



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in Light of NEP-2020
Diploma in Civil Engineering
(2021-2024)

COURSE CODE	CAT-EGO-RY	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*				
DTCE501	DCC	Design of Concrete Structures	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):

Student will be able to analyze and design different components of RCC members for various loads and combinations for building type at site economically & safely.

Course Outcomes (COs):

1. Calculate the different types of loadings on the structure.
2. Identify the method of analysis and design.
3. Design the structures and draw the reinforcement detailing.

Syllabus

UNIT I

9 Hrs.

Design Methods- Working stress method, ultimate load, and limit state methods of design; Basic Concept, assumption, derivations for moment of resistance & lever arm.

UNIT II

9 Hrs.

Beams- Design of Reinforced Concrete Beams, singly reinforced rectangular beams; Simply supported, cantilever beams; Effect of shear, bond, and torsion in beam; Design of doubly reinforced rectangular beams.

UNIT III

9 Hrs.

Slabs- Design of Slabs spanning in one direction; Simply supported and continuous slab; Design of Two-way slab.

UNIT IV

9 Hrs.

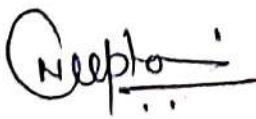
Compression Member- Design of columns; Design of uniaxial column; Design of footing by limit state method.


UNIT V

9 Hrs.

Staircase- Design of Staircases with waist slab; Stair slab spanning longitudinally; Stair slab spanning transversely; Design of slab-less staircase (Tread Riser Staircase).


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Text Books:


1. Reinforced Concrete Design, S. N. Sinha, McGraw Hill Education; Third edition, 2017.
2. Plain and reinforced concrete, B.C. Punamia, Laxmi Publications; Fifth edition, 2015
3. Design of Reinforced Concrete Structures - N. Subramanian, Oxford, 2013
4. Reinforced Concrete: Limit State Design, A K Jain, Nem Chand & Brothers, Roorkee, 2012


References:

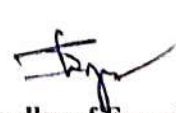
1. Structural Design & Drawing, N.K. Raju, CBS Publishers & Distributors, 2019
2. Reinforced Concrete Structure, Pillai & Menon; Tata McGraw Hill, New Delhi, 2017
3. Limit State Design by P.C. Varghese, Prentice Hall of India, New Delhi, 2008


List of Experiments.

1. Details of reinforcement in a simply supported RCC beam (singly reinforced and doubly reinforced) with the given design data regarding the size and number of bars, stirrups their size and spacing.
2. Details of reinforcement in a one-way slab with the given design data regarding the size and spacing of bars.
3. Details of reinforcement in a two-way slab with the given design data regarding the size and spacing of bars.
4. Details of reinforcement for a RCC square and circular column with footing.
5. Details of reinforcement of staircase (Staircase with waist slab and without waist slab) with the given design data regarding the size and spacing of bars.


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DTCE 502	DCC	Estimating, Costing and Valuation	60	20	20	30	20	3	0	2	4	

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Course Educational Objectives (CEOs):

Students will be able to -

1. To learn the procedure for estimating and costing of Civil Engineering works.
2. To perform rate analysis for different items associated with construction projects.

Course Outcomes (COs):

Students will be able to -

1. Prepare approximate estimate of a civil engineering works.
2. Prepare detailed estimate of a civil engineering works.
3. Justify rate for given items of work using rate analysis techniques.

Syllabus

UNIT I

8 Hrs.

Fundamentals of Estimating and Costing: Purpose and principle of estimation, Types of estimates - Approximate and Detailed, Uses of Revised estimate, Supplementary estimate, Mode of measurement, measurement sheet and abstract sheet, bill of quantities, Specification of items of building work as per PWD /DSR.

UNIT II

9 Hrs.

Approximate Estimates: Definition and Purpose, Methods of approximate estimate - Plinth area rate method, Cubical content method, Typical Bay method, Approximate quantity method. Study of Approximate estimate for roads, Railways, bridges, irrigation projects and water supply projects.

UNIT III


8 Hrs.

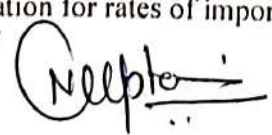
Detailed Estimate: Methods of detailed estimate, preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts. Services for building such as water supply, drainage, and electrification

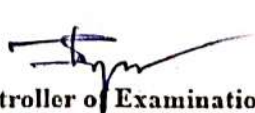
UNITIV


8 Hrs.

Rate Analysis: Various factors involved in the rate of an item, material and labour requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.).


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UNITV

9 Hrs.

Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building. Preparation of DPR

Valuation: Purposes, depreciation, sinking fund, scrap value, year purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings

Text Books:

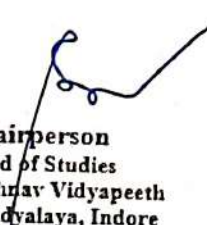
1. Datta, B.N., Estimating and Costing in Civil engineering, UBS Publishers Distributors Pvt. Ltd. New Delhi, 2020.
2. Rangwala., Estimating and Costing, Charotar Publishing House Pvt. Ltd., Anand, 2017.
3. Birdie, G.S., Estimating and Costing, Dhanpat Rai Publishing Company(P) Ltd. New Delhi, 2014.


References:


1. Chakraborti, M. Estimating and costing, specification, and valuation in civil engineering, Monojit Chakraborti, Kolkata, 2006.
2. PWD Schedule of Rates.


List of Experiments.

1. Preparation of detailed estimate for various RCC building elements.
2. Preparation of detailed estimate for services of plumbing and water supply or Electrification work.
3. Preparation of detailed for earth work for the road construction or arched culvert.
4. Rate analysis for at least 8 items of construction.
5. Preparation of DPR of Civil Engineering Project.
6. Prepare bill of quantities of given item from actual measurements. (Any four items)


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DTCE503	DCC	Public Health Engineering	60	20	20	30	20	2	0	2	3	

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Course Educational Objectives (CEOs):

Following are the objectives of this course:

1. To learn the principles for identification of sources of surface and subsurface water
2. To learn calculation of population and requirement of drinking water
3. To understand the plotting of water supply scheme highlighting different features
4. To know evaluation of characteristics and treatment of water and sewage.

Course Outcomes (COs):

After competing this course, student will be able to:

1. Identify the sources of surface and subsurface water.
2. Estimate the quantity of drinking water required and wastewater generated.
3. Evaluate the characteristics and required treatment for water and sewage.
4. Draw labelled layout for water supply scheme and sewage treatment system.
5. Understand treatment processes of water and wastewater.

Syllabus

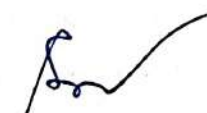
UNIT I

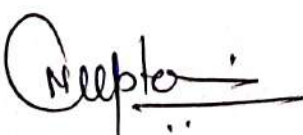
7 Hrs.


Sources, Demand and Quality of water: Water supply schemes: Objectives, Sources of water: Surface and Subsurface sources of water, Intake Structures, Factors governing the location of an intake structure, Types of intakes.


Demand of water: Factors affecting rate of demand, Variation in water demands, Forecasting of population, Methods of forecasting of population, (Simple problems on forecasting of population), Design period.

Quality of water: Need for analysis of water, Characteristics of water- Physical, Chemical and Biological, testing of water for Total solids, hardness, chlorides, dissolved Oxygen, pH, Fluoride, Nitrogen and its compounds, Bacteriological tests, MPN, Sampling of water, Water quality standards as per IS 10500.


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UNIT II

7 Hrs.

Purification of water: Objectives of water treatment, Aeration- objects and methods of aeration, Plain sedimentation, Sedimentation with coagulation, principles of coagulation, types of coagulants, process of coagulation, types of sedimentation tanks, Clariflocculator.

Filtration – Mechanism of filtration, classification of filters: slow sand filter, rapid sand filter. Construction and working of slow sand filter and rapid sand filter, operational problems in filtration.

Disinfection: Objective, methods of disinfection, Chlorination, forms of chlorination, types of chlorination practices, residual chlorine and its importance, Flow diagram of water treatment plants.

UNIT III

5 Hrs.


Conveyance and Distribution of water: Types of Pipes used for conveyance of water, choice of pipe material, Types of joints & Types of valves- their use, location and function on a pipeline, Distribution of water: Methods of distribution of water- Gravity, pumping, and combined system, Service reservoirs - functions and types, Layouts of distribution of Water-Dead end system, grid iron system, circular system, radial system; their suitability, advantages, and disadvantages.


UNIT IV

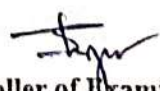
5 Hrs.

Domestic sewage and System of Sewerages: Building Sanitation: Necessity of sanitation, Necessity to treat domestic sewage, Definitions Sewage, sullage, types of sewage. Definition of the terms related to Building Sanitation Water pipe, Rainwater pipe, Soil pipe, Sullage pipe, Vent pipe. Building Sanitary Fittings-Water closet – Indian and European type, flushing cistern, wash basin, sinks, Urinals. Trap types, qualities of good trap. Systems of plumbing - one pipe, two pipe, single stack, choice of system. Principles regarding design of building drainage, inspection, and junction chambers, their necessity and location.

Systems of Sewerage and Sewer Appurtenances: Types of Sewers, Systems of sewerage, self-cleansing velocity and non-scouring velocity, Manholes and Drop Manhole-component parts, location, spacing, construction details, Sewer Inlets, Street Inlets.


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UNIT V

6 Hrs.

Characteristics and treatment of Sewage: Analysis of sewage: Characteristics of sewage, B.O.D., C.O.D. and its significance., Central Pollution Control Board Norms for discharge of treated sewage, Objective of sewage treatment and flow diagram of conventional sewage treatment plant. Treatment of Sewage: Screening, Types of screens, Grit removal, Skimming, Sedimentation of sewage, Aerobic and anaerobic process, Sludge digestion, trickling filters, Activated sludge process, Disposal of sewage, Oxidation Pond, Oxidation ditch. Septic tank,

Text Books:


1. Garg, S.K., Environmental Engineering Vol. I and Vol. II, Khanna Publishers.
2. Sharma S.C, Environmental Engineering, Khanna Publishing House, New Delhi.


References:


1. Punmia, B C, Environmental Engineering, vol. I and II, Laxmi Publishers.
2. Peavy H S, Rowe D R, and Tchobanoglous G, Environmental Engineering, McGraw.
3. Birdie, G. S. and Birdie, J. S. Water Supply and Sanitary Engineering, Dhanpat Rai.
4. Basak N N, Environmental Engineering, McGraw Hill Publishers.


List of Experiments.

1. Determine pH value of given sample of water.
2. Determine the turbidity of the given sample of water.
3. Determine suspended, dissolved solids and total solids of given sample of water.
4. Determine the dissolved oxygen in a sample of water.
5. Determine the optimum dose of coagulant in a given raw water sample by jar test.
6. Determine B.O.D. of given sample of sewage.
7. Determine pH value of given sample of sewage.
8. Determine C.O.D. of given sample of sewage.
9. Draw sketches of various valves used in water supply pipeline.
10. Draw a sketch of one pipe and two pipe system of plumbing


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DTCE 504	DCC	Soil Mechanics and Foundation Engineering	60	20	20	30	20	3	0	2	4

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Course Educational Objectives (CEOs):

1. To understand and determine physical and index properties and classification of soil.
2. To estimate permeability and shear strength of soil.
3. To know the load bearing capacity of soil.
4. To learn various soil stabilization and compaction methods.

Course Outcomes (COs):

1. Identify types of rocks and sub soil strata of earth.
2. Interpret the physical properties of soil related to given construction activities.
3. Use the results of permeability and shear strength test for foundation analysis.
4. Interpret soil bearing capacity results.
5. Compute optimum values for moisture content for maximum dry density of soil through various tests.

Syllabus

UNIT I

8 Hrs.


Overview of Geology and Geotechnical Engineering: Introduction of Geology; Rock Classification based on their genesis (mode of origin), formation. Classification and engineering uses of igneous, sedimentary, and metamorphic rocks.

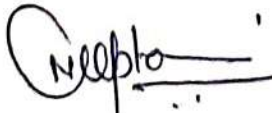
Importance of soil as construction material in Civil engineering structures and as foundation bed for structures; Field application of geotechnical engineering for foundation design, pavement design, design of earth retaining structures, design of earthen dam.


UNIT II

9 Hrs.

Basic Definitions and Index Properties: Definition, scope of soil mechanics; Historical development, formation of soils; Soil structure (two and three phase system); Index properties, water content, void ratio, porosity, unit weight etc; Determination of index properties; Atterberg's limits; Classification systems based on particle size; consistency limits.


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DTCE 504	DCC	Soil Mechanics and Foundation Engineering	60	20	20	30	20	3	0	2	4	

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UNIT III

8 Hrs.

Permeability and Shear Strength of Soil: Permeability, Definition, Darcy's law, Coefficient of permeability, factors affecting, determination of coefficient of permeability by constant head and falling head tests, Simple problems to determine coefficient of permeability. Seepage through earth-structures. Shear failure of soil; concept of shear strength of soil; Components of shearing resistance of soil – cohesion, internal friction.

UNIT IV

8 Hrs.

Bearing Capacity of Soil: Bearing capacity, Concept of bearing capacity, Ultimate, Safe, and allowable bearing capacity; Types of foundation, Introduction to Terzaghi's analysis and assumptions; Field methods for determination of bearing capacity. Definition of earth pressure, Active and Passive earth pressure, coefficient of earth pressure; Rankine's theory and assumptions made for non-cohesive Soils.

UNIT V

9 Hrs.

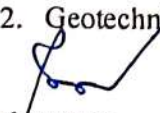
Soil Improvement Techniques; Compaction, factors affecting compaction, properties of soil affected by compaction; CBR Test; Proctor compaction tests. Soil Stabilisation; Mechanical, lime, cement, bitumen, chemical, thermal, electrical stabilisation, and stabilisation by grouting.

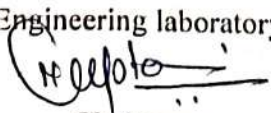
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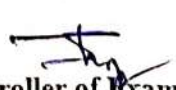
1. Soil Mechanics and Foundations Engineering by Dr. K.R. Arora, Standard Publishers Distributors, New Delhi, 2020.
2. Soil Mechanics and Foundations by Dr. B.C. Punamia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications, New Delhi, 2017.
3. Geotechnical Engineering by C. Venkatramiah, New Age International Publishers, New Delhi, 2017.

References:

1. Soil Mechanics & Foundation Engineering by S.K. Garg, Khanna Publishers, New Delhi, 2003.
2. Geotechnical Engineering laboratory Manual.


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

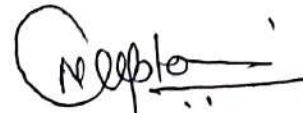
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

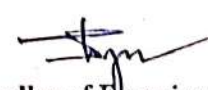
3. Relevant Indian Standard Codes.


List of Experiments.

1. To determine water content of given soil sample by oven drying method.
2. To determine specific gravity of soil by pycnometer method.
3. To determine dry unit weight of soil in field by core cutter method.
4. To determine Plastic and Liquid Limit along with Plasticity Index of given soil.
5. To determine grain size distribution of given soil sample by mechanical sieve analysis.
6. To determine the coefficient of permeability of a soil using Constant head and Falling head method.
7. To determine the shearing strength of the soil using Direct shear apparatus.
8. To determine shear strength of soil by vane shear test.
9. Determination of CBR value on the field.
10. Study of Plate load Test.


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