

Course No.	Course Title	L	T	P/D	Hours	Credit
CEH-321	Engineering Economics and Management	3	1	0	4	3

Principles of Economics: Importance of the economic background to measurement, objectives of business firm. Factors bearing on size of firms. Motives to growth. Obstacles to growth of firms, Study of present economy.

Capital: Analysis of need working capital, Estimation of requirements of working capital, Credit Management, Cash Management, Managing payments to suppliers and out standings.

Economic Analysis: Cost implication to different forms of construction and maintenance and maintenance and replacement lives of material, Installation and running cost of services, Capital investment in project, Cost analysis by traders and by functional element, Cost planning techniques, Cost control during design and Construction, Depreciation, Various Appraisal Criteria Methods. Break-even analysis, Cash flow analysis, Risk Analysis and Management Practice, Role of Lender's Engineer.

Financial Planning : Long term finance planning, Stock, Borrowings, Debentures, Loan Capital, Public Deposit, Dividend Policies, Bonus Shares, Market value of shares, Reserves. Over and under capitalisation.

Budget : Budgetary control system. Types of budgets, Procedure for master budgets. Budget manual. Cash now forecast. Problems of expansion and merger of companies, Corporate tax planning, Public policies on ICRA grading of exchange, World financial market, Role of financing institutes in Construction, CIDC-IRA grading of construction entities.

Construction Accounts : Accounting process, preparation of profit and loss account and balance sheet as per the companies Act, 1956, preparation of contract accounts for each project, methods of recording and reporting site accounts between project office and head office. Case study of how project appraisal is done, funds are raised, accounts are kept for execution of a major construction project.

Reference Books

1. Prasanna Chandra, 'Projects planning, Analysis Selection, Implementation and Review. Tata McGraw Hill, New Delhi.
2. Singh H. 'Construction Management and Accounts', Tata McGraw Hill, New Delhi. 3. Cormican D. 'Construction Management : "Planning and finance"', Construction press, London.
4. Brealey R.A. "Principles of Corporate Finance", Tata McGraw Hill, New Delhi.
5. Leland T. Blank. Anthony Tarquin. 'Engineering Economy' McGraw Hill.
6. David Bedworth, Sabah Randhawa. 'Engineering Economics' McGraw Hill.
7. Bruggeman. Fishr 'Real Estate, Finance and investment' McGraw Hill.
8. Block Hirt. 'Foundations of Financial Management' McGraw Hill.18
9. Burner 'Case studies in finance'. McGraw Hill
10. DeMello 'Cases in Finance' McGraw
11. Oliver, Lianabel ' The cost management toolbox ; A Managers guide to controlling costs and boosting profits.'Tata McGraw Hill.

Course No.	Course Title	L	T	P/D	Hours	Credit
CED-322	Structural design I (RCC)	3	1	0	4	3

Introduction: Type of loads and load combinations, Properties of concrete and reinforcing steel, design philosophies, limit state, ultimate load method, working stress method.

Design of Flexural members (Beam and Slab) by Limit state method: Design of Beams: Singly reinforced, doubly reinforced, rectangular, Flanged beams and lintels. Design of Slabs: One way, two way, Flat Slab, circular slab.

Design of Columns by limit state method: Design of short and long columns Subjected to eccentric and axial loading.

Design of Stair Cases:Types terms used, design of stairs spanning, horizontally&longitudinally,Circular/spiral doglegged stairs with quarter space landing, stairs with central stringer beam, Open well stair.

Design of footings: Isolated and combined footing, raft foundation and pile foundation.

Books

1. *S.N.Sinha, Reinforced Concrete Design, Tata Mcgraw Hill Education*
2. Pillai, S, Unnikrishna, Menon, Devdas: Reinforced Concrete Design, Tata Mcgraw-Hill, New Delhi
3. Varghese, P.C.: Limit state design of reinforced concrete, Prentice-Hall, New Delhi.
4. *B.C.Punmia, Ashok Kumar Jain & Arun Kumar Jain, Limite State Design of Reinforced Concrete Structures, Laxmi*
5. *S.S.Bhavikatti, elements of R.C.C Structures, New Age*
6. A K Jain: Reinforced Concrete (Limit state design).
7. IS 456 2000: Code of Practice for Plain and Reinforced Concrete

Course No.	Course title	L	T	P/D	Hours	Credit
CED-323	Water Resource Engg. - II	3	1	0	4	3

Irrigation Demand Assessment and Application Methods: Historical development of irrigation in Indian subcontinent, Present status and future requirements of irrigation in India, Water requirements of crops: Soil moisture and crop-water relations, Irrigation water quality, Consumptive use of water, Principal cropping seasons, Water demand assessment, duty and delta, irrigation efficiencies, principal crops, assessment of irrigation water, Irrigation methods

Canals: Canal classification, distribution system for canal irrigation, canal capacity, canal losses, alignment of canals, most efficient section, lined canals, their design.

Sediment load, mechanics of sediment transport, estimation of transported sediment in a canal, Critical shear stress, bed load, local and suspended load transport.

Design of stable channels, regime theory and design of unlined canals. Canal lining, design and construction.

Water logging: causes, preventive and curative measures, drainage system design for irrigated lands, salinity.

Well irrigation: Open wells and tube-wells. Duty of tube well water, Ground water depletion and associated problems due to excessive withdrawal of ground water.

OPEN CHANNEL FLOW

Introduction: Types of open channels, Prismatic and non prismatic channel, classification of flows, continuity equation, energy and momentum correction factors, critical depth, critical flow computations, flow transitions. Chezy's and Mannings equation, Hydraulically efficient channel cross sections. Introduction to GVF and Hydraulic jump.

Books

- 1) Design of Irrigation Structures: S.K.Sharma.
- 2) Irrigation Engineering and Hydraulic Structures: S.K. Garg
- 3) Irrigation Engineering and Hydraulic Structures : S.R.Sahasrabudhe
- 4) Irrigation Engineering Vol.I,II and III : K.R.Sharma
- 5) Irrigation Practice and Design Vol.1 to VII: K.B.Khushalni

Course No.	Course Title	L	T	P/D	Hours	Credit
CED-324	Quantity Surveying	3	1	0	4	3

Estimate: Principles of estimation, units, items of work, different kinds of estimates, different methods of estimation, estimation of materials in single room building, two roomed building with different sections of walls for foundation, floors and roofs, R.B. and R.C.C. works, plastering, white-washing, distempering, painting, doors and windows, and lump sum items, estimates of canals and roads.

Specification of Works: Necessity of specifications, types of specifications, general specifications, specification for bricks, cement, sand, water, lime, reinforcement; detailed specifications for earthwork, cement, concrete, brick work, floorings, D.P.C., R.C.C., cement plastering, white and colour washing, distempering, painting.

Rate Analysis: Purpose, preparation of rate analysis, procedure of rate analysis for items:- earthwork, concrete works, R.C.C. works, reinforced brick work, plastering, painting, white-washing and distempering.

Valuation: Gross income, net income, outgoings, scrap values, salvage value, obsolescence, annuity, sinking fund, depreciation, valuations of buildings.

Public Works Account: Regular and work charge establishment, earnest money, security money, retention money, muster roll, measurement book, cash book, examination and payment of bills, first and final bills, administrative sanction, technical sanction.

Text Books:

1. B.N. Dutta, *Estimating & Costing in Civil Engineering: Theory and Practice*.

Reference Books:

1. P.L. Bhasin, *Estimating and Costing for Building & Civil Engineering Works*,
2. M. Chakarborty, *Estimating, Costing & Specification in Civil Engineering*, and
3. George H. Cooper, *Building Construction Estimating*.

Course No.	Course Title	L	T	P/D	Hours	Credit
CEO-316/325	Finite element Method	3	1	0	4	3

Introduction: Principles of discretization, element stiffness and mass formulation based on direct, variational and weighted residual techniques and displacements approach, Shape functions and numerical integrations, convergence, Displacement formulation for rectangular, triangular and isoparametric elements for two dimensional and axisymmetric stress analysis. Three dimensional elements and degenerated forms. Stiffener elements and modifications such as use of different coordinate systems use of non-conforming modes and penalty functions. FEM applications in engineering problems.

Books

1. O.C. Zienkiewicz And R.L. Taylor, Finite Element Methods, Vol I & Vol II, Mcgraw Hill, 1989
2. K. J. Bathe, Finite Element Procedures, Phi Ltd.
3. R.D.Cook, Malkus&Plesha, Concept and Application of Finite Element Method, John Wiley.
4. David V.Hutton, Fundamental of Finite Element Analysis, Tata Mcgraw Hill Education
5. J.N.Reedy, An Introduction to The Finite Element Method, Tata Mcgraw Hill Education.
6. Kenneth H.Huebner,Donald L.Dewhirst&Douglas E.Smith,Ted G.Byrom, The Finite Element Analysis for Engineers, John Wiley.
7. Chandrupatla, Tirupathi R., Belgundu, Ashok D., Introduction to Finite Elements in Engineering, Prentice-Hall.
8. C.S.Krishnamoorthy,Finite Element Analysis (Theory & Programming),Tata Mcgraw Hill Education.
9. Chennakesava R.Alavala,Finite Element Methods, PHI.
10. V.K.Manicka Selvam, *Rudiments of Finite Element Method Analysis of Structures, Dhanpat Rai.*
11. P.Seshu, *Finite Element Analysis, PHI.*

Course No.	Course Title	L	T	P/D	Hours	Credit
CED-326	Structural Drawing I (RCC)	0	0	3		1

Structural Drawing of reinforced concrete Structures: Rectangular Beam, Flanged Beam, One way and Two way slab, Flat slab, Circular slab, Doglegged staircases, Open Well type, tread rise staircase, cantilever/ spiral staircase, Columns, Isolated Footing, strip, raft and pile foundation.

Books

1. *D.Krishnamurthy, Structural Design And Drawing Vol-I,II&III, CBS*
2. *N.KrishnaRaju, Structural Design and Drawing, Oxford University Press.*
3. *Murugesan&PadminiSubbarayan, Structural Drawing and Detailing, Pratheeba Publishers.*
4. *S.N.Sinha, Reinforced Concrete Design, Tata Mcgraw Hill Education*
5. Pillai, S, Unnikrishna, Menon, Devdas: Reinforced Concrete Design, Tata Mcgraw-Hill, New Delhi
6. Varghese, P.C.: Limit state design of reinforced concrete, Prentice-Hall, New Delhi.
7. *B.C.Punmia, Ashok Kumar Jain & Arun Kumar Jain, Limite State Design of Reinforced Concrete Structures, Laxmi*
8. *S.S.Bhavikatti, Elements of R.C.C Structures, New Age*
9. IS 456 2000: Code of Practice for Plain and Reinforced Concrete

Course No.	Course Title	L	T	P/D	Hours	Credit
CED 328	Construction Practice	1	0	3	2	

I Civil Engineering Activities At Construction Site:

1a. Develop basic technical know-how of construction activities

1b. Inspect Construction Site

- Construction activities such as excavation, brick masonry, concreting, carpentry, welding, plumbing, etc.
- Importance and Interdependency of various activities
- Technical aspects involved in workmanship and Safety precautions

II Masonry and Concreting:

2a. Apply basic techniques for masonry and concreting works

2b. Use quality control measures

- Brick and stone Masonry work, Different type of joints/bonds, Concept of line, plumb, right angle and water level.

- Plastering, Pointing,

- Flooring, Skirting and Dado

- Concrete Laying: Proper Mixing of concrete, Use of tools like concrete mixtures and vibrators, different types of vibrators.

-Formwork

-Scaffolding

-Centering/ Shuttering

III Carpentry, Welding and Drilling work:

3a. Identify appropriate materials required for each activity

3b. Select appropriate tools and equipments involved in various activities for specific uses

- Types of woods/timber, different types of tools, machines and accessories for wood works

- Types of welding, ARC welding, Gas welding, Gas Cutting, welding of dissimilar materials, Selection of welding rod material, welding processes.

- Fitting operation like chipping, filing, right angle, marking, drilling, tapping etc.

- Drilling machine.

- Safety precautions in carpentry, welding, fittings safety equipments and its use in

IV Plumbing:

4a. Install the plumbing and fixtures in buildings

4b. Observe the technical aspects involved in workmanship of various plumbing tasks

4c. Observe the safety precautions

- Different types of pipes, joints, taps, fixtures and accessories used in plumbing.

- Components (pipes, bends, chambers etc.) used in sanitary/sewerage lines

- Scheme/plan for water supply and sanitary system for a simple residential building.

V Finishing Works:

5a. Provide and fix the false ceiling , aluminum –glass works

5b. Carry out whitewashing and painting

- False ceiling, POP work, aluminum –glass works

- Whitewashing and painting: brush, roller and spray painting, types of finishing, preparation of surface, need of primer

VI Scaffolding and shuttering:

Introduction to Shuttering Carpentry & Scaffolding ,

Role of Shuttering Carpenter & Scaffolder in construction sector

Information of various tools and equipment used in Shuttering Carpentry & Scaffolding trade

Knowledge of erection & dismantling of straight shutters, safety while erection & dismantling, handling and stacking, methods of stacking and maintenance. Knowledge of conventional column and raft foundation, handling and stacking, methods of stacking and maintenance Identification of different types of conventional scaffolding materials & their uses.

VII Reinforcement binding – Foundation column beam, slab , brick masonry band

