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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTCE301N	DCC	Material Technology	60	20	20	30	20	2	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
The Objective of the course is to develop an understanding of construction materials, focusing on their properties, applications, and selection criteria.

Course Outcomes (COs):
The students will be able to

1. Recognize various construction materials, categorize them based on origin
2. Understand the physical, chemical, and mechanical properties of construction materials
3. Assess factors like strength, durability, cost-effectiveness, and environmental impact when choosing materials for construction.
4. Investigate special and processed materials, such as geosynthetics and ferrocrete, and their roles in modern construction.

Syllabus

UNIT I **6 Hrs.**

Overview of Construction Materials: Scope of construction materials in various engineering fields. Selection criteria based on strength, durability, eco-friendliness, and economy. Classification: Natural, Artificial, Special, Finishing, and Recycled materials.

UNIT II **6 Hrs.**

Natural Construction Materials: Characteristics, quarrying, and dressing of stone. Timber: properties, seasoning, preservation, and defects. Bamboo in construction. Asphalt, bitumen, and tar: properties and uses. Lime: types and uses. Soil types and suitability. Sand properties and aggregate classification.

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UNIT III **6 Hrs.**

Artificial Construction Materials - Bricks: types, characteristics, tests, and manufacturing process. Cement: composition, types, and tests. Pre-cast concrete blocks: types and applications. Plywood, particle board, veneers, laminated board, and their uses. Glass: types and applications. Ferrous and non-ferrous metals in construction.

UNIT IV **6 Hrs.**

Special Construction Materials: Termite-proofing, thermal and sound insulation materials. Fibers: jute, glass, plastic, asbestos (uses only). Geopolymer cement: properties and uses.

UNIT V **6 Hrs.**

Processed Construction Materials - POP and finishing boards: constituents, sizes, and uses. Paints and varnishes: types and applications. Industrial waste materials: fly ash, slag, marble waste, and their uses. Agro waste materials: rice husk, bagasse, coir fibers. Special processed materials: geosynthetics, ferrocrete, artificial timber, and sand.

Text Books:

1. Engineering Materials – S. C. Rangwala, Charotar Publishers, Ahmedabad, 2019 (43rd Edition).
2. Building Materials – S. K. Duggal, New International, New Delhi, 2012 (4th Edition).
3. Building Materials – P. C. Varghese, PHI Learning, New Delhi, 2015 (2nd Edition).

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DTCE301N	DCC	Material Technology	60	20	20	30	20	2	0	2	4

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Reference Books:

1. Civil Engineering Construction Materials – S. K. Sharma, Khanna Publishing House, Delhi, 2019 (1st Edition).
2. Engineering Materials – R. K. Rajput, S. Chand and Company, 2006 (3rd Revised Edition).
3. Laboratory Manual on Testing of Engineering Materials – H. Sood, New Age Publishers, New Delhi, 2003.
4. Engineering Materials – C. P. Sharma, PHI Learning, New Delhi, 2003.

List of Experiments.

1. Identify various sizes of available coarse aggregates from sample of 10 kg in laboratory and prepare report (60,40, 20,10 mm)
2. Identify the available construction materials in the laboratory on the basis of their sources.
3. Select first class, second class and third-class bricks from the stake of bricks and prepare report on the basis of its properties.
4. Measure dimensions of 10 bricks and find average dimension and weight. Perform field tests- dropping, striking and scratching by nail and correlate the results obtained.
5. Identify the type of glasses from the given samples.
6. Prepare the cement mortar of proportion 1:3 or 1:6 using artificial sand as a special processed construction material.
7. Prepare mortar using cement and Fly ash or Granite/marble polishing waste in the proportion 1:6 or 1:3.

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DTCE302N	DCC	Mechanics of Materials	60	20	20	30	20	2	1	2	4

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
After competing this course, students will be able to:

1. To learn properties of area and structural material properties.
2. To understand the concept of stress and strain.
3. To calculate shear force, bending moment for different shapes of structural elements
4. To understand the concept of buckling loads for short and long columns.

Course Outcomes (COs):
After competing in this course, student will be able to:

1. Articulate practical applications of moment of inertia of symmetrical and unsymmetrical structural sections.
2. Analyze structural behaviour of materials under various loading conditions.
3. Determine the bending and shear stresses in beams under different loading conditions.
4. Analyze the column for various loading and end conditions.

Syllabus

UNIT I **8 Hrs.**

Moment of Inertia Moment of inertia (M.I.): Definition, M.I. of plane lamina, Radius of gyration, section modulus, Parallel and Perpendicular axes theorems, M.I. of rectangle, square, circle, semi-circle, quarter circle and triangle section.

UNIT II **9 Hrs.**

Simple Stresses and Strains Definition of rigid, elastic and plastic bodies, deformation of elastic body under various Forces, Definition of stress, strain, elasticity, Hook's law, Elastic limit, Modulus of elasticity. Type of Stresses- Tensile and Compressive stresses.

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UNIT III **8 Hrs.**

Shear Force and Bending Moment- Types of supports, beams and loads, Concept and definition of shear force and bending moment, Shear force and bending moment diagram for cantilever and simply supported beams, Subjected to point loads, uniformly distributed loads and couple (combination of any two types of loading)

UNIT IV **8 Hrs.**

Bending and Shear Stresses in beams - Concept and theory of pure bending, assumptions, flexural equation (without derivation), bending stresses and their nature, bending stress distribution diagram. Concept of moment of resistance and simple numerical problems using flexural equation.

UNIT V **9 Hrs.**

Columns - Concept of compression member, short and long column, Effective length, Radius of gyration, Slenderness ratio, Types of end condition for columns, buckling of axially loaded columns. Euler's theory, assumptions made in Euler's theory and its limitations, Application of Euler's equation to calculate buckling load.

Text Books:

1. Strength of Materials – D. S. Bedi, Khanna Publishing House, Delhi, 2018.
2. Mechanics of Structures (Vol. 1) – Dr. H. J. Shah & S. B. Junnarkar, Charotar Publishing House Pvt. Ltd., 2016.
3. Strength of Materials – R. S. Khurmi, S. Chand and Co. Ltd., New Delhi, 2005.

Reference Books:

1. Strength of Materials – S. S. Rattan, McGraw Hill Education, New Delhi, 2017
2. Strength of Materials – R. K. Bansal, Laxmi Publications, 2024
3. Strength of Materials – R. Subramaniam, Oxford University Press, 2016.

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List of Experiments:

1. To determine the Compressive Strength of Materials.
2. To determine the Tensile Strength of Materials.
3. To determine the Rockwell Hardness of Materials.
4. To determine the Toughness of the materials.
5. To determine the deflection of Beam using deflection-beam apparatus.
6. To determine young's modulus of Elasticity of different materials of beam (simply supported).

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DTCE303N	DCC	Building Drawing and Design	60	20	20	30	20	2	0	2	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
The students should be able to learn basic principles and various byelaws of the building planning and drawing.

Course Outcomes (COs):
The students should be able to:

1. To learn basic principles of building planning and drawing.
2. To know graphical representation of various components of buildings.
3. To draw complete plan and elevation of a building.
4. To learn basics of perspective drawings and Computer Aided Drawings

Syllabus

UNIT I **7 Hrs.**

Conventions and Symbols: IS 962 conventions; symbols for materials, doors, windows, sanitary, and electrical installations. Types of lines and their uses. Lettering, numerals, and scales selection. Standard sheet sizes and interpretation of architectural drawings.

UNIT II **5 Hrs.**

Introduction of Building Elements and their Drawings: Explain various building Elements (Foundation, Roof, Floor, walls, Lintels etc.); Drawing of various type of doors & window; Stair and their types (like Dog legged, Open well etc.)

UNIT III **6 Hrs.**

Planning of Building: Principles of planning for Residential and Public building; Introduction to National Building Code; Space requirement and norms for minimum dimension of different units in the residential and public buildings as per IS 962; Rules and byelaws of sanctioning authorities for construction work; Plot area built up area, super built-up area, plinth area, carpet area, floor area and FAR (Floor Area Ratio).

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DTCE303N	DCC	Building Drawing and Design	60	20	20	30	20	2	0	2	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit.
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UNIT IV **7 Hrs.**

Drawing of Building: Line plans for residential building of minimum three rooms including water closet (WC), bath and staircase as per principles of planning; Line plans for public building-school building, primary health center, restaurant, bank, post office, hostel, Function Hall, and Library; Draw Dimensional Plan and Elevation of Residential building.

UNIT V **5 Hrs.**

Perspective Drawing: Definition, Types of perspective, terms used in perspective drawing, principles used in perspective drawing; Explain Various Method of perspective with Example.

Textbooks:

1. Building Drawing – M. G. Shah, C. M. Kale, & S. Y. Patki. McGraw Hill Publishing Company Ltd., New Delhi., 2019
2. Civil Engineering Drawing – Malik & Meo. Computech Publication Ltd., New Asian Publishers, New Delhi, 2023.
3. Principles of Perspective Drawing – M. G. Shah & C. M. Kale. McGraw Hill Publishing Company Ltd., New Delhi, 2017.

Reference Books:

1. Building Planning and Drawing – Kumara Swamy, N. Rao & A. Kameshwara. Charotar Publication, Anand, 2023
2. Building Construction – S. S. Bhavikatti. Vikas Publication House Pvt. Ltd., New Delhi, 2017.

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DTCE303N	DCC	Building Drawing and Design	60	20	20	30	20	2	0	2	3

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

List of Experiments.

1. Draw various types of lines, graphical symbols for materials, doors and windows, symbols for sanitary, water supply and electrical installations and write abbreviations as per IS 962
2. Write summary of observations of all technical details from the given drawing (One/Two BHK) obtained from the professional architect or civil engineer (Group activity in four students)
3. Measure the units of existing building and Draw line plan of measured existing building with suitable scale.
4. Draw line plan to suitable scale (Minimum 1BHK, staircase, WC and Bathroom)
5. Draw line plans to suitable scale for any Five Public Buildings from the following (School Building, Primary Health Centre, Bank, Post Office, Hostel, Restaurant, Community Hall, and Library).
6. Draw the Dimensional plans and elevation of residential building (One/Two BHK)

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DTCE304N	DCC	Surveying	60	20	20	30	20	3	0	2	4

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To apply the knowledge of surveying for field survey.
2. To know the types of method and equipments to be used for different surveys.
3. To know the use and operational details of various surveying equipments.

Course Outcomes (COs):

The students will be able to

1. Select the type of survey required for given situation.
2. Compute area of open field using chain, tape and cross staff.
3. Conduct traversing in the field using chain and compass.
4. Use digital planimeter to calculate the areas.

Syllabus

UNIT I **8 Hrs.**

Overview and Classification of Survey - Survey- Purpose and Use. Types of surveying- Primary and Secondary, Classification: Plane, Geodetic, Cadastral, Hydrographic, Photogrammetry and Aerial. Principles of Surveying. Scales: Engineer's scale, Representative Fraction (RF) and diagonal scale.

UNIT II **9 Hrs.**

Chain Surveying - Instruments: Metric chain, tapes, arrows, ranging rods, cross staff, optical square, etc. Survey stations, baseline, check line, tie line, offsets. Ranging: Direct and indirect. Chaining methods and obstacles. Errors: Instrumental, personal, natural, and random. Triangulation principles. Types of offsets. Conventional signs and field book recording.

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UNIT III **8 Hrs.**

Compass Traverse Survey - Compass traversing: Open and closed. Technical terms: Meridians, bearings (WCB & RB), conversions, fore & back bearings, internal/external angle calculations. Magnetic needle dip and declination. Prismatic compass: Components, adjustments, and usage. Local attraction and error correction. Traverse plotting and graphical error adjustment.

UNIT IV **10 Hrs.**

Levelling and Contouring - Terminology: Level surfaces, datum, benchmarks, reduced level, collimation, station sights. Types of levels: Dumpy, tilting, auto, digital. Components and adjustments of dumpy level. Leveling staff: Self-reading and target staff. Reduction of levels: Collimation and rise & fall method. Leveling types: Simple, differential, fly, profile, reciprocal. Contours: Intervals, characteristics, uses, and contouring methods (direct & indirect).

UNITV **8 Hrs.**

Measurement of Area and Volume and Advanced Survey Instruments - Components and use of Digital planimeter. Measurement of area using digital planimeter. Measurement of volume of reservoir from contour map: Introduction to Total Station, GIS, GPS

Textbooks:

1. Surveying Volume I – S. K. Duggal, McGraw Hill Education, New Delhi, 2019 (5th Edition).
2. Surveying I – B. C. Punmia, Ashok Kumar Jain & Arun Kumar Jain, Laxmi Publications, New Delhi, 2016 (17th Edition).
3. Surveying and Levelling – N. N. Basak, McGraw Hill Education, New Delhi, 2017 (2nd Edition).

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Reference Books:

1. Surveying and Levelling Volume I – T. P. Kanetkar & S. V. Kulkarni, Pune Vidyarthi Gruh Prakashan, 2006.
2. Surveying – M. D. Saikia, B. M. Das & M. M. Das, PHI Learning, New Delhi, 2010.
3. Fundamentals of Surveying and Levelling – R. Subramanian, Oxford University Press, New Delhi, 2014 (2nd Edition).

List of Experiments:

1. Measure distance between two survey stations using chain, tape and ranging rods when two stations are inter-visible.
2. Undertake reciprocal ranging and measure the distance between two stations.
3. Determine area of open field using chain and cross staff survey.
4. Measure Fore Bearing and Back Bearing of survey lines of open traverse using Prismatic Compass.
5. Measure Fore Bearing and back bearing of a closed traverse of 5 or 6 sides and correct the
6. bearings and included angles for the local attraction.
7. Undertake Survey Project with chain and compass for closed traverse for minimum 5 sides around a building.
8. Undertake simple leveling using dumpy level/ Auto level and leveling staff.
9. Measure area of irregular figure using Digital planimeter.

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