

B.Tech Third Year (Odd Semester)						
Civil Engineering						
Sr.No.	Course Code	Course Name	L	T	P	Credit
1	CE3CO10	Hydraulics and Hydraulic Machines	3	1	2	5
2	CE3CO12	RCC Design and Drawing	3	1	2	5
3	CE3CO13	Geotechnical Engineering-I	3	1	2	5
4	CE3CO15	Quantity surveying & Estimation	3	1	0	4
5	CE3EL01	Environmental Engineering	3	0	0	3
6	EN3HS04	Fundamentals of Management, Economics and Accountancy	3	0	0	3
7	EN3MC02	Technical English	2	0	0	0
		Total	20	4	6	25
		Total Contact Hours	30			

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
CE3CO10	Hydraulics and Hydraulic Machines	3	1	2	5

UNIT – I

Boundary Layer Theory: Introduction, Development of boundary layer over a flat plate, boundary layer thickness, displacement, momentum and energy thicknesses, Hydrodynamically rough and smooth surfaces, boundary layer separation and its control, laminar and Turbulent Boundary layers on a flat plate, Laminar sub layer, Prandtl's mixing length theory, Resistance to flow of fluid in smooth and rough pipes.

UNIT-II

Introduction to Open Channel Flow: Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, velocity distribution of open channel flow.

Uniform flow in open channels: Continuity equation, Energy equation and Momentum equation, Characteristics of uniform flow, Computation of uniform flow, Chezy's and Manning's formulae, Determination of normal depth and velocity, Normal and critical slopes, Economical sections.

UNIT-III

Non-uniform flow in open channels: Specific energy, Specific energy curve, Critical flow computation and its applications, transitions with sub critical and super critical flows.

Gradually varied flow: Dynamic equation of gradually varied flow, classification of channel bottom slopes, classification of surface profile, characteristics of surface profile, Computation of water surface profile.

UNIT – IV

Rapidly varied flow or Hydraulic Jump: Theory of hydraulic jump, Elements and characteristics of hydraulic jump in a rectangular channel, length and height of jump, Types, application and location of hydraulic jump, Energy dissipation and other uses, Surge length as a moving hydraulic jump, Positive and negative surges.

UNIT- V

Hydraulic Machines

Turbines: classification of tribunes, Impulse and Reaction turbines, characteristic curves, draft tubes.

Pumps: classification of pumps, centrifugal pump, efficiency and power, Output of centrifugal pumps, characteristics curves, reciprocating pump, efficiency of reciprocating pump.

Text Books

1. Modi & Seth, Fluid Mechanics, Standard Book house, Delhi
2. Rangaraju, Open Channel Flow - Tata Mc Graw - Hill Publishing Comp. Ltd., New Delhi
3. A.K. Jain, Fluid Mechanics - Khanna Publishers, Delhi

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Reference Books

1. Bakhmetiff B.A., Hydraulics of open channels - McGraw Hill, New York
2. Chow V.T., Open Channel Hydraulics - McGraw Hill, New York
3. Frank M White, Fluid Mechanics, McGraw Hill Education.

Proposed List of Practicals

1. Study of performance characteristics of centrifugal pump at constant speed.
2. Study of performance characteristics of centrifugal pump at different speed.
3. Study of performance characteristics of reciprocating pump at constant speed.
4. Study of performance characteristics of gear pump at constant speed.
5. Study of performance characteristics of Pelton wheel turbine at constant speed.
6. Study of performance characteristics of Francis turbine at constant speed.
7. Study of performance characteristics of Kaplan turbine at constant speed.
8. Determination of force exerted by a jet of water on a fixed vane.
9. Determination of coefficient of discharge of open channel flow measurement
10. Study of characteristics curves of a Hydraulic ram at constant valve lift and constant supply head

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
CE3CO12	RCC Design and Drawing	3	1	2	5

UNIT I

Concrete making materials, Properties of concrete and reinforcements, Introduction to working stress method and limit state methods of design, Compression stress block, Estimation of ultimate moment by strain compatibility

UNIT II

Design of Beams: Design of Rectangular Singly and Doubly Reinforced beams, T-beams, L-beams by Limit State Design in collapse and serviceability.

UNIT III

Design of Slabs: Design of one way and two way solid slabs by Limit State Design Method, Serviceability Limit States, Control of deflection, Torsion and cracking.

UNIT IV

Design of Columns: Design of Columns by Limit State Design Method- Effective height of columns, Assumptions, Minimum eccentricity, Short column under axial compression, requirements for reinforcement, Column with helical reinforcement, Short column under axial load and uni-axial bending, Design of columns under bi-axial loading by Design Charts.

UNIT V

Design Of Footing: Design of wall footing – Design of axially and eccentrically loaded rectangular pad and sloped footings – Design of combined rectangular footing for two columns only

Text Books

1. S.Ramamrutham, Plain & Reinforced Concrete - Dhanpat Rai Publishing Company (P) Ltd- New Delhi
2. B.C. Punnia, Plain & Reinforced Concrete – Laxmi Publication, New Delhi
3. A. K. Jain, Reinforced Concrete-Limit State Design, Nem Chand Brothers, Roorkee

Reference Books

- 1 Unnikrishna Pillai and Devdas Menon, Reinforced Concrete Design, Tata McGrawHill
- 2 S. N. Sinha, Reinforced Concrete Design, Tata McGraw Hill
- 3 M.L. Gambhir, Fundamentals of reinforced concrete design, PHI

List of Practicals

1. Design of Singly & Doubly Reinforced beams
2. Working Drawing of Singly & Doubly Reinforced beams
3. Design of T-beams
4. Working Drawing of T-beams
5. Design of one-way slabs
6. Working Drawing of one-way slabs
7. Design of Two-way slabs
8. Working Drawing of Two way slabs
9. Design of columns and footing
10. Working Drawing of columns and footing

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
CE3CO13	Geotechnical Engineering-I	3	1	2	5

UNIT I

Introduction and index properties scope of soil mechanics, origin and general types of soil, Formation of soils, Soil composition, clay Minerals and its behavior, Soil structure. Three phases and two phase system and its mass- volume relationships (numerical problems). Index properties of soil, Consistency limits, unified soil classification system and IS soil classification system.

UNIT II

Permeability and seepage Soil water, capillarity, Permeability definition and necessity of its study, Darcy's law, Factors affecting permeability. Laboratory measurement of permeability: - constant head and falling head method as per IS 2720, permeability of stratified soil deposits.

Seepage and seepage pressure, Quick sand condition, critical hydraulic gradient, flownet, General flow equation for 2-D flow (laplace equation), properties and Applications of flownet, Effective, neutral and total stresses.

UNIT III

Compaction and consolidation Introduction, Comparison between compaction and consolidation, compaction tests- Standard Proctor test, Modified Proctor test, Zero air void line. Factors affecting compaction. Effect of compaction on soil properties, Field compaction methods and compaction equipment for different types of soil, Placement water content.

consolidation, primary and secondary consolidation, Relationship between pressure and void ratio, Theory of one dimensional consolidation. Consolidation test, total settlement and time rate of settlement, Fitting Time curves. Normally and over consolidated clays.

UNIT IV

Stress Distribution in Soils and Shear Strength of Soils Stress distribution beneath loaded areas by Boussinesq and westergaard's analysis. Newmark's influence chart. Contact Pressure distribution. Mohr - Coulomb's theory of shear failure of soils, Mohr's stress circle, Measurement of shear Strength: - Shear box test, Triaxial compression test, unconfined compression test, Vane shear test, Measurement of pore pressure, pore pressure parameters, critical void ratio, Liquefaction.

UNIT V

Stability of Slopes & Earth pressure Infinite and finite slopes, Types of slope failures, Rotational slips. Stability number. Effect of ground water. Selection of shear strength parameters in slope stability analysis. Analytical and graphical methods of stability analysis. Stability of Earth dams.

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Rankine's state of Plastic Equilibrium in soils- Active and Passive states due to wall movement, Earth Pressure at rest. Rankine's Theory: Earth pressure on Retaining wall due to submerged backfill. Backfill with uniform surcharge, backfill with sloping surface, layered backfill. Coulomb's Wedge theory.

Text Books

1. K.R. Arora, Soil Mechanics & Foundation Engineering Std. Publishers Delhi.
2. B.C.Punmia, Soil Mechanics & Foundation Engineering, Laxmi Publications, Delhi.
3. Alam Singh, Modern Geotech Engineering - IBT Publishers, Delhi.

Reference Books

1. C. Venkatramaiah, Geotechnical Engineering, New Age International Publishers.
2. Braj M.Das, Principles of Geotechnical Engineering, Cengage Learning.
3. Donald. P. Coduto, Geotechnical Engineering by Principles & Practices, Pearson Education.

Proposed List of Practicals

1. To determine water content by Oven dry method
2. To determine water content by Calcium carbide method.
3. To determine specific gravity of soil particles by pycnometer method
2. Sieve analysis, particle size determination and IS classification as per I.S. Codes
3. To determine plastic limit, liquid limit, shrinkage limit
4. To determine coefficient of permeability by Variable head method.
5. Indian standard Proctor test
6. Modified proctor test.
7. Direct shear test.
8. Consolidation test.

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
CE3CO15	Quantity Surveying & Estimation	3	1	0	4

UNIT I

Introduction to estimates and related terms: Definitions of estimation and valuation. Significance (application) of the Course. Purpose of estimation. Type of estimates, data required for estimation as a pre-requisite. Meaning of an item of work and enlisting the items of work for different Civil Engineering projects. Units of measurement. Mode of measurement of building items/ works. Introduction to components of estimates: face sheet, abstract sheet (BOQ), measurement sheet, Rate Analysis, lead statement. Provisional sum & prime cost items, contingencies, work charge establishment, centage charges. Introduction to S.O.R. Types of sanction, Introduction to DPR and its content.

UNIT II

Quantity and Rate Analysis Meaning & purpose, Quantity analysis of various items (R.C.C., masonry, plastering etc.), Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades, types. Drafting detailed specifications for materials, quality, workmanship, method of execution, mode of measurement and Rate analysis for major items like, excavation, stone/ brick masonry, plastering, ceramic tile flooring, R.C.C. work.

UNIT III

Detailed Estimate detailed estimates of residential buildings (Two room building) centre line method and long wall & short wall method. Estimates of R.C.C.works(Slab, Beam, Column with footing), earth work calculations for roads , Retaining wall.

UNIT IV

Valuation Purpose of valuation. Meaning of price, cost and value. Factors affecting 'value'. Types of value: Fair Market Value, Book Value, Salvage/ Scrap Value, Distressed Value and Sentimental Value. Concept of free hold and lease hold property. Estimation versus valuation. Meanings of depreciation & obsolescence. Gross and net income, dual rate interest, methods of valuation, rent fixation of buildings (Numerical).

UNIT V

Tender & Contract: Definition. Methods of inviting tenders, tender notice, tendering procedure, Pre and post qualification of contractors, tender documents. 3 bid/ 2 bid or single bid system. Qualitative and quantitative evaluation of tenders. Comparative statement, Pre-bid conference, acceptance/ rejection of tenders. Various forms of BOT & Global Tendering, E-tendering.

Contracts: Definition, objectives & essentials of a valid contract as per Indian Contract Act (1872), termination of contract. Types of contracts: lump sum, item rate, cost plus.

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Defect liability period, liquidated damages, retention money, interim payment or running account bills, advance payment, secured advance, final bill.

Arbitration: Introduction to Arbitrations as per Indian Arbitration & Conciliation Act (1996) Meaning and need of arbitration, qualities and powers of an Arbitrator.

Text Books

1. B.N. Dutta, Quantity Surveying & Costing, U.B.S. Publisher.
2. Z.G.S. Birdi, Estimating & Costing for Civil Engineering, Dhanpat Rai Publishing Company
3. Chakraborty, Quantity surveying & costing, M. Chakraborti Publishers.

Reference Books

1. S.V Deodhar, Estimating & Costing and valuation, Khanna Publishers
2. M.S. Roy, Quantity Surveying & Contract and Tenders, Vayu Education of India.
3. S.C. Rangwala, Estimating Costing and Valuation, Charotar Publishers.

S. K. Singh

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
CE3EL01	Environmental Engineering	3	0	0	3

UNIT I

Primary Treatment of Sewage Characteristic of sewage (i.e. Physical, Chemical, Biological), Flow chart of Treatment, Primary Treatments namely: Screening, Grit Chamber, Skimming Tank and their Disposals. Primary Sedimentation Tank.

UNIT II

Secondary Treatment of sewage Secondary Sedimentation Tank, Activated Sludge Process, Trickling Filter Process (contact beds), oxidation pond and ditch, sludge digestion and Septic tank, Sludge conditioning, Sewage, sickness, sludge disposal.

UNIT III

Air Pollution and its Measures Introduction, Sources of Air pollution, Types of Air Pollutants (i.e. Primary and secondary), Effects of air pollution, Air quality Standards, Measures (Gravitational settling chambers).

UNIT IV

Noise Pollution and its Control Introduction, Human Acoustics, Sources and its effects, Measurement of noise and its propagation, Control methods, noise pollution rules and standards.

UNIT V

Environmental Impact Assessment Introduction , Utility and Scope of EIA , Significant Environmental Impacts, Stages of EIA , Environmental Inventory methods of Impact identification (i.e. Matrix , Network and Checklist).

Text Books

1. NN Basak, Environmental Engineering, Tata McGraw Hill
2. G.S.Birdie, Water Supply & Sanitary Engineering, Dhanpat Rai Publishing Company
3. S. C. Rangwala, Water supply and sanitary Engineering (Environmental Engineering), Charotar Publishing House Pvt.Ltd.

References Books

1. PN Modi, Water Supply Engineering, Standard Book House
2. SK GARG, Water supply Engineering, Khanna Publishers
3. Balram Pani, Text Book of Environmental Chemistry, I K International Publishing House;

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
EN3HS04	Fundamentals of Management, Economics and Accountancy	3	0	0	3

UNIT I Concepts of Management

Definition, characteristics and importance of management; Management: Science or Art, Difference between Management and Administration, Levels of management, Functions of Management, Managerial Roles, Managerial skills and competencies; Decision Making: Definition, process and types; Decision making under certainty, uncertainty and risk; Cross cultural issues in management and challenges.

UNIT II Fundamentals of Marketing and Human Resource Management

Introduction to Marketing: Definition, importance, function and scope of marketing, Core concepts of marketing, Marketing concepts and orientations, Marketing environment, Marketing-mix, Holistic marketing concept, Customer Relationship Management (CRM).

Introduction to Human Resource Management (HRM): Nature, Scope, Objectives and Functions; Role of HR manager, Process and need for Human Resource Planning, Human resource policies, Changing role of Human Resource in India, Globalization and its impact on Human Resource.

UNIT III Fundamentals of Economics

Introduction to Economics: Definition, nature, scope and significance; Difference between micro and macro economics; Time value of money, Law of diminishing marginal utility; Theory of Demand and Supply, Price elasticity of demand; Meaning and types of costs, Law of variable proportions; Types of market structure; National income and related aggregates; Meaning and types of Inflation; Meaning and phases of business cycle.

UNIT IV Basic Accounting Principles

Accounting Principles and Procedure, Double entry system, Journal, Ledger, Trail Balance, Cash Book; Preparation of Trading, Profit and Loss Account; Balance sheet; Cost Accounting: Introduction, Classification of costs, Methods and Techniques of costing, Cost sheet and preparation of cost sheet; Breakeven Analysis: Meaning and its application.

UNIT V Fundamentals of Financial Management

Introduction of Business Finance: Meaning, Definition of Financial Management, Goals of Financial Management (Profit Maximization and Wealth Maximization), Modern approaches to Financial Management – (Investment Decision, Financing Decision and Dividend Policy Decisions).

Text Books

1. R. D. Agarwal, "Organization and Management", McGraw Hill Education.
2. P. C. Tripathy and P. N. Reddy, "Fundamentals of Management, Economics and Accountancy", Tata McGraw Hill
3. Kotler Philip and Keller Kevin Lane, "Marketing Management", Pearson

Reference Books

1. Peter F Drucker, "The Practice of Management", McGraw Hill
2. Harold Koontz, "Essentials for Management", Tata McGraw Hill
3. M Y Khan and P K Jain, "Management Accounting", Tata McGraw Hill

Website Link

1. <https://nptel.ac.in/courses/122108038/> (Management Concepts)
2. <https://nptel.ac.in/courses/110104068/> (Marketing)
3. www.hrsguide.net (Human Resource Management)
4. <http://economicsconcepts.com> (Economics)
5. <https://nptel.ac.in/courses/110101003/> (Accounting)
6. <https://nptel.ac.in/courses/105103023/39> (Financial Management)

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
EN3MC02	Technical English	2	0	0	0

UNIT I

Higher grammar and Vocabulary-Idioms and phrases, Antonyms and Synonyms. Modals, Narration, Voices, Clauses,

UNIT II

Reading Skills-Three –Pass system, Comprehending passage.

UNIT III

Writing skills- Precis writing, Story writing, Report writing, Paragraph writing, Unseen prose, Letter writing, Interpretation of charts, Translation- from Indian to English and vice-versa, Writing speeches, Paraphrasing
Citing resources- Editing book and Media Review

UNIT IV

Speaking Skills- Critical Thinking: syntheses, analysis and evaluation, Oral presentation, Importance of Audio-Visual aids, Speeches, Jam.

UNIT V

Soft Skills- Team Work, Emotional Intelligence, Adaptability, Leadership and problem solving.

Text books

1. Sharma S C and Krishna Mohan *Business Correspondance and Report Writing a: a practical approach to business and technical communication*, Tata Mc Graw-Hill Publishing Company Limited
2. Thomson A J & A V Martinet, *A Prcatical English Grammar* Fourth Edition, Oxford University Press New Delhi India.
3. Alex k *Soft Skills: Know yourself and know the world*, S Chand & Company Ltd. New Delhi.

Reference Books

1. L Bovee Courtland, John V Thill and Mukesh Chaturvedi *Business Communication Today* Dorling Kindersley (India) Pvt. Ltd.
2. Ranjan Bhanu *Communication Skills*, Dhanpat Rai & Co. (Pvt) Ltd Delhi.
3. Wren & Martin *High School English Grammar & Composition*, S Chand & Company Ltd. New Delhi.

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