



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in Light of NEP-2020
B.Tech. in Civil Engineering
(2021-2025)

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*				
BTCE 402	DCC	Concrete Technology and Advanced Construction Materials	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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Course Educational Objectives (CEOs):

1. To gain the discrete knowledge of concrete and its technology.
2. The subject involves theoretical and practical approaches which help in exploring the different kinds of concrete & its properties.
3. To enable the students to understand the factors that control the strength behavior of the Concrete.

Course Outcomes (COs):

The students will be able to:

1. Analyse the basic and advanced materials to enhance the properties of concrete.
2. Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete.
3. Identify the functional role of ingredients of concrete and apply this knowledge to mix design philosophy.
4. Design a concrete mix which fulfils the required properties for fresh and hardened concrete.

Syllabus:

UNIT I

6 Hrs.

Introduction: Classification, properties, grades, advantage & disadvantages of concrete; Ingredients of concrete- Types of cement, aggregates, water; Testing of materials-Cement, Aggregate & Water.

UNIT II

6 Hrs.

Properties of Fresh and Hardened Concrete: Introduction, Workability- Various test on fresh concrete, Factors affecting; Rheology of concrete, Compressive & Tensile strength, Stress and strain Characteristics, Shrinkage and temperature effects, Creep of concrete, Permeability, durability, Thermal properties.

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UNIT III

6 Hrs.

Cement Concrete mix design: Different methods of concrete mix design, Concrete mix design by Indian Standards method; Manufacturing process of Cement Concrete- Batching, Mixing, Compaction, Transportation, Curing.

UNIT IV

5 Hrs.

Special Concretes: Light weight concrete, Ready mix concrete, Vacuum concrete, Ferrocement, Fiber reinforced concrete, Polymer concrete composites, Shotcrete, Guniting, Rubble concrete, Resin concrete, Heat resistant concrete, Mass concrete, Temperature control of mass concrete.

UNIT V

7 Hrs.

Admixtures & Advance Construction Materials: Admixtures – Types & Properties; Uses of fly ash in mortars and concrete, Fly ash bricks, Stabilized mud blocks, Non-erodible mud plinth; D.P.C. materials; Building materials made by Industrial & Agricultural waste; Clay products.

Text Books:

1. Gambhir M.L.; Concrete Technology – Tata McGraw Hill Publishing Co. Ltd., Delhi, Fifth edition, 2017
2. Shetty M.S., Concrete Technology, 2014 S. Chand and Co. Pvt. Ltd., New Delhi.
3. Mehta, P.K., Concrete: Microstructure, Properties, and Materials, McGraw Hill Education; Fourth edition, 2017

Reference Books:

1. IS 10262 (2009): Guideline for Concrete mix design proportioning.
2. IS 383 (2016): Coarse and fine aggregate for concrete specifications.
3. Handbooks on Materials & Technology - Published by BMTPC & HUDCO
4. Properties of Concrete - A.M. Neville - Pearson Education
5. Dr. R.P. Rethaliya, Concrete Technology, 2011 Charotar Publishing House
6. M.L. Gambhir, Building and Construction Materials; Testing and Quality control, McGraw Hill Education, 2017.

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List of Practical's:

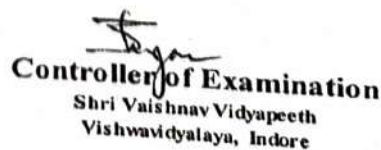
1. Determination of fineness of cement by sieve analysis.
2. Determination of consistency of cement, initial and final setting time.
3. Determination of soundness of cement by Le-Chatelier apparatus & Autoclave.
4. Determination of compressive strength of cement.
5. Determination of compressive strength of concrete.
6. Determination of workability of concrete by slump cone test.
7. Determination of workability of concrete by compaction factor test.
8. Determination of workability of concrete by Vee Bee Consistometer.
9. Non-destructive test to determine compressive strength of concrete by rebound hammer test.



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BTCE403	DCC	Mechanics of Fluids	60	20	20	30	20	3	0	2	4

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Course Educational Objectives (CEOs):

1. To give fundamental knowledge of fluid, its properties and behavior under various conditions of internal and external flows.
2. To develop understanding about hydrostatic law, principle of buoyancy and stability of a floating body and application of mass, momentum and energy equation in fluid flow.

Course Outcomes (COs):

1. Understand the broad principles of fluid statics, kinematics and dynamics.
2. Understand definitions of the basic terms used in fluid mechanics.
3. Be able to apply the continuity, momentum and energy principles.
4. Be able to apply dimensional analysis.

Syllabus

UNIT I

10 Hrs.

Introduction: Scope and Application of Fluid Mechanics: Physical Properties of Fluids: Density, Specific Weight, Specific Volume, Specific Gravity, Viscosity, Dynamic & Kinematic Viscosity, Newton's Law of Viscosity, Classification of Fluids, Compressibility, Cohesion, Adhesion, Surface Tension, Capillarity, Vapour Pressure.

Equilibrium of Fluids: Pressure at a Point, Pressure Variation, Barometer, Gauges, Manometers, Hydrostatic Forces, Equilibrium of Fluid in Motion, Floatation - Stability of Floating and Submerged Bodies.

UNIT II

09 Hrs.

Kinematics of Fluid Flow: Velocity field, classification of flows, Stream, Path & Streak Lines, Continuity Equation, Stream Function, Velocity Potential, Flow-nets.

Dynamics of Fluid Flow: Euler's Equations of Motion, Bernoulli's equation, Pitot tube, Flow through Openings - Orifices, Mouth pieces etc., Flow through Notches Weirs, Empirical formulae.

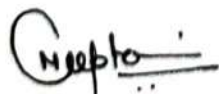
UNIT III

08 Hrs.

Dimensional Analysis & Model Study: Units and Dimensions, Dimensional Homogeneity, Buckingham-II-Theorem, Dimensionless Numbers, Principles of Similitude & Applications.



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UNIT IV

08 Hrs.

Flow Through Pipes: Laminar Flow, Flow between Parallel Plates, Measurement of Viscosity, Reynold's experiment, Turbulent flow in Pipes, Solution of Pipe Flow Problems, Losses in Pipes, Measurement of Pipe Flow - Orifice, Nozzle, Bend Meters, Rotameters. Concept of Water Hammer and Surges.

UNIT V

09 Hrs.


Flow Through Open Channels: Classification, Geometric Elements, Continuity, Energy and Momentum Equations, Pressure, Velocity Distributions, Uniform flow, Concept of Normal Depth, Chezy, Manning and other formulae. Best Hydraulic Sections, Specific Energy, Specific Force, Hydraulic Jump and its characteristics, Gradually Varied Flow, Surface Profiles, Dynamic Equations, Measurement of flow in Open Channels.


Text Books:

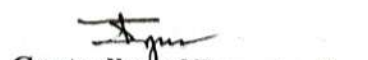
1. Bansal R.K., Fluid Mechanics and Hydraulic Machines, Laxmi Publication, 2018
2. Rajput R.K., A Textbook of Fluid Mechanics and Hydraulic Machines Standard Book House 2017
3. Modi P.N.& S.M. Seth, Hydraulics and Fluid Mechanics Including Hydraulics Machines, Standard Book House 2019

Reference Books:

1. Subramanya K., Fluid Mechanics and Hydraulic Machines, McGraw Hill Education (India) 2018
2. Garde R.J. and Miraigaoker A.G . Engineering Fluid Mechanics, Scitech Publisher 2017
3. White, Fluid Mechanics McGraw Hill Education (India) 2017


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List of Experiments.

1. Determination of Metacentric height of a flat-bottomed pontoon.
2. Study the flow of liquid through orifice meter.
3. Calibration of venturi meter and study of variation of coefficient of discharge with the Reynold's number.
4. Determination of discharge by notches and weir.
5. Study of different flow conditions and to obtain the Reynold's number in different flow conditions.
6. Study of the variation of friction factor 'f' for turbulent flow in rough and smooth commercial pipes.
7. Demonstration of working of Hydraulic Ram and determine the efficiency of the Hydraulic Ram.
8. Demonstration of working of Pelton Turbine, Kaplan Turbine and Francis Turbine and determination of efficiency.
9. Demonstration of Reciprocating pumps and centrifugal pump

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BTCE 405	DCC	Environmental Engineering -I	60	20	20	30	20	3	0	2	4

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Course Educational Objectives (CEOs):

The course objective is to build student's knowledge to identify the various sources of water, it's demand and to study the quality of water, it's treatment technique and distribution system.

Course Outcomes (COs):

The students should have:

1. An understanding of importance of water, environmental regulations, and standards; the driving forces behind environmental engineering projects
2. An understanding of water quality criteria, and their relation to public health and environment.
3. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, social, environmental, and economic factors.
4. An ability to develop and conduct appropriate experiments, analyze and interpret data and use engineering judgment to draw conclusions.

Syllabus

UNIT I

9 Hrs.

Introduction: Introduction. Importance of water, sources of water-surface and ground water sources. Water (prevention and control of pollution) Act - 1974.

Water Demand: Types of water demand, Domestic demand, Industrial demand, Fire Demand etc. Per capita demand, variations in demand, Design period. Factors affecting water consumption. Population forecasting.

UNIT II

9 Hrs.

Quality of Water: Characteristics of water, physical, chemical, and biological characteristics. Types of microbes, Water borne diseases and their control. Indian standard for drinking water.

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Transmission of Water: Intake structure, types and working, pipe materials (merits & demerits)- cast iron, vertically cast and spun pipes, mild steel pipes, asbestos cement, R.C.C and prestressed pipes, pipe joints- spigot and socket joint, flanged joints, coupled and Expansion joints, Valves, Corrosion in pipes - Galvanic, Biological, Stress Corrosion.

UNIT III

8 Hrs.

Treatment of Water: Various types of water treatment (Theory and Applications): Preliminary, secondary, and tertiary. Screening: Course and Fine Screen, Design Criteria.

Sedimentation: Sedimentation tank, types- rectangular and circular settling basins, upward and horizontal flows, detention period, overflow rate, inlet and outlet devices, baffles, Design criteria for sedimentation tank. Coagulation: Theory of coagulation, common coagulants, feeding devices, mixing device, flocculation tank, Dewatering and disposal of sludge.

UNIT IV

9 Hrs.

Filtration: Theory of filtration, description of slow sand and rapid sand gravity filters, their comparison and merits, media characteristics for filters, size and depth, filter gravel and under drains, negative head, and other problems in filtration, back washing of filters.

Disinfection: Mechanisms of disinfection, factors affecting efficiency of disinfection, criteria for a good disinfectant. Chlorination, types of chlorination-plain chlorination, pre chlorination, post Chlorination, double chlorination, super chlorination, dichlorination, Break Point Chlorination, chlorine demand, Doses of chlorine, Determination of Residual Chlorine-O.T. & O.T.A. test, other methods of disinfection in brief ozone, U.V. rays, Iodine, Bromine, Chlorine dioxide. Aeration & Water Softening: Types of hardness, methods of removal

UNIT V

8 Hrs.

Distribution of Water: Introduction, Requirements of a good distribution system, Layouts of distribution networks, Components of distribution system, method of distribution, system of supply, Hardy cross methods for network analysis. Function and types of distribution reservoirs, standpipe, Storage capacity of service reservoir. Leak detection, its importance, methods of leak detection.

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Text Books:

1. Water Supply Engineering by S.K. Garg, Khanna Publishers, Delhi
2. Water Supply Engineering by B.C. Punmia - Laxmi Publications (P) Ltd. New Delhi

Reference Books:

1. Water supply engineering (volume-I) by Dr.P.M.Modi, Standard Book House, Delhi
2. Water Supply & Sanitary Engg. by G.S. Birdi - Laxmi Publications (P) Ltd. New Delhi
3. Environmental Engineering by Peavy, H.S., Rowe D.R. and Techobanoglous, Mc Graw Hill, Book Company.
4. Manual of Water Supply and Water Treatment, Ministry of Urban Development, Govt.of India

List of Experiments.

1. Study of sampling techniques for water.
2. Determine the pH value of given sample of water.
3. Determine the acidity of given sample of water.
4. Determine the alkalinity of given sample of water.
5. Determine turbidity in a given sample of water with the help of turbidity meter.
6. Determine the total hardness and calcium hardness in the given sample of water.
7. Determine the concentration of chlorides in the given sample of water.
8. Determine the dissolved oxygen in the given sample of water.
9. Determine the total, dissolved, and suspended solids in the given sample of water.
10. Determine optimum dose of coagulant with the help of jar test apparatus

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BTCE501	DCC	Structural Analysis-I	60	20	20	0	0	3	1	0	4

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Course Educational Objectives (CEOs):

The objectives of the course are to build on the student's knowledge on the theory and application of structures in buildings and to introduce the students to concept of structural stability, methods in structural analysis.

Course Outcomes (COs):

The students should be able to:

1. Distinguish between determinate and indeterminate structure
2. Analysis of Indeterminate structure by various methods
3. Analysis of beams under moving load and to draw influenced line diagram.
4. Analysis of two hinged three hinged arch and suspension bridges.

Syllabus:

UNIT I

9 Hrs.

Indeterminate Frames - Degree of static and kinematic Indeterminacy of rigid jointed and pin jointed frames for space and plane; Analysis of one degree indeterminate beams by method of consistent deformations; Analysis of fixed and continuous beam by three moment equation.

UNIT II

9 Hrs.

Slope Deflection Method - Analysis of beams by slope deflection method with support displacements; Analysis of frames with and without sway.

UNIT III


9 Hrs.

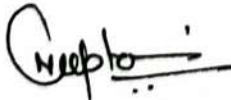
Moment Distribution Method - Analysis of beams by moment distribution method; Analysis of beams by moment distribution method subjected to support displacements; Analysis of non-sway frames by moment distribution method.

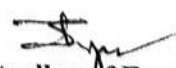
UNIT IV

8 Hrs.

Moving Load and Influence Line Diagram - Maximum shear force and bending moment curves for various types of Rolling loads; Influence line of indeterminate beams and continuous beams by Muller Breslau's Principle.


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UNIT V

8 Hrs.


Arch and Suspension bridges - Three hinged arches of different shapes; Eddy's Theorem, settlement and temperature effects; Two Hinged- settlement and temperature effects; Suspension cable; Stiffening girders.

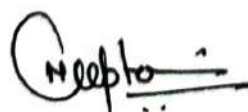
Text Books:


1. B.C Punmia, Ashok Jain., Theory of Structure, Lakshmi Publication Delhi.
2. S. Ramamrutham, Theory of Structure, Dhanpat Rai Publishing Company Private Limited- New Delhi; Ninth edition (2014)
3. S.S Bhavikatti, Structural Analysis, - Volume 1 and 2, Vikas Publishing House; Fourth edition (2013).

Reference Books:

1. Ghali A & Neville M., Structural Analysis - A Unified classical and matrix Approach, Chapman and Hall, New York.
2. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.
3. Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.
4. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in Light of NEP-2020
B.Tech. in Civil Engineering
(2021-2025)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCE 407	SEC	Advance Field Survey Systems	0	0	0	30	20	0	0	4	2

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):

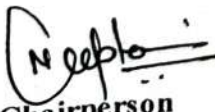
To collect the knowledge about significance of advanced surveying in field measurements in terms of utility and precision of data collection

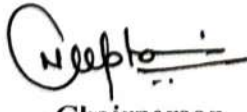
Course Outcomes (COs):


1. To know about significance of advanced surveying in field measurements in terms of utility and precision of data collection
2. To learn on the principles of electronic distance measurements, Total station and their accuracy
3. To get introduced to the field of geodesy, coordinate systems, Map projections, GPS, its working principles, data collection, data processing and analysis

List of Practical's:

1. Electronic Distance Measurement and instruments.
2. Total Station – Parts of a Total Station – Accessories –Advantages and Applications
3. Field Procedure for total station survey
4. Errors in Total Station Survey
5. Global Positioning Systems- Segments
6. GPS measurements, errors, and biases
7. Surveying with GPS


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