understand (L2)
CO2	Apply Functional Planning Techniques For Various Residential Building Layouts and Integrate Vastu Principles. (L3)	Apply (L3)
CO3	Design and Draw Public, Commercial, and Industrial Buildings as Per Functional and Universal Design Standards. (L6)	Create (L6)
CO4	Develop Detailed Plans, Elevations, and Sections Using CAD Software For Residential and Non-Residential Buildings. (L3)	Apply (L3)
CO5	Evaluate and Prepare Service Drawings, Submission Drawings, and Working Drawings In Compliance With Municipal Regulations. (L5)	Evaluate (L5)

TEXT BOOKS:

1. **1.** M. G. Shah, C. M. Kale, *Building Drawing*, Tata McGraw Hill Publishing Co. Ltd., 2nd Edition, 2012.
2. Gurucharan Singh, *Building Drawing*, Standard Publishers Distributors, 9th Edition, 2015.

REFERENCE BOOKS:

- K. R. Karnan, *Building Planning and Drawing*, Scitech Publications (India) Pvt. Ltd., 2016.
- S. P. Bindra, *Building Drawing and Detailing*, DhanpatRai Publishing Co., 2014.

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- B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, *Building Planning and Drawing*, Laxmi Publications Pvt. Ltd., 2011

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2	–	–	–	2	2	1	–	–	–	2	2	3
C02	3	2	3	–	2	–	–	–	2	–	–	2	3	3
C03	3	3	3	–	2	–	–	–	2	–	–	2	3	3
C04	2	–	2	–	3	–	–	–	–	–	–	2	3	3
C05	3	2	3	–	3	2	2	2	2	2	–	3	3	3

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23MRBPC4	SURVEYING	L	T	P	C
		3	0	0	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the Principles, Classifications, and Fundamental Techniques of Surveying Including Chain, Compass, Levelling, and Plane Table Surveys. **(L2)**
2. Apply Basic Surveying Instruments and Techniques For Measurement of Distances, Angles, Levels, Areas, and Volumes. **(L3)**
3. Analyze and Compute Traverse Data, Horizontal and Vertical Angles Using theodolites and Trigonometric Levelling Methods. **(L4)**
4. Evaluate the Use of Modern Surveying Instruments Like Total Stations, GPS, and Remote Sensing Tools For Spatial Data Acquisition. **(L5)**

Interpret Photogrammetric Data For Topographic Mapping, Aerial Triangulation, and Preparation of Maps Using Stereoscopy. **(L5)**

UNIT –1: (9)

Introduction and Basic Concepts: Introduction, Objectives, Classification and Principles of Surveying, Surveying Accessories. Introduction To Compass, Leveling and Plane Table Surveying.

Linear Distances- Approximate Methods, Direct Methods- Chains- Tapes, Ranging, Tape Corrections.

Prismatic Compass- Bearings, Included Angles, Local Attraction, Magnetic Declination, and Dip – Systems and W.C.B and Q.B Systems of Locating Bearings

UNIT –2 (9)

Leveling- Types of Levels, Methods of Levelling, and Determination of Levels, Effect of Curvature of Earth and Refraction.

Contouring- Characteristics and Uses of Contours, Methods of Contour Surveying.

Areas - Determination of Areas Consisting of Irregular Boundary and Regular Boundary.

Volumes -Determination of Volume of Earth Work In Cutting and Embankments For Level Section, Capacity of Reservoirs.

UNIT –3: (9)

Theodolite Surveying: Types of theodolites, Temporary Adjustments, Measurement of Horizontal Angle By Repetition Method and Reiteration Method, Measurement of Vertical Angle, Trigonometrical Leveling When Base Is Accessible and Inaccessible.

Traversing: Methods of Traversing, Traverse Computations and Adjustments, Introduction To Omitted Measurements.

UNIT –4: (9)

Curves: Types of Curves and their Necessity, Elements of Simple, Compound, Reverse Curves. Introduction To Tacheometric Surveying.

Modern Surveying Methods: Principle and Types of E.D.M. Instruments, Total Station- Advantages and Applications. Introduction To Global Positioning System. Introduction To Drone Survey and Lidar survey (Light Detection and Ranging).

UNIT –5:

(9)

Photogrammetry Surveying:

Introduction, Basic Concepts, Perspective Geometry of Aerial Photograph, Relief and Tilt Displacements, Terrestrial Photogrammetry, Flight Planning; Stereoscopy, Ground Control Extension For Photographic Mapping- Aerial Triangulation, Radial Triangulation, Methods; Photographic Mapping- Mapping Using Paper Prints, Mapping Using Stereo-Plotting Instruments, Mosaics, Map Substitutes.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course- students will be able to		Bloom's Level
CO1	To Understand the Basic Principles, Classifications, and Techniques of Surveying Using Chain, Compass, Levelling, and Plane Table Methods. (L2)	Understand (L2)
CO2	To Apply Appropriate Methods For Levelling, Contouring, and Calculating Areas and Volumes For Civil Engineering Projects. (L3)	Apply (L3)
CO3	To Analyze and Compute Angular Measurements, Traverses, and Heights Using theodolites and Trigonometric Levelling. (L4)	Analyze (L4)
CO4	To Utilize Modern Surveying Tools Such as EDM, Total Station, GPS, Drones, and Lidar For Advanced Spatial Data Collection. (L3)	Apply (L3)
CO5	To Evaluate and Interpret Photogrammetric Data For Map Preparation, Stereoscopy, Aerial Triangulation, and Mosaics. (L5)	Evaluate (L5)

TEXT BOOKS:

1. S. K. Duggal, *Surveying* (Vol. 1 & 2), Tata McGraw Hill Publishing Co. Ltd., New Delhi, 5th Edition, 2019.
2. C. Venkatramaiah, *Textbook of Surveying*, Universities Press, 1st Edition, 2011.

REFERENCE BOOKS:

1. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, *Surveying* (Vol. 1), Laxmi Publications (P) Ltd., New Delhi, 18th Edition, 2024.
2. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, *Surveying* (Vol. 2), Laxmi Publications (P) Ltd., New Delhi, 17th Edition, 2022.
3. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, *Surveying* (Vol. 3), Laxmi Publications (P) Ltd., New Delhi, 16th Edition, 2023.
4. A. M. Chandra, *Plane Surveying and Higher Surveying*, New Age International Pvt. Ltd., New Delhi, 3rd Edition, 2015.

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5. N. Basak, *Surveying and Levelling*, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 4th Edition, 2014.
6. K. R. Arora, *Surveying* (Vol. 1, 2 & 3), Standard Book House, Delhi, 12th Edition, 2015.

REFERENCE WEBSITE:

https://Onlinecourses.Nptel.Ac.In/Noc20_Ce18/Preview

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
C01	3	2	2	-	2	-	-	-	1	2	-	-	3	2
C02	3	3	2	2	2	-	1	-	-	1	-	-	3	3
C03	3	3	2	2	3	-	-	-	-	2	-	2	3	2
C04	3	2	2	2	3	-	2	-	-	2	-	2	3	3
C05	2	3	2	3	3	-	2	2	-	1	-	2	3	3

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23MRBPC5	Concrete Technology	L	T	P	C
		3	0	0	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the Composition, Properties, Specifications, and Testing Methods For Concrete Materials. [L1]
2. Learn the Methods of Concrete Production Including Mixing, Transportation, Placing, Compaction, and Curing. [L2]
3. Acquire Knowledge On the Behavior of Fresh and Hardened Concrete and Factors Influencing Performance. [L3]
4. Develop the Ability To Design Concrete Mixes Using Standard Methods For Normal and High Strength Concrete. [L4]
5. Explore Special Concretes, Quality Control Measures, and Durability Aspects. [L4]

UNIT -1: **(9)**

Materials For Making Concrete: Cement - Chemical Composition, Physical Properties; Tests, I.S. Specifications; Different Types – Aggregates - Classification, Mechanical Properties, and Tests, Grading Requirements, Sampling of Aggregate; Water - Quality of Water, Permissible Impurities As Per I.S; – Mineral Admixtures: Fly Ash, GGBS, Silica Fume, Metakaolin, Rice Husk Ash, Etc. Chemical Admixtures - Accelerators, Retarders, Water Reducing Agents, Super Plasticizers, Air Entrainers, Water Proofer.

UNIT -2: **(9)**

Concrete: Manufacture of Concrete, Measurement of Materials, Storage and Handling, Batching Plant and Equipment Mixing - Types of Mixers, Transportation of Concrete, Pumping of Concrete, Placing of Concrete, Under Water Concreting, Compaction of Concrete, Curing of Concrete, Ready Mixed Concrete. Mix Design - Nominal Mixes and Design Mixes, Factors Influencing Mix Design; ACI Method and I.S Method, Design For High Strength Mixes.

UNIT -3: **(9)**

Fresh, Hardened Properties of Concrete: Fresh Concrete - Workability, Tests For Workability, Cohesion, Segregation, and Bleeding; Hardened Concrete- Factors Affecting Strength of Concrete, Strength of Concrete In Compression, Tension, and Flexure; Stress- Strain Characteristics and Elastic Properties; Introduction To Microstructural Properties of Concrete

UNIT -4 **(9)**

Mix Design - Factors Influencing Mix Proportion - Mix Design By ACI Method and I.S. Code Method - Design of High Strength Concrete. Strength of Concrete - Shrinkage and Temperature Effects - Creep of Concrete - Permeability of Concrete - Durability of Concrete - Corrosion - Causes and Effects - Remedial Measures- thermal Properties of Concrete - Micro Cracking of Concrete.

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UNIT –5

(9)

Special Concrete - Lightweight Concrete - Fibre Reinforced Concrete - Polymer-Polymer Modified Concrete - Ferrocement - Mass Concrete - Ready Mix Concrete- Self Compacting Concrete- Quality Control - Sampling and Testing-Acceptance Criteria.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course- students will be able to		Bloom's Level
CO1	Explain the chemical and physical properties of cement, aggregates, water, and admixtures as per IS standards. [L2]	Understand (L2)
CO2	Describe the manufacturing process of concrete, including equipment, methods, and curing techniques. [L2]	Apply (L3)
CO3	Analyze the fresh and hardened properties of concrete including workability, strength, and microstructure. [L4]	Analyze (L4)
CO4	Design concrete mix proportions using ACI and IS methods for normal and high-strength concrete. [L4]	Evaluate (L5)
CO5	Evaluate the behavior and performance of concrete under various conditions, including shrinkage, creep, corrosion, thermal effects, and special concrete types. [L5]	Create (L6)

TEXT BOOKS:

1. Properties of Concrete, AM Nevelli, Prentice Hall Publishers, 2012, 5th Edition.
2. Concrete Technology: theory and Practice, M.L. Gambhir, Tata McGraw Hill Publishers, 2017, 5th Edition.

REFERENCE BOOKS:

1. P. Kumar Mehta , Paulo J.M. Monteiro, Concrete: Microstructure, Properties, and Materials, Mcgraw Hill Education, 2014
2. Concrete Technology: theory and Practice, M. S. Shetty and A. K. Jain, S Chand Co., Publishers, 2018.
3. Concrete Technology, J.J. Brooks and A. M. Neville, Pearson, 2019, 2nd Edition.
4. Santakumar A.R., Concrete Technology, Oxford University Press, New Delhi, 2007.

REFERENCE WEBSITE:

CO \ PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	2	-	2	-	-	2	-	1	3	2
CO2	3	3	2	2	2	-	-	-	-	2	-	1	3	2
CO3	3	3	3	3	3	-	2	-	1	3	-	2	3	3
CO4	3	3	3	2	3	-	-	-	1	3	-	2	3	3
CO5	3	3	3	3	3	1	3	2	1	3	-	2	2	3

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23MRBPC6	Concrete Technology Lab	L	T	P	C
		-	-	3	1.5

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the Physical Properties and Behavior of Cement and Aggregates. [L1]
2. Gain Hands-On Experience In Determining the Fresh and Hardened Properties of Concrete. [L2]
3. Conduct Standard Laboratory Procedures For Assessing the Quality of Concrete Materials. [L3]
4. Familiarize With Concrete Mix Design Using IS Method. [L4]
5. Interpret Experimental Data For Evaluating the Performance of Concrete. [L5]

Experiments:

1. Determination of Fineness and Specific Gravity of Cement.
2. Determination of Consistency of Standard Cement Paste.
3. Determination of Initial and Final Setting Times of Cement.
4. Determination of Compressive Strength of Cement.
5. Determination of Soundness of Cement By La-Chatalier's Apparatus.
6. Determination of Fineness Modulus of Coarse and Fine Aggregates.
7. Determination of Percentage of Voids, Bulk Density, Specific Gravity of Coarse and Fine Aggregates.
8. Workability Tests: Slump Cone Test, Compaction Factor Test, Vee-Bee Consistometer, Flow Test.
9. Preparing and Curing Concrete Specimens For Tests & Determination of Compressive Strength of Concrete Cubes.
10. Study of Stress - Strain Characteristics of Concrete and Tests For Tensile Strength of Concrete.
11. Experiments To Demonstrate the Use of Non-Destructive Test Equipment.
Mix Design: IS Code Method.

Course Outcomes:

After Completing This Course, the Student Will Be Able To:

- C01:** Determine the Physical Properties of Cement Through Standard Tests Such As Fineness, Consistency, Setting Time, Soundness, and Compressive Strength. [L3]
- C02:** Assess the Properties of Fine and Coarse Aggregates and Evaluate the Workability of Fresh Concrete Using Standard Test Methods. [L3]
- C03:** Prepare, Cure, and Test Concrete Specimens To Determine Compressive and Tensile Strength, and Analyze Stress-Strain Behavior. [L4]
- C04:** Apply the IS Method For Concrete Mix Design and Verify the Mix Through Testing. [L4]
- C05:** Demonstrate the Use of Non-Destructive Testing Equipment To Assess the Quality of Hardened Concrete. [L3]

TEXT/REFERENCE BOOKS:

Concrete Technology: theory and Practice, M.L. Gambhir, Tata McGraw Hill Publishers, 2017, 5th Edition.

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[illegible]

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23MRBPC7	Surveying Lab	L	T	P	C
		-	-	3	1.5

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. Understand and perform different types of surveying techniques including chain, compass, plane table, and Theodolite surveying. [L2]
2. Apply methods of leveling and contouring for field measurements and building layouts. [L3]
3. Interpret and plot survey data accurately to prepare maps and plans. [L3]
4. Use modern surveying instruments like Total Station for precise measurements. [L3]
5. Develop skills to set out curves and perform traversing for practical civil engineering projects. [L3]

Experiments:

1. Chain Survey - Traversing and Plotting of Details
2. Compass Survey - Traversing With Compass and Plotting
3. Plane Table Survey - Method of Radiation and Intersection
4. Levelling - Fly Leveling - Plane of Collimation Method
5. Levelling - Fly Leveling - Rise and Fall Method
6. Levelling - Longitudinal and Cross Sectioning
7. Levelling - Contour Surveying
8. Layout of Buildings
9. Profile Levelling and Cross Sectioning.
9. Grid Contouring
10. Theodolite Surveying - Measurement of Horizontal Angle By Method of Repetition and Reiteration
11. Setting Out of Simple Curves - Linear Methods
12. Description of Total Station

Course Outcomes:

After completing this course, the student will be able to:

CO1: Conduct chain, compass, and plane table surveys, and accurately plot survey details. [L3]

CO2: Perform leveling operations including fly leveling, profile leveling, and contouring for terrain mapping. [L3]

CO3: Use theodolite for precise measurement of horizontal angles and set out simple curves. [L4]

CO4: Operate Total Station equipment for accurate data collection and site layout. [L4]

CO5: Prepare field survey maps and layouts for building and civil engineering projects based on survey data. [L4]

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Course Outcome s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
C01	3	3	2	-	1	-	-	-	1	2	-	-	3	2
C02	3	3	2	-	1	-	-	-	1	2	-	-	3	2
C03	3	3	3	-	2	-	-	-	1	3	-	-	3	3
C04	3	3	3	-	2	-	-	-	1	3	-	-	3	3
C05	3	3	3	-	2	-	-	-	1	3	-	-	3	3

TEXT/REFERENCE BOOKS:

Surveying and Levelling By N.N.Basak, TMH Publication 2. Surveying By B.C. Punamia, A.K. Jain and A.K. Jain, Vol. 1, Laxmi Publications (P) Ltd., New Delhi

Online Resources:

- <https://Nptel.Ac.In/Courses/105/107/105107122/>
- <https://Nptel.Ac.In/Courses/105/104/105104101/>
- <http://Sl-Iitr.Vlabs.Ac.In/Sl-Iitr/>