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			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCE301N	**DCC**	**Construction Materials and Building Construction**	60	20	20	30	20	3	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 students will be able to identify, use and apply available material and technique according to field requirement efficiently and economically.

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

1. Communicate building features and select the good quality material for safe and stable construction.
2. Apply appropriate technique or Material for economic construction at a particular place.
3. Provide various building services in building according to conditions and impart / introduce an aesthetic look to the building.
4. Solve the problems in construction and repair the building elements.

Syllabus:

UNIT I **9 Hrs.**

Stones and Aggregate: Classification, Characteristics, and their uses, quarrying and dressing of stones; **Wood and Wood products:** Introduction to wood macrostructure, sap wood and heart wood, defects and decay of timber, seasoning and preservation of timber, fire resisting treatment, introduction to wood products- veneers, plywood, fibre board, particle board, block board, batten boards; **Brick and Tiles**: Manufacturing, characteristics, Classification and uses, Improved brick from inferior soils, Hand moulding brick table, Clay-fly ash brick table, Flooring tiles and other tiles and their characteristics.

UNIT II **8 Hrs.**

Metals: Steel: Important properties and uses of Iron (Cast iron, wrought iron and steel), Important tests on steel rebar, aluminum, and copper; **Glass:** types and uses; **Gypsum:** source, properties, uses; **Plastic:** properties and uses; **Paint:** types, distemper, varnish; **Adhesive:** Types, **Bitumen**: types, properties, and tests.

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BTCE301N	**DCC**	**Construction Materials and Building Construction**	60	20	20	30	20	3	0	2	4

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UNIT III **8 Hrs.**

Foundation: Purpose, types of foundation- shallow, deep, pile, raft, grillage foundation; **Masonry: Brick Masonry**: types of bonds, relative merits and demerits of English, Single Flemish, and Double Flemish bond; **Stone Masonry:** General principles, classification of stone masonry and their relative merits and demerits; **Cavity wall:** components and construction; **Arches:** Terminology and classifications; **Doors and Windows:** Types, materials used

UNIT IV **9 Hrs.**

Floors and Roofs: Types, minimum thickness, construction, floor finishes, Flat roofs, RCC jack arch, reinforced brick concrete, solid slab, and timber roofs, pitched roofs, false ceiling, roof coverings, Channel unit, cored unit, Waffle unit, Plank and Joist, Brick panel, L-Panel, Ferro cement roofing units, water proofing, techniques, and materials for low-cost housing.

UNIT V **9 Hrs.**

Finishing, Services and Special constructions: **Wall Finishes:** Plastering, pointing, distempering, and painting: Purpose, methods, defects, and their solutions; **Vertical communication:** Stairs: Terminology, requirements of good staircase, classification; ramps, lifts, and escalators; **Damp proofing:** Causes, effects, prevention, and treatments; **Fire resistant construction**: Fire resistant properties of common building materials, requirements for various building components.

Text Books:

1. S. S. Bhavikatti; Building Materials and Construction; Vikas Publishing House, 2023.
2. S. K. Duggal; Building Materials; New Age Publishers; Fifth edition, January 2019.
3. S.C. Rangwala; Engineering Materials. Charotar Pub House, January 2021.

Reference Books:

1. Sushil Kumar; Building Construction, Standard Publisher Distributor, 2020.
2. B.C. Punmia; Building Construction, Laxmi Publications; Eleventh edition, January 2016.

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BTCE301N	**DCC**	**Construction Materials and Building Construction**	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
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List of Practical's:

1. Determination of compressive strength of brick.
2. Determination of water absorption capacity of brick
3. Determine particle size distribution of coarse aggregate by sieving or screening.
4. Determine Angularity Number, flakiness index and elongation index.
5. Determine specific gravity of coarse aggregate.
6. Determine the soundness of aggregate.
7. Determine bulking of given sample of sand.
8. Determine specific gravity of fine aggregate.
9. Determine penetration value of bitumen.
10. Determine specific gravity of bitumen.

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BTCE302N	**DCC**	**Mechanics of Solids**	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):
To make the students, aware of the behavior of structural members subjected to different kinds of stresses, and forces like tension/compression, shear, bending, torsion, etc. This subject deals as a base for the students in structural engineering.

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

1. Recall the basic mechanical properties related to engineering materials.
2. Independently perform basic calculations and determine the internal mechanical stresses in loaded structural elements.
3. Develop an understanding of the relation between material properties and strength of materials.

Syllabus

UNIT I **9 Hrs.**

Mechanical Properties of Materials: Strength, Stiffness, Elasticity, Plasticity, Toughness, Hardness, Ductility.

Elastic Behaviour of Bodies: Stress and Strain, Normal and Shear Stresses and Strains, Hooke's Law and Poisson's Ratio, Complementary Shear, Relations between the Elastic Constants, Stresses on Oblique Planes, Principal planes, and Principal stress and strains.

UNIT II **9 Hrs.**

Bending Moment and Shear Force: Bending Moment and Shear Forces at a Section of Beam subject to Vertical Loads and Couples. Relation between Bending Moment and Shear Forces. Graphical Methods for drawing B.M. diagram and S.F. diagram.

UNIT III **9 Hrs.**

Stresses due to Bending and Shear: Theory of Bending Stresses due to Bending and Shear, Distribution of Stresses along the Section, Modulus of Section, and Modulus of Rupture. Beams of varying Cross Section and Beams of uniform strength.

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BTCE302N	**DCC**	**Mechanics of Solids**	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.

UNIT IV **9 Hrs.**

Deflection of Beams: Uniform Curvature, Relation between the Deflection, Curvature, and Bending Moment. Slopes and Deflection of Beams, Macaulay's method, Conjugate beam method, Maxwell's reciprocal theorem.

UNIT V **9 Hrs.**

Torsion of Shafts: Pure Torsion. Twisting of Solid and Hollow Circular Cross Sections. Stress due to Torsion. Transmission of Power by Circular Shafts. Combined Bending and Twisting.

Text Books:

1. R.S. Khurmi, Strength of Materials, S Chand Publications, 2019.
2. R. Subramanian, Strength of Materials, Oxford University Press, 2021.
3. R.K. Rajput, Strength of Materials, S Chand Publications, 2018.

Reference Books:

1. S. Ramamurtham, Strength of Materials, Dhanpat Rai and Sons, 2020.
2. S. Timoshenko, Strength of Materials., CBS Publishers & Distributors, 2021.

List of Practical's:

1. Study of Universal Testing Machine.
2. To determine the Compressive Strength of Materials.
3. To determine the Tensile Strength of Materials.
4. To determine the Brinell Hardness of Materials.
5. To determine the Rockwell Hardness of Materials.
6. To determine the Toughness of the materials.
7. To determine the stiffness of the spring.
8. To determine the deflection of the Beam using deflection-beam apparatus.
9. To determine Young's modulus of Elasticity of different materials of beam (simply supported).
10. To study the various types of Strain Gauge.

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BTCE303N	**DCC**	**Engineering Geology**	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 will be able to understand, use and apply knowledge of geological processes and features to solve the problems related to the site selection efficiently and economically.

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

1. Communicate Geological features and process.
2. Utilize geological materials for construction.
3. Design sustainable structures for particular set of landform/geological processes/features.
4. Select suitable site for safe, stable and economic construction.

Syllabus:

UNIT I **6 Hrs.**

Physical Geology: Introduction to Geology, Objects and Scope of Geology; Physical Geology: Nebular Hypothesis of Origin of Earth and Age of Earth from Radiometric dating, Layers and internal structure of Earth, Basic concepts of Continental Drift and Plate-Tectonics, Earthquake, Volcanoes, Weathering, Gradation: Wind, River, Glacial and Marine Erosion Processes & features, Soil formation, Soil Profile and Geological classification of Soil.

UNIT II **6 Hrs.**

Mineralogy: Definition of Minerals, Physical Properties of Minerals, Classification of Minerals, Study of Common rock forming Minerals, Silica group, Feldspar group, Mica group, Pyroxene and Amphibole group, Common Ore Minerals and minerals of economic importance to civil engineering i.e., Calcite, Gypsum & Quartz.

UNIT III **6 Hrs.**

Petrology and Stratigraphy: Composition of Earth's Crust, Formation, Characteristics and Classification of Igneous, Sedimentary and Metamorphic Rocks, Brief study of granite, basalt, sandstone, limestone, shale, slate, marble and quartzite.
Geology of India: Physiographic features of India, Study of Main stratigraphic systems, and series of India with their economic importance.

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BTCE303N	**DCC**	**Engineering Geology**	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.

UNIT IV **6 Hrs.**

Structural Geology: Attitude of rocks and geological structures- strike and dip, Outcrop, Terminology, brief classification and engineering significance of folds, faults, joints and unconformities.

UNIT V **6 Hrs.**

Applied Geology*:* Introduction to applied geology and its use in civil engg., properties of rocks, selection of sites for roads, bridges, dams, reservoirs and tunnels, stability of hill sides, introduction to water bearing strata, artesian wells, Use of remote-sensing techniques in selection of above sites.

Text Books:

1. Prabin Singh, A Textbook of Engineering and General Geology, S.K. Kataria & Sons, Eight edition: 2019
2. P. K. Mukerjee, A Textbook of Geology, World Press Private Ltd., Thirteenth Reprint Edition, 2019
3. S.K. Garg, Physical and Engineering Geology, Khanna Publishers, 1983

References:

1. Bangar, K.M., Principal of Engineering Geology, Standard Publishers, 2017
2. S. Ramamrutham, Engineering Geology, Dhanpat Rai Publishing Company Private Limited-New Delhi; First edition, January 2014.

List of Experiments.

1. Identification and study of important rock forming minerals
2. Identification and study of Industrial minerals
3. Identification and study of important ore minerals
4. Identification and study of Igneous rock
5. Identification and study of Sedimentary rock
6. Identification and study of Metamorphic rock
7. Study of River basin map of India
8. Study of Earthquake zone map of India

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BTCE304N	**DCC**	**Building Drawing and Planning**	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 will be able to:

1. To understand the fundamental principles and concepts of planning and architecture for buildings.
2. To learn the development controls covered by building bye laws and national building code for buildings.

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

1. Demonstrate provisions of national building code, bye laws and architectural composition
2. Demonstrate drawing of building elements.
3. Describe building services with their line plan.
4. Do Planning and drawing of building plans efficiently.
5. Draw perspective view of simple objects and element of the building

Syllabus

UNIT I **5 Hrs.**

Planning of Building: Conventions signs and symbols, Introduction to National Building Code, Building byelaws and terminologies, principles of planning (aspect, prospect, privacy etc), various principles of architectural composition.

UNIT II **7 Hrs.**

Introduction of Building Elements and their Drawings: Drawing of various type of doors & window, Stair and their types, Design and Drawing of staircase like Dog legged, Open well, Types of trusses and roofs.

UNIT III **5 Hrs.**

Building Amenity: Introduction and application: -Building Amenities like water supply and drainage, electrification, fire safety, thermal insulation: sun shading devices, acoustics of building. Line plan of building services like Water supply system and Electrification of building. NBC 2016

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BTCE304N	DCC	Building Drawing and Planning	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.**

Detailed Planning and Drawing of Building: Planning and preparation of detailed drawings of various types of buildings like residential building, institutional buildings, etc.

UNIT V **6 Hrs.**

Green Building and Perspective Drawing: Green Building and their concepts, Elements of perspective drawing involving simple problems, one point and two-point perspectives.

Text Books:

1. Dr. N. Kumara Swamy & A. Kameswara Rao; Building Planning and Drawing, Charotar Publishing House Pvt. Ltd.; 9th Edition 2023.
2. M.V. Chitawadagi & S.S. Bhavikatti; Building Planning and Drawing, Dreamtech Press, 2019.

References:

1. Rangwala; Civil Engineering Drawing, Charotar Publishing House Pvt. Ltd.; 3rd Edition 2017
2. R.S. Malik & G.S.Meo, Building Design and Drawing, Computech Publications Limited,2021.
3. S.V Deodhar, Building Science & Planning, Khanna Publishers, Delhi, 2021.

List of Experiments

1. One drawing Sheet for Conventions signs and symbols.
2. Drawing of various types of staircases.
3. Drawing of various types of doors and windows
4. Sketches of various truss i.e., king post and queen post truss
5. One drawing sheet containing detailed planning of residential building.
6. One drawing sheet containing detailed planning of institutional building.

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BTCE304N	**DCC**	**Building Drawing and Planning**	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.

7. One drawing sheet for building Amenity like water supply and electrification etc.
8. One drawing sheet of one-point perspective.
9. One drawing sheet containing two-point perspective.

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BTCE305N	**SEC**	**Civil Engineering Software Lab - I**	0	0	0	0	50	0	0	2	1

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):

Impart the knowledge of CAD commands for drawing 2D building drawings required for various civil engineering applications.

Course Outcomes (COs):

Student will be able to –

1. Apply preliminary settings of CAD work sheet and develop plan of various buildings
2. Develop planning of various type of buildings with detailing
3. Develop elevation and section of various type of buildings with detailing
4. Develop service plans of the building.

Syllabus

- Introduction to Computer Aided Drawing
- Different Softwares for CAD
- Practice exercises on CAD
- Drawing a plan of a Single Storeyed building in Auto CAD
- Drawing a plan of a Multi Storeyed building in Auto CAD
- Drawing of sections and elevations of buildings
- Drawing of building components
- Exercises on development of working drawings of buildings in CAD

References:

1. AutoCAD Essentials, Autodesk official Press, John Wiley & Sons, USA
2. Computer Aided Design Laboratory by M. N. Sesha Prakash & Dr. G. S. Servesh – Laxmi Publications

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