III B.Tech I Semester

15AHS05 – MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common for CE and ME)

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Course Objective:

Prepare engineering students to analyze cost/revenue data and carry out make economic analyses in the decision making process to justify or reject alternatives/projects on an economic basis.

UNIT-I

Introduction to Managerial Economics & Demand Analysis: Definition of Managerial Economics, Characteristics and Scope – Managerial Economics and its relation with other subjects- Basic economic tools in Managerial Economics.

Demand Analysis: Meaning- Demand distinctions- Demand determinants- Law of Demand and its exceptions.

Elasticity of Demand & Theory of Production and Cost Analysis: Definition -Types of Elasticity of demand - Measurement of price elasticity of demand: Total outlay method, Point method and Arc method- Significance of Elasticity of Demand.

UNIT-II

Demand Forecasting: Meaning - Factors governing demand forecasting - Methods of demand forecasting - Forecasting demand for new products- Criteria of a good forecasting method.

Theory of Production and Cost Analysis: Production Function- Isoquants and Isocosts, MRTS, Cobb-Douglas Production function.

Cost Analysis: Cost concepts, Opportunity cost, Fixed Vs Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break even analysis -Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEP.

UNIT -III

Introduction to Markets & Pricing Policies: Market structures: Types of competition, Features of Perfect Competition, Monopoly and Monopolistic Competition. Price-Output Determination under Perfect Competition, Monopoly, Monopolistic Competition.

Pricing Policies: Methods of Pricing-Marginal Cost Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Bundling Pricing, and Peak Load Pricing.Internet Pricing Models: Flat rate pricing, Usage sensitive pricing, Transaction based pricing, Priority pricing, charging on the basis of social cost, Precedence model, Smart market mechanism model.

UNIT-IV

Types of Industrial Organization & Introduction to business cycles: Characteristic features of Industrial organization, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, State/Public Enterprises and their types.

Introduction to business cycles: Meaning - Features of business cycles.

Capital and Capital Budgeting: Meaning of capital budgeting, Need for capital budgeting – Capital budgeting decisions (Examples of capital budgeting) - Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), IRR and Net Present Value Method (simple problems).

UNIT V

Introduction to Financial Accounting: Introduction to Double-entry system, Journal, Ledger, Trial Balance- Final Accounts (with simple adjustments) - Limitations of Financial Statements.

Interpretation and analysis of Financial Statement: Ratio Analysis – Liquidity ratios, Profitability ratios and solvency ratios – Preparation of changes in working capital statement and fund flow statement.

LEARNING OUTCOMES:

1. Be able to perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
2. Be able to perform and evaluate payback period and capitalized cost on one or more economic alternatives.
3. Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.

Text Books:

1. J.V. PrabhakarRao: Managerial Economics and Financial Analysis, Maruthi Publications, 2011
2. N. AppaRao. & P. Vijaya Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi, 2011

References:

1. A R Aryasri - Managerial Economics and Financial Analysis, TMH 2011
2. Suma damodaran- Managerial Economics, Oxford 2011
3. S.A. Siddiqui& A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, 2011.

III B.Tech I Semester

15ACE18-STRUCTURAL ANALYSIS- II

L	T	P	C
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Course Objective:

Indeterminate structures are subjected to different loading with different supported conditions; hence it is necessary for students to study the behaviour of the structures.

UNIT-I

Kani`s Method:- Analysis of continuous beams – including settlement of supports and single bay, single storey portal frames with side sway by Kani's method.

UNIT – II

Flexibility Methods:- Flexibility methods, Introduction, application to continuous beams including support settlements.

Stiffness Method: - Introduction, application to continuous beams including support settlements.

UNIT III

Influence Lines and Rolling Loads :For Statically Determinate Structures- Moving/Rolling and influence lines; Influence lines for beam reactions ; Influence lines for shearing force; Influence lines for bending moment; Calculation of maximum shear force and bending moment at a section for rolling loads; Calculation of absolute maximum bending moment; Influence lines for simple trusses.

UNIT IV

Arches : Three hinged arches, Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature. Two **Hinged Arches:** Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – (No analytical question).

UNIT – V

Plastic Analysis: Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment – Plastic hinge – lower and upper bound theorems – ultimate strength of fixed and continuous beams.

Course Outcomes:

On completion of the course, the students will be able to:

- *Apply the methods of indeterminate truss analysis*
- *Analyze the behavior of arches through different methods of analysis*
- *Use various classical methods for analysis of indeterminate structures*

- *Determine the effect of support settlements for indeterminate structures*
- *Able to analyze the beam and frames for vertical and horizontal loads and draw*

TEXT BOOKS

1. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.
2. Analysis of structures by Vazrani&Ratwani – Khanna Publications.
3. Structural Analysis by D.S.PrakashaRao, Univ.Press, Delhi.Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi.

REFERENCE

1. Theory of structures by Ramamuratam,jain book depot , New Delhi
2. Structural analysis – Hibbler, 6th edition – Pearson publilcation.
3. Structural analysis by R.S.Khurmi, S.Chand Publications, New Delhi.
4. Analysis Of Structures By Dev Das Menon – John wileypubilication.
5. Comprehensive Structural Analysis-Vol.I&2 by Dr. R. Vaidyanathan&Dr.P.Perumal-Laxmi publications pvt. Ltd., New Delhi.
6. Analysis of Structures – Vol. I & 2 by Bhavikatti, Vikas publications.
7. Strength of Materials and mechanics of solids Vol-2 by B.C. Punmia, Laxmi Publications, New Delhi.

III B.Tech I Semester

15ACE19-CONCRETE TECHNOLOGY

L	TP	C
3	1 0	3

Course Objective:

- *Lot of advances is taking place in the concrete technology as par with development taking place in the engineering.*
- *The present day industry needs the knowledge of concrete technology thoroughly.*
- *The subject is designed to give the basic knowledge as well as latest developments in concrete technology.*

UNIT - I

Cement, Concrete & Its Components: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrated cement – Test`s on physical properties – Different grades of cement – Admixtures – Mineral additives: slags, flyashes, rice husk ash, metakaolin, calcinedclays,silica fume, limestone powder.and chemical admixtures- aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – II

Tests on Concrete : Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.- Water / Cement ratio – Abram's Law – Gel space ratio – Nature of strength of concrete – Maturity concept – Curing- Compression tests – Tension tests – – Strength in tension & compression – Factors affecting strength– Relation between compressive & tensile strength– Flexure tests – Splitting tests – Non-destructive testing methods – codal provisions for NDT.

UNIT – III

Elasticity, Creep & Shrinkage : Modulus of elasticity – Dynamic modulus of elasticity – Posisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – IV

Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – ACI method & IS 10262 method.

UNIT – V

Special Concretes: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Different types of fibres – Factors affecting properties of F.R.C – Applications – Polymer concrete – Types of Polymer concrete – Properties of polymer concrete – Applications – High performance concrete – Self consolidating concrete – SIFCON – Bacterial concrete(self healing concrete).

Course outcomes:

- *Identify the functional role of ingredients of concrete and apply this knowledge to mix design philosophy.*
- *Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete.*
- *Evaluate the effect of the environment on service life performance, properties and failure modes of structural concrete and demonstrate techniques of measuring the Non Destructive Testing of concrete structure.*
- *Develop an awareness of the utilization of waste materials as novel innovative materials for use in concrete.*
- *Design a concrete mix which fulfills the required properties for fresh and hardened concrete.*

TEXT BOOKS:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
2. Concrete Technology by M.S.Shetty. – S.Chand& Co.; 2004

REFERENCES:

1. Properties of Concrete by A.M.Neville – Pearson publication – 4th edition
2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi
3. Non-Destructive Test and Evaluation of materials by J.Prasad& C.G.K. Nair , Tata Mcgraw hill Publishers, New Delhi.
4. P.K.Mehta and P.J.M. Monteiro," concrete micro structure, properties and materials', Third edition Tata McGraw Hill 2006

III B.Tech I Semester

15ACE20-DESIGN OF REINFORCED CEMENT CONCRETE STRUCTURES

L	T	P	C
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Course Objectives:

1. *Familiarize Students with different types of design philosophies.*
2. *Equip student with concepts of design of flexural members.*
3. *Understand Concepts of shear, bond and torsion.*
4. *Familiarize students with different types of compressions members and Design.*
5. *Understand different types of footings and their design.*

UNIT –I

Introduction: Introduction to Materials, Constituents of concrete, recommendation in IS 456 – 2000, grades of concrete, working stress method, design constants; Design singly reinforced and Doubly Reinforced beams.

UNIT –II

Limit State Design: Concepts of limit state design – Comparison between two methods- Basic statistical principles – Characteristic loads – Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design –stress - block parameters – limiting moment of Resistance-Limit state design of singly reinforced, doubly reinforced.

UNIT –III

Beams:, T, L and Continuous beam sections by limit state method.

Shear, Torsion, Bond, & Serviceability: Limit state design of section for shear and torsion – concept of bond, anchorage and development length, Limit state design of serviceability for deflection, cracking and codal provision

UNIT –IV

Slabs:, Design of one way slab - Two-way slab, continuous slab.

UNIT – V

Columns & Footings

Short and long columns – under axial loads, uni-axial bending and **biaxial bending(Not for Examination)**, I S Code provisions. Different types of footings – Design of isolated, square, Rectangular, stepped and sloped footings,

Course Outcomes:

- *Students are able to know the working stress and limit state methods of design.*
- *Students are able to know the design concepts of flexural members.*
- *Students are able to know the design concepts of compression members.*
- *Students are able to know the serviceability requirements of the reinforced cement concrete structure.*
- *Students are able to understand the different types of footings and their design.*

TEXT BOOKS

1. 1.Design of Reinforced Concrete Structures (Limit State) – A.K.Jain, 1st Edition, NemchandBrothers,Roorkee.
2. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt.Ltd., New Delhi.
3. Reinforced concrete structures – I.C. Syal&A.K.Goel, S.Chand Publishers.
4. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

REFERENCE

1. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
2. Reinforced concrete design by S.UnnikrishnaPillai&DevdasMenon, Tata Mc.Graw Hill, New Delhi.
3. Limit state designed of reinforced concrete – P.C.Varghese, Prentice Hall of India, New Delhi..
4. Design of concrete structures – ArthusH.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.
5. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers.

III B.Tech I Semester

15ACE21-GEOTECHNICAL ENGINEERING – I

L	T	P	C
3	1	0	3

Course Objective:

The object of this course is to make the student to understand the behaviour of soil under different loads and different conditions. This is necessary because the safety of any structure depends on soil on which it is going to be constructed.

UNIT – I

INTRODUCTION: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship – Relative density. INDEX PROPERTIES OF SOILS: Moisture Content, Specific Gravity, Insitu density, Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils

UNIT –II

PERMEABILITY:

Soil water – capillary rise – flow of water through soils – Darcy's lawpermeability – Factors affecting – laboratory and Field determination of coefficient of permeability –Permeability of layered systems. SEEPAGE THROUGH SOILS: Total, neutral and effective stresses –quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT – III

STRESS DISTRIBUTION IN SOILS:

Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart . COMPACTION: Mechanism of compaction – factors affecting – effects of compaction on soil properties. – Field compaction Equipment – compaction control.

UNIT – IV

CONSOLIDATION :

Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement..

UNIT – V

SHEAR STRENGTH OF SOILS : Importance of shear strength – Mohr's– Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelops – Shear strength of sands - dilatancy – critical void ratio – Liquefaction- shear strength of clays.

Course Outcomes:

On completion of the course, the students will be able to:

- *carry out soil classification*
- *solve any practical problems related to soil stresses estimation, permeabilityand seepage including flow net diagram*
- *estimate the stresses under any system of foundation loads solve practicalproblems related to consolidation settlement and time rate of settlement*

TEXT BOOKS:

1. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
2. Soil Mechanics and Foundation by byB.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
3. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).

REFERENCES:

1. Basic and Applied Soil Mechanics by GopalRanjan& ASR Rao, New age International Pvt .Ltd, New Delhi.
2. Soil Mechanics and Foundation Engineering by Purushtoma Raj, Pearson Pubilications
3. Geotechnical Engineering V.N.S.Murthy, CRC Press, Newyork, Special Indian Edition
4. Geotechnical Engineering by Brije.M.Das, Cengage Publications, New Delhi.4.Geotechnical Engineering by Brije.M.Das, Cengage Publications, New Delhi.

III B.Tech I Semester

15ACE22-ENVIRONMENTAL ENGINEERING – I

L	T	P	C
3	1	0	3

Course objectives:

To make the students conversant with sources and its demand of water
To understand the basic characteristics of water and its determination
To expose the students to understand the design of water supply lines
To provide adequate knowledge about the water treatment processes and its design
To have adequate knowledge on safe disposal methods

UNIT – I

Introduction: Necessity of protected water supply –Flow chart of public water supply system - Role of Environmental Engineer.

Water Demand and Water Quality: Population forecasts, design period – water demand, types of water demands – factors affecting – fluctuations – fire demand – Characteristics of water – Physical, Chemical & Biological and their testing – drinking water standards - Waterborne diseases - Comparison from quality and quantity and other considerations.

Water collection structures at source: intakes – infiltration galleries.

UNIT-II

Water Treatment (Sedimentation, Filtration and Disinfection): Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation flocculation clarifier design – coagulants – feeding arrangements– Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – theory of chlorination, chlorine demand, other disinfection practices

UNIT-III

Water Distribution Network Analysis : Distribution systems – Requirements, Layout of Water distribution systems – Design procedures- Hardy Cross and equivalent pipe methods - service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

UNIT IV

Waste Water Collection : House plumbing– inverted siphon – catch basins – flushing tanks– ejectors - Conservancy and water carriage systems – sewage and storm water estimation - fluctuations – types of sewers – Hydraulics of sewers and storm drains– design of sewers– shapes and materials.

Waste Water Characteristics: Characteristics of sewage – cycles of decay –decomposition of sewage. - B.O.D. – C.O.D. equations.

UNIT – V

Waste Water Treatment : Layout and general outline of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – trickling filters – ultimate disposal of sewage – Construction and design of Oxidation ponds – sewage farming – dilution. Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks and Imhoff -Tanks working principles and design – soak pits.

***Course outcomes**:*

- *Understand key current environmental problems.*
- *Be able to identify and value the effect of the pollutants on the environment: atmosphere, water and soil.*
- *Be able to analyze an industrial activity and identify the environmental problems.*
- *Be able to plan strategies to control, reduce and monitor pollution.*
- *Be able to select the most appropriate technique to purify and/or control the emission of pollutants.*
- *Be able to apply the basis of an Environmental Management System (EMS) to an industrial activity.*
- *Be able to plan and design the quantity of water for any given population.*

TEXT BOOKS

1. Water supply and sanitary Engineering by G.S. Birdi, DhanpatRai& Sons Publishers.
2. Water supply and sanitary Engineering by S.A.Garg,
3. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers.
4. Manual on Water supply and Treatment - CPHEEO, 1999.
5. Punmia B.C, Ashok Jain &Arun Jain, Water Supply Engineering, Laxmi Publications, Pvt. Ltd., New Delhi, 2004.

REFERENCS

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
2. Water and Waste Water Technology by Steel
3. Water and Waste Water Engineering by Fair Geyer and Okun
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
5. Waste water Engineering by Metcalf and Eddy.
6. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age International
7. Environmental Engineering by georad.Kiely TMH Pubilications.

III B.Tech I Semester

15ACE23-CONCRETE TECHNOLOGY LAB

L	T	P	C
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Course Objective:

To have knowledge on building materials like fine aggregate, coarse aggregate, cement, their mechanical properties and their applications.

1. a) Determination of Specific Gravity of Cement.
   b) Determination of Unit Weight or Bulk Density of Cement.
2. Determination of Normal Consistency of Cement.
3. a) Determination of Initial Setting Time of Cement.
   b) Determination of Final Setting Time of Cement.
4. a) Preparation of Mortar Cubes for Compressive Strength.
   b) Test on Mortar Cubes for Compressive Strength.
5. a) Fineness of Cement by sieving method.
   b) Fineness of Cement by Air Permeability Method.
6. a) Determination of Specific Gravity of Fine Aggregate.
   b) Determination of Bulk Density of Fine Aggregate.

Fine Aggregate

7. a) Determination of Specific Gravity of Coarse Aggregate.
   b) Determination of Bulk Density of Coarse Aggregate.
8. Tests on Bulking of Sand a. Laboratory Method b. Field Method.
9. Determination of Fineness Modulus of Fine Aggregate.
10. Determination of Fineness Modulus of Coarse Aggregate.

Tests on Concrete

1. Tests on Workability of Concrete.
   a. Slump Test
   b. Compaction Factor Test
2. Tests on Hardened Concrete.
   a. Compressive Strength
   b. Flexural Strength
   c. Split tensile strength.
3. Non-Destructive Testing of Concrete Structures (only demonstration).

CourseOutcomes:

- *Students can test and analyze the properties of concrete materials.*
- *Students can design different proportions of concrete mixes.*
- *Students can have knowledge on non-destructive techniques on concrete.*

NOTE: At least EIGHT of the above experiments are to be conducted.

List of Equipment :

1. Pycnometers.
2. Slump cone
3. Vicat's apparatus
4. Specific gravity bottle.
5. Lechatlier's apparatus.
6. Compaction factor setups
7. Longitudinal compressometer and

8.Rebound hammer, Pulse velocity machine.

9. Relevant IS Codes

III B.Tech I Semester

15ACE24-GEOTECHNICAL ENGINEERING LAB

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CourseObjective:

To obtain the properties of soils by conducting experiments, it is necessary for students to understand the behaviour of soil under various loads and conditions.

LIST OF EXPERIMENTS

1. Atterberg's Limits.
2. Field density-core cutter and sand replacement method
3. Grain size analysis
4. Specific gravity of soils by Density Bottle method &Pycnometer method
5. Permeability of soil, constant and variable head test
6. Compaction test
7. CBR Test
8. Consolidation test
9. Unconfined compression test
10. Tri-axial Compression test
11. Direct shear test.
12. Vane shear test

NOTE: At least EIGHT of the above experiments are to be conducted.

CourseOutcome:

- *solve any practical problems related to soil stresses estimation, permeability and seepage including flow net diagram*

TEXT BOOKS:

1. Soil Testing Lab Manual by K.V.S. AppaRao&V.C.C.Rao,University Science Press , Laxmi Publication.
2. Soil Testing for Engineers by S.Mittal and J.P.Shukla, Kahna Publishers, New Delhi.
3. Relevant IS Codes.