



# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## Bachelor of Technology (Civil Engineering)

### SEMESTER III

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
ML 301	BS	ENVIRONMENTAL & ENERGY STUDIES	60	20	20	0	0	4	0	0	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 Objectives:** The students will be able to:

1. To understand sources of information required for addressing environmental challenges
2. To identify a suite of contemporary tools and techniques in environmental informatics
3. To apply literacy, numeracy and critical thinking skills to environmental problem-solving

**Course Outcomes:** The students should be able to:

1. Apply the principles of ecology and environmental issues that apply to air, land and water issues on a global scale.
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
3. Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community.
- 4.

**Syllabus:**

#### UNIT I

**Environmental Pollution and Control Technologies:** Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary and Tertiary.

#### UNIT II

**Natural Resources:** Classification of Resources: Living and Non - Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable energy source, case studies.

#### UNIT III

**Ecosystems:** Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the



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ecosystem, Biogeochemical cycles, Bioaccumulation, ecosystem value, devices and carrying capacity, Field visits.

#### UNIT IV

**Biodiversity and its Conservation:** Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts; Conservation of biodiversity: In-situ and Ex-situ conservation. National biodiversity act.

#### UNIT V

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP)

#### Suggested Readings:

1. Agrawal, K.C., (latest edition).Environmental Biology, Bikaner: Nidi Pub. Ltd.,
2. Brunner R.C. (latest edition) Hazardous Waste Incineration, McGraw Hill Inc.
3. Clank R.S. ., (latest edition. Marine Pollution, Clanderson Press Oxford (TB).
4. Environmental Encyclopedia, Jaico Pub. Mumbai,
5. De A.K (latest edition) Environmental Chemistry, Wiley Wastern Ltd.
6. Erach Bharucha (2005).Environmental Studies for Undergraduate Courses by for University Grants Commission.
7. R. Rajagopalan (2006).Environmental Studies. Oxford University Press.
8. M. Anji Reddy (2006).Textbook of Environmental Sciences and Technology. BS Publication.
9. Richard T. Wright (2008).Environmental Science: towards a sustainable future PHL Learning Private Ltd. New Delhi.
10. Gilbert M. Masters and Wendell P. Ela.(2008).Environmental Engineering and science. PHI Learning Pvt Ltd.
11. Daniel B. Botkin & Edwards A. Keller (2008).Environmental Science Wiley INDIA edition.
12. Anubha Kaushik (2009).Environmental Studies. New age international publishers.



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BTCE 301	DCS	CONSTRUCTION MATERIAL & CONSTRUCTION TECHNOLOGY	60	20	20	30	20	3	1	2	5

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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#### Course Objectives:

The Students will be able to identify, use and apply available material and technique according to field requirement efficiently and economically.

**Course Outcomes:** 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

##### Construction Materials:

**Stones & Aggregate:** Classification, Characteristics and their uses, quarrying and dressing of stones.

**Timber:** Important timbers, their engineering properties and uses, defects in timber, seasoning and treatment

**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

##### Construction Materials:

**Steel:** Structural Steel & their Properties Reinforced Steel, Grades of Steel & Types, and Properties of Reinforced Steel.

**Polymers:** Types, Uses & Properties of Polymer

**Pavement Material:** Bitumen, Tar, Asphalt Test on Bitumen, Grades of Bitumen

##### UNIT III

##### Construction Technology:

**Foundation:** Type of soils, bearing capacity, soil stabilization and improvement of bearing capacity, settlement and safe limits. Spread foundations, wall footings, grillage, foundations well



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foundation, causes of failure and remedial measures; under reamed piles, foundation on shrinkable soils, black cotton soil, timbering for trenches, dewatering of foundations. Simple methods of foundation design, Damp proof courses, Repairs Techniques for foundations.

#### UNIT IV

##### Construction Technology:

**Masonry and Walls:** Brick masonry, Bonds, Jointing, Stone masonry, casting and laying, masonry construction, Brick cavity walls, Common defects in construction and their effect on strength and performance of walls, precast stone masonry block, Hollow concrete block, plastering and pointing, white and colour washing, distempering, dampness and its protection, Design of hollow block masonry walls.

**Doors, Windows and Ventilators:** Types based on material etc., size location, fittings, construction sunshades, sills and jambs, RCC doors/windows frames. Stairs types, rule of proportionality etc., Repairs techniques for masonry, walls, doors & windows.

#### UNIT V

##### Construction Technology:

**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.

##### Text Books:

1. S.C. Rangwala; Engineering Materials
2. Shetty MS; Concrete Technology; S Chand publishing co.
3. B.C. Punmia; Building Construction

##### Reference Books:

1. Mohan Rai & M.P. Jai Singh; Advance in Building Materials & Construction.
2. Sushil Kumar; Building Construction,
3. . Building Construction, Metchell
4. Construction Technology, Chudley R.
5. Civil Engineering Materials, N. Jackson.
6. Engineering Materials, Surendra Singh

##### 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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<b>BTCE 302</b>	<b>DCS</b>	<b>STRENGTH OF MATERIALS</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>5</b>

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#### Course Objectives:

To make aware the students, behaviour of structural members subjected to different kinds of stresses, forces like tension / compression, shear, bending, torsion etc. This subject deals as a base for the students in the structural engineering field.

**Course Outcomes:** The students should be able to:

- 1) Independently perform basic calculations and determine the internal mechanical stresses in loaded structural elements
- 2) Develop an understanding of the relation between material properties and strength of materials

#### Syllabus:

##### UNIT I

**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, Complex stresses, Stresses on Oblique Planes, Principal planes and Principal stress and strains, Mohr's diagrams.

**Mechanical Properties of Materials:** Strength, Stiffness, Elasticity, Plasticity, Toughness, Hardness, Ductility etc. Ultimate Strength, Working stress and Factor of safety.

##### UNIT II

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

##### UNIT III

**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.

##### UNIT IV

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



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#### UNIT V

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

#### Text Books:

1. R.K. Rajput, Strength of Materials, Laxmi Publications.
2. Ramamurtham S., Strength of Materials, Dhanpat Rai Publications.
3. Punmia B.C., Strength of Material and Mechanics of Structure-Vol I., Standard Publishers Distributors.
4. Sadhu singh, Strength of material, Khanna Book Publishing.

#### Reference Books:

1. Timoshenko S., Strength of Materials., CBS Publishers & Distributors
2. Surendra Singh, Strength of Materials., Stosius Inc/Advent Books Division
3. Ryder G.H., Strength of Materials., Palgrave Macmillan; Student international edition

#### 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 Beam by the use of 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 Gauges.



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BTCE 303	DCS	ENGINEERING GEOLOGY	60	20	20	30	20	3	1	2	5

**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 Objectives:

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:** 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

**Physical Geology:** Introduction to Geology, Objects and Scope of Geology; Physical Geology: Origin and Age of Earth, Layers and internal structure of Earth, Basic concepts of Continental Drift and Plate-Tectonics, Earthquake, Volcanoes, Weathering, Gradation: Wind, River, Glacial and Marine Erosion cycles, Soil formation, Soil Profile and Geological classification of Soil.

##### UNIT II

**Mineralogy and Crystallography:** Definition of Minerals, Physical and Chemical Properties of Minerals, Origin 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. Elements of Crystallography and Introduction to Crystal Systems

##### UNIT III

**Petrology and Stratigraphy:** Composition of Earth's Crust, Formation, Characteristics and Classification of Igneous, Sedimentary and Metamorphic Rocks, Brief study of granite, gabbro, dolerite, basalt, sandstone, limestone, shale, gneiss, schist, slate, marble and quartzite.

**Geology of India:** Physiographic features of India, Brief Geological history of India, Study of Main stratigraphic systems and series of India with their economic importance.

##### UNIT IV

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



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unconformities.

#### UNIT V

**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, water bearing strata, artesian wells, Use of remote-sensing techniques in selection of above sites.

#### Text Books:

1. S.K. Garg, A text Book of Physical and Engineering Geology, Khanna Publishers, Delhi.
2. P.K. Mukerjee, A text Book of Geology, Word press
3. Prabin Singh, Engineering and General Geology, S K Kataria & Sons

#### Reference Books:

1. Gulati ; Geotechnical Engineering; TMH
2. Parthasarthy- Engineering Geology, Wiley

#### List of Practical's:

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
9. Study of Geological map and drawing profile section
10. Study of Wooden models of Folds and Faults



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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
<b>BTCE 304</b>	<b>DCS</b>	<b>BUILDING DRAWING AND PLANNING</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>5</b>

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**Course Objectives:** The students will be able to:

1. To demonstrate planning of building and its elements according to circumstances effectively
2. To draw and dimension various types of doors, window, roof, stairs, and trusses.
3. To imagine the perspective view of buildings.
4. To design energy efficient building.

**Course Outcomes:** The students should be able to:

1. Demonstrate drawing of doors, windows, stairs, and trusses.
2. Do Planning and drawing of building plans efficiently.
3. Describe building services like water supply, drainage, electrification, fire safety.
4. Demonstrate provisions of national building code, bye laws and architectural composition
5. Draw perspective view of simple objects and element of building

**Syllabus:**

#### UNIT I

**Planning of Building:** Introduction to National Building Code, Building bye-laws and terminologies, principles of planning (aspect, prospect, privacy etc), various principles of architectural composition.

#### UNIT II

**Building Elements and their Drawings:** Drawing of various type of doors & window, Design of stair, Drawing of staircase like dog legged, Open well, Spiral, Bifurcated, Half turn, Types of trusses and roofs.

#### UNIT III

**Building Amenity:** Introduction of Building Amenities like water supply and drainage, electrification, fire safety, thermal insulation: sun shading devices, acoustics of buildings.

#### UNIT IV

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



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#### UNIT V

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

#### Text Books:

1. Malik & Meo, Building Design and Drawing, Computech Publications Limited.
2. S.V Deodhar, Building Science & Planning, Khanna Publishers, Delhi.

#### Reference Books:

1. Shah, Kale & Patki; Building Design and Drawing; TMH
2. Gurucharan Singh & Jagdish Singh Building Planning, Design and Scheduling, Standard Publishers Distributors.

#### List of Practical's:

1. One drawing sheet containing detailed planning of residential building
2. One drawing sheet containing detailed planning of institutional building
3. One drawing sheet of one point perspective
4. One drawing sheet containing two point perspective
5. Drawing of various types of Doors and Windows
6. Sketches of various truss i.e. King post and queen post truss
7. Drawing of various types of stair cases
8. Introduction to AUTOCAD software
9. Detailed planning of residential building using AUTOCAD