

Annamacharya Institute of Technology and Sciences, Tirupati

Course structure for Four Year Regular B.Tech. Degree Program

(Effective for the batches admitted from 2019-20)

CIVIL ENGINEERING (CE)

III B. Tech – II Semester

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	PCC	19APC0120	Foundation Engineering	3	0	0	3	30	70	100
2	PCC	19APC0121	Transportation Engineering	3	0	0	3	30	70	100
3	PCC	19APC0122	Remote Sensing and GIS	3	0	0	3	30	70	100
4	PEC		Professional Elective II	3	0	0	3	30	70	100
		19APE0106	Subsurface Investigation and Instrumentation							
		19APE0107	Prestressed Concrete							
		19APE0108	Advanced Structural Analysis							
		19APE0109	Railways, Airport, Docks & Harbor Engineering							
19APE0110	Finite Element Methods									
5	OEC		Open Elective II (Inter Disciplinary Elective II)	3	0	0	3	30	70	100
		19AHSMB01	Managerial Economics and Financial Analysis							
		19AOE0301	Management Science							
		19AHSMB02	Entrepreneurship Development							
6	HSC		Humanities Elective I	3	0	0	3	30	70	100
		19AOE9901	English for Research writing skills							
		19AHE9911	Environmental waste Management							
		19AHE9902	Principles of Effective Public Speaking							
7	MC	19AMC9902	Constitution of India	2				30		30
PRACTICAL										
8	PCC	19APC0123	Remote Sensing and GIS Lab	0	0	3	1.5	30	70	100
9	PCC	19APC0124	Transportation Engineering lab	0	0	3	1.5	30	70	100
10	PRC	19APR0104	Industrial Training/ Internship/Research Projects in National Laboratories/Academic Institutions *	0	0	0	0	-	-	-
11	PRC	19APR0103	Socially Relevant Projects (15 hrs / semester)	0	0	1	0.5	50	-	50
TOTAL							21.5	350	630	880

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: TIRUPATI

Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19APC0120	Foundation Engineering	3	0	0	3

Course Outcomes: After the completion of the course student should be able to

1. Understand the principles and methods of Soil Exploration
2. Decide the suitability of soils and check the stability of slopes
3. Calculate lateral earth pressures and check the stability of retaining walls
4. Determine the bearing capacity of soil
5. Analyze and design the shallow and deep foundations

UNIT – I SOIL EXPLORATION:

Need – methods of soil exploration – boring and sampling methods – penetration tests – plate load test– planning of soil exploration programme, -preparation of soil investigation report.

UNIT – II SLOPE STABILITY:

Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish slip circle method, method of slices– Taylor’s Stability Number.

UNIT – III EARTH PRESSURE THEORIES:

Active, Passive and at rest soil pressures Rankine’s theory of earth pressure in cohesive and non-cohesive soils – Earth pressures in layered soils -Coulomb’s earth pressure theory. Culmann’s and Rebhann Graphical method for active case.

RETAINING WALLS: Types of retaining walls – stability of cantilever retaining walls.

UNIT – IV SHALLOW FOUNDATION

Types - choice of foundation – location and depth - safe bearing capacity – shear criteria – Terzaghi’s method of bearing capacity- settlement criteria –plate load test – allowable settlements of structures.

UNIT - V PILE FOUNDATION

Types of piles – load carrying capacity of piles based on static pile formulae – dynamic pile formulae - pile load tests - load carrying capacity of pile groups in sands and clays – Settlement of pile groups – negative skin friction

TEXT BOOKS:

1. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt Ltd
3. Soil Mechanics and Foundation by by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
4. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
5. Geotechnical Engineering by C. Venkataramiah, New age International Pvt. Ltd, (2002).

REFERENCE BOOKS:

1. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
2. Principals of Geotechnical Engineering by Braja M. Das, Cengage Learning Publishers.
3. Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
4. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata McGraw-Hill Publishers New Delhi.

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19APC0121	Transportation Engineering	3	0	0	3

Course Outcomes: After the completion of the course student should be able to

1. Understand the highway development and planning.
2. Understand the geometric design of highway.
3. Understand traffic studies and regulations.
4. Understanding the concept of intersections, interchanges.
5. Understanding the various pavement types and design.

UNIT-I

HIGHWAY DEVELOPMENT AND PLANNING: Highway development in India – Necessity for highway planning – Different Road development plans – Classification of roads – Road network patterns – Highway alignment – Factors affecting alignment – Engineering surveys – Drawings and reports.

UNIT-II

HIGHWAY GEOMETRIC DESIGN: Importance of geometric design – Design controls and criteria – Highway cross section elements – Sight distance elements – Stopping sight distance, Overtaking sight distance and intermediate sight distance – Design of horizontal alignment – Design of super elevation and extra widening – Design of transition curves – Design of vertical alignment – Gradients – Vertical curves.

UNIT-III

TRAFFIC ENGINEERING & REGULATIONS : Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies - Data Collection and Presentation - Speed studies - Data Collection and Presentation - Parking Studies – On street & Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams - Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings-Types of Road Markings - Design of Traffic Signals – Webster Method

UNIT-IV

INTERSECTION DESIGN: Conflicts at intersections – Channelisation: Objectives – Traffic islands and design criteria – Types of At grade intersections – Types of grade separated intersections – Rotary intersection – Concept of rotary and design criteria – Advantages and disadvantages of rotary intersection.

UNIT-V

PAVEMENT DESIGN: Types of pavements – Difference between flexible and rigid pavements – Pavement components – Sub grade, Sub base, Base and wearing course – Functions of pavement components – Design factors – Flexible pavement design methods – G.I method, CBR method, (as per IRC 37-2012) – Design of rigid pavements – Critical load positions – Westergaard's stress equations.\ (as per IRC 58-2002).

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 6th Edition – 1997.

REFERENCES:

1. Principles of Traffic and Highway Engineering – Garber & Hoel, Cengage Learning.
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.
3. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981)

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19APC0122	Remote Sensing and GIS	3	0	0	3

Course Outcomes: After the completion of the course student should be able to

1. Understand principles of aerial photography
2. Understand the concept of remote sensing
3. Understand the concept of GIS
4. Analyze the GIS spatial data
5. Apply the concepts of GIS in water resources

UNIT – I

INTRODUCTION TO PHOTOGRAMMETRY:

Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducially points, parallax measurement using fiducially line.

UNIT – II

REMOTE SENSING :

Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – III

GEOGRAPHIC INFORMATION SYSTEM:

Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

TYPES OF DATA REPRESENTATION:

Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – IV

GIS SPATIAL ANALYSIS:

Computational Analysis Methods(CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT – V

WATER RESOURCES APPLICATIONS:

Land use/Land cover in water resources, Surface water mapping and inventory -Watershed management for sustainable development and Watershed characteristics - Reservoir sedimentation, Fluvial Geomorphology - Ground Water Targeting, Identification of sites for artificial Recharge structures - Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

- 1 Remote Sensing and GIS by B.Bhatta, Oxford University Press, New Delhi.
- 2 Fundamentals of remote sensing by Gorge Joseph , Universities press, Hyderabad

REFERENCES:

1. Advanced Surveying : Total Station GIS and Remote Sensing – Satheesh Gopi – Pearson Publication.
2. Remote Sensing and its applications by LRA Narayana University Press 1999.
3. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
4. Remote sensing and GIS by M.Anji Reddy ,B.S.Publiications,New Delhi.
5. GIS by Kang – Tsung Chang, TMH Publications & Co.,

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19APE0106	Subsurface Investigation and Instrumentation	2	0	0	2

Course Outcomes: After the completion of the course student should be able to

1. Understand the exploration and geophysical methods
2. Understand the exploration techniques
3. Understand the sampling of soil
4. Understand field testing of soil
5. Understand the usage of instrumentation in subsurface investigation

UNIT -I

EXPLORATION AND GEOPHYSICAL METHODS: Exploration program planning -methods of exploration- preliminary and detailed design spacing and depth of bores, data presentation. Geophysical exploration and interpretation, seismic and electrical methods, cross bore hole, single bore hole – up hole - down hole methods.

UNIT –II

EXPLORATION TECHNIQUES: Methods of boring and drilling, non-displacement and displacement methods, drilling in difficult subsoil conditions, limitations of various drilling techniques, stabilization of boreholes, bore logs.

UNIT -III

SOIL SAMPLING: Sampling Techniques – quality of samples – factors influencing sample quality - disturbed and undisturbed soil sampling advanced sampling techniques, offshore sampling, shallow penetration samplers, preservation and handling of samples.

UNIT -IV

FIELD TESTING IN SOIL EXPLORATION: Field tests, penetration tests, Field vane shear, Insitu shear and bore hole shear test, pressure meter test, dilatometer test - plate load test–monotonic and cyclic; field permeability tests

UNIT -V

INSTRUMENTATION: Instrumentation in soil engineering, strain gauges, resistance and inductance type, load cells, earth pressure cells, settlement and heave gauges, pore pressure measurements.

TEXT BOOKS:

1. Alam Singh and Chowdhary G. R., "Soil Engineering in Theory and Practice, Volume-2, Geotechnical testing and instrumentation", CBS Publishers and Distributors, New Delhi, 2006.
2. Dunnycliff J., and Green, G. E., "Geotechnical Instrumentation for Monitoring Field Performance", John Wiley, 1993.

REFERENCES:

1. Bowles J. E., "Foundation Analysis and Design", 5th Edition, The McGraw-Hill companies, Inc., New York, 1995.
2. C. Venkataramiah, "Geotechnical Engineering", New age International Pvt . Ltd, (2002).
3. Hanna T. H., "Field Instrumentation in Geotechnical Engineering", Trans Tech., 1985. 4. Hunt R. E., "Geotechnical Engineering Investigation Manual", McGraw Hill, 1984.

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19APE0107	Prestressed Concrete	2	0	0	2

Course Outcomes: After the completion of the course student should be able to

1. Understand the methods of prestressing.
2. Understand the prestress losses
3. Analyze and design of sections to withstand flexure and shear.
4. Analyze and design of composite sections.
5. Understand the concepts of deflections.

UNIT – I

INTRODUCTION: Historic development – General principles of Prestressing, Pretensioning And Post Tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

METHODS OF PRESTRESSING:-

Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System, Freyssinet system and Gifford – Udall System.

UNIT – II

LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of stress in steel, slip in anchorage ,bending of member and wobble frictional losses.

UNIT – III

ANALYSIS & DESIGN OF SECTIONS FOR FLEXURE: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure – Kern – lines, cable profile.

UNIT – IV

DESIGN OF SECTION FOR SHEAR : Shear and Principal Stresses – Design for Shear in beams.

COMPOSITE SECTION: Introduction – Analysis of stress – Differential shrinkage – General design considerations.

UNIT – V

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections – factors influencing deflections – short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS:

- 1 Prestressed Concrete by N. Krishna Raju; - Tata Mc.Graw Hill Publications.
- 2 Prestressed Concrete by K.U.Muthu, PHI Publications.
- 3 Prestressed Concrete by Ramamrutham, Dhanpatrai Publications

REFERENCE:

1. Prestressed Concrete Design By Praveen Nagrajan, Pearson Publications, 2013 Editions.
2. Design Of Prestressed Concrete Structures (Third Edition) By T.Y. Lin & Ned H. Burns, John Wiley & Sons.
3. Prestressed Concrete By Pandit.G.S. And Gupta.S.P., CBS Publishers And Distributors Pvt. Ltd, 2012.
4. Prestressed Concrete By Rajagopalan.N, Narosa Publishing House, 2002.
5. Prestressed Concrete Structures By Dayaratnam.P., Oxford And IBH, 2013

Codes/Tables:

Codes: BIS code on prestressed concrete, IS 1343-2012 to be permitted into the examination Hall.

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19APE0108	Advanced Structural Analysis	2	0	0	2

Course Outcomes: After the completion of the course student should be able to

1. Understand indeterminate structures
2. Analyze the structures using stiffness matrix method
3. Analyze the trusses and frames using flexibility matrix method
4. Analyze the trusses and frames using stiffness matrix method
5. Understand the shear wall analysis

UNIT – I

Introduction to matrix methods

Introduction to matrix methods of analysis – static indeterminacy and kinematic indeterminacy – degree of freedom – coordinate system – structure idealization stiffness and flexibility matrices – suitability element stiffness equations – elements flexibility equations – mixed force – displacement equations – for truss element, beam element and tensional element. Transformation of coordinates – element stiffness matrix – and load vector – local and global coordinates.

UNIT – II

Stiffness matrix method

Assembly of stiffness matrix from element stiffness matrix – direct stiffness method – general procedure – band matrix – semi bandwidth – computer algorithm for assembly by direct stiffness matrix method.

UNIT – III

Truss and Frame-Flexibility method

Analysis of plane truss – continuous beam – plane frame and grids by flexibility methods.

UNIT – IV

Truss and Frame-Stiffness method

Analysis of plane truss – continuous beam – plane frame and grids by stiffness methods.

UNIT – V

Shear wall analysis

Special analysis procedures – static condensation and sub structuring – initial and thermal stress. Shear walls- Necessity – structural behavior of large frames with and without shear walls – approximate methods of analysis of shear walls.

TEXT BOOKS:

1. Matrix Analysis of Frames structures by William Weaver J.R and James M. Gere, CBS publications.
2. Advanced Structural Analysis by Ashok. K. Jain, Nem Chand Brothers.

REFERENCES:

1. Basic Structural Analysis by C.S. Reddy, Tata Mc-Graw hill
2. Matrix Structural Analysis by Madhu B. Kanchi, John Willey publishers
3. Indeterminate Structural Analysis by K.U. Muthuet al., I.K. International Publishing House Pvt. Ltd.
4. Matrix Methods of Structural Analysis by J.L. Meek, Mc-Graw hill

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19APE0109	RAILWAYS, AIRPORT, DOCKS AND HARBOUR ENGINEERING	2	0	0	2

Course Outcomes: After the completion of the course student should be able to

1. Know various components and their functions in a railway track
2. Acquire design principles of geometrics in a railway track.
3. Know basic concepts of airport engineering and its layouts
4. Acquire design principles of airport geometrics design
5. Know the planning, construction and maintenance of Docks and Harbours.

UNIT I

RAILWAY ENGINEERING:

Permanent way components –Cross Section of Permanent Way – Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density – Rail joints.

UNIT – II:

GEOMETRIC DESIGN OF RAILWAY TRACK:

Gradients – Grade Compensation – Cant and Negative Super Elevation – Cant Deficiency – Pointing And Crossings – Layout And Functioning Of Left Hand Turn Out And Right Hand Turn Outs– Station Yards – Signaling

UNIT - III

AIRPORT ENGINEERING:

Airport Site Selection – Factors Affecting Site Selection And Surveys- Runway Orientation – Wind Rose Diagram – Basic Runway Length – Correction For Runway Length – Terminal Area- Layout And Functions – Simple Building , Linear Concept, Pier Concept And Satellite Concept and Typical Layouts

UNIT – IV

GEOMETRIC DESIGN OF RUNWAYS AND TAXIWAYS:

Aircraft Characteristics – Influence Of Characteristics On Airport Planning And Design – Geometric Design Elements Of Runway – Standards And Specifications As Per- Functions Of Taxiways – Taxiway Geometric Design – Geometric Elements And Standard Specifications – Runway And Taxiway Lighting.

UNIT – V

PORTS AND HARBOURS:

Requirements of Ports And Harbours – Types Of Ports – Classification Of Harbours –Docks And Types Of Docks – Dry Docks, Wharves And Jetties – Breakwaters:– Dredging Operations – Navigation Aids,

TEXT BOOKS:

1. A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi.
2. Transportation Engineering: Railways, Airports, Docks and Harbours, Bridges and Tunnels, by C.Venkataramaiah, Universities Press, Hyderabad (2016)
3. Airport Planning and Design- S.K. Khanna and M.G Arora, Nemchand Bros.

REFERENCES:

1. Highway, Railway, Airport and Harbour Engineering – K.P. Subramanian, Scitech publishers.
2. Harbour, Dock and Tunnel Engineering – R. Srinivasan, Charotar Publishing House Pvt. Limited, 2009
3. A Text book of Transportation Engineering – S.P.Chandola – S.Chand & Co.Ltd. –

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19APE0110	Finite Element Methods	2	0	0	2

Course Outcomes: After the completion of the course student should be able to

1. Solve simple boundary value problems using Numerical technique of Finite element method.
2. Demonstrate the differential equilibrium equations and their relationship.
3. Develop finite element formulation of one and two dimensional problems and solve them.
4. Demonstrate the displacement models and load vectors
5. Analyze plane stress and plane strain problems

UNIT-I-INTRODUCTION:

Concepts of FEM - Steps involved - Merits & Demerits Energy Principles Discretization Review of stiffness method- Principle of Stationary potential energy- Potential energy of an elastic body- Rayleigh-Ritz method of functional approximation.

UNIT-II Principles of Elasticity- Equilibrium Equations- Strain Displacement relationships- Constitutive relationship for plane stress, plane strain and axis symmetric bodies of revolution with axis symmetric loading.

UNIT-III ONE DIMENSIONAL & TWO DIMENSIONAL ELEMENTS:

Stiffness matrix for bar element-shape functions for one dimensional elements one dimensional problem. - - - - -

Two Dimensional Elements - Different types of elements for plane stress and plane strain analysis Displacement models generalized coordinates shape functions convergent and compatibility requirements Geometric invariance Natural coordinate system area and volume-coordinates

UNIT-IV GENERATION OF ELEMENT:

Generation of element stiffness and nodal load matrices for 3-node triangular element and four noded rectangular elements.

UNIT-V SOLUTION TECHNIQUES:

Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

Text Book

1. Finite Element Methods in Civil Engineering by M.Rama Narasimha Reddy,Dr.K.Sreenivasu Reddy, D.Srinivasulu Reddy, Sci-Tech Publications Pvt.Ltd.
2. Finite Element Analysis By S.S. Bhavakatti-New Age International Publishers.
3. Finite Element Methods by R.Dhanaraj& K.Prabhakar Nair, Oxford Publishers.

REFERENCES:

1. Finite Element analysis Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers
2. Finite Element Analysis for Engineering and Technology, Tirupathi R Chandraputla, Universities Press Pvt Ltd, Hyderabad. 2003.
3. Finite Element Analysis in Engineering Design by S.Rajasekharan, S.Chand Publications, New Delhi.
4. Finite Element Analysis And Procedures In Engineering by H.V.Lakshminaryana, 3rd Edition, Universities Press, Hyderabad.

A First Course in the Finite Element Methods by Daryl Logan, Cengage Publishers.

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19A0EMB01	Managerial Economics and Financial Analysis	3	0	0	3

Course Outcomes:

- Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
- Apply the Concept of Production cost and revenues for effective Business decision
- Analyze how to invest their capital and maximize returns.
- Evaluate the capital budgeting techniques.
- Define the concepts related to financial accounting and management and able to develop the accounting statements and evaluate the financial performance of business entity.

UNIT – I MANAGERIAL ECONOMICS

Introduction – meaning, nature, meaning, significance, functions, and advantages, ME and its role in other fields. Demand - Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting- Factors governing forecasting, Methods.

UNIT – II PRODUCTION AND COST ANALYSIS

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and Long run Production Function- Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns - Internal and External Economies of scale. Cost & Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)-Managerial significance and limitations of Break-Even Analysis.

UNIT III BUSINESS ORGANIZATIONS AND MARKETS

Introduction – Nature, meaning, significance, functions and advantages. Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT IV CAPITAL BUDGETING

Introduction to Capital, Sources of Capital. Short-term and Long-term Capital : Working capital, types, Estimating Working capital requirements. Capital Budgeting – Features, Proposals, Time value of money. Methods and Evaluation of Projects – Pay Back Method, Accounting Rate of Return (ARR), Net Present Value (NPV), and Internal Rate Return (IRR) Method (simple problems).

UNIT V FINANCIAL ACCOUNTING AND ANALYSIS

Introduction – Nature, meaning, significance, functions and advantages. Concepts and Conventions- Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). **Financial Analysis** - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

TEXTBOOKS:

1. Varshney&Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019

REFERENCE BOOKS:

1. Ahuja HI Managerial economics Schand,3/e,2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, NewDelhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19AOE0301	Management Science	2	0	0	2

Course Outcomes: After the completion of the course student should be able to

- CO: 1 Understand the concepts & principles of management and designs of organization in a practical world.
- CO: 2 Apply the knowledge of Work-study principles & Quality Control techniques in industry.
- CO: 3 Analyze the concepts of HRM in Recruitment, Selection and Training & Development.
- CO: 4 Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT.
- CO: 5 Create Modern technology in management science

UNIT I

Introduction to Management:

Management - Concept - Nature - Functions – Levels - Evolution of Management Thought - Taylor's Scientific Theory - Henry Fayol's principles - Elton Mayo's Human relations - Leadership styles - Autocratic leadership - Democratic & Free rein leadership.

Organizational Designs: Line organization - Line & Staff Organization - Functional Organization - Matrix Organization - Project Organization - Committee form of Organization.

UNIT II

Operations Management:

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), Work Study. **Material Management** - Objectives – Inventory classification - Inventory Techniques - EOQ-ABC Analysis

Marketing Management: Concept - Meaning - Nature- Functions of Marketing - Marketing Mix - Channels of Distribution - Advertisement and Sales Promotion - Marketing Strategies based on Product Life Cycle.

UNIT III

Human Resources Management (HRM):

HRM - Definition and Meaning - Managerial and Operative functions - Evolution of HRM - Job Analysis & Job Evaluation - Human Resource Planning (HRP) Process/Procedure- Employee Recruitment Process - Employee Selection Process and Tests in Employee Selection - Employee Training and Development - Performance Appraisal Concept - Methods of Performance Appraisal – Placement - Employee Induction - Wage and Salary Administration

UNIT IV

Strategic Management:

Definition & Meaning - Setting of Vision - Mission - Goals - Corporate Planning Process - Environmental Scanning - SWOT Analysis

Project Management - Network Analysis - Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Probability of Completing the project within given time - Project Cost- Analysis - Project Crashing (Simple problems).

UNIT V

Contemporary Management:

The concept of Management Information System (MIS) - Materials Requirement Planning (MRP) - Customer Relations Management (CRM) - Total Quality Management (TQM) - Six Sigma Concept - Supply Chain Management (SCM) - Enterprise Resource Planning (ERP) - Performance Management - Business Process Outsourcing (BPO) - Business Process Re-engineering and Bench Marking - Balanced Score Card.

Textbooks:

1. A.R Aryasri, "Management Science", TMH, 2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education, New Delhi, 2012.

References:

1. Koontz & Weihrich, "Essentials of Management", 6th edition, TMH, 2005.
2. Thomas N.Duening & John M.Ivancevich, "Management Principles and Guidelines", Biztantra.
3. Kanishka Bedi, "Production and Operations Management", Oxford University Press, 2004.

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19A0EMB02	ENTERPRENEURSHIP DEVELOPMENT	2	0	0	2

Course Outcomes: After the completion of the course student should be able to

- Understand the concept of Entrepreneurship and challenges in the world of Competition.
- Apply the Knowledge in generating ideas for New Ventures and design business plan structure.
- Analyze various sources of finance and subsidies to entrepreneurs.
- Evaluate the role of central government and state government in promoting women Entrepreneurship. Study the role of incubations in fostering startups.

UNIT – I INTRODUCTION TO ENTREPRENEURSHIP

Entrepreneurship - Concept, knowledge and skills requirement - Characteristics of successful entrepreneurs - Entrepreneurship process - Factors impacting emergence of entrepreneurship - Differences between Entrepreneur and Intrapreneur - Understanding individual entrepreneurial mindset and personality - Recent trends in Entrepreneurship.

UNIT – II FORMULATION OF BUSINESS IDEA

Starting the New Venture - Generating business idea – Sources of new ideas & methods of generating ideas - Opportunity recognition - Feasibility study - Market feasibility, technical/operational feasibility - Financial feasibility - Drawing business plan - Preparing project report - Presenting business plan to investors.

UNIT III FINANCIAL ASPECTS OF PROMOTION

Sources of finance - Various sources of Finance available - Long term sources - Short term sources - Institutional Finance – Commercial Banks, SFC's in India - NBFC's in India - their way of financing in India for small and medium business - Entrepreneurship development programs in India - The entrepreneurial journey- Institutions in aid of entrepreneurship development.

UNIT IV WOMEN ENTREPRENEURSHIP

Women Entrepreneurship - Entrepreneurship Development and Government - Role of Central Government and State Government in promoting women Entrepreneurship - Introduction to various incentives, subsidies and grants – Export- oriented Units - Fiscal and Tax concessions available - Women entrepreneurship - Role and importance - Growth of women entrepreneurship in India - Issues & Challenges - Entrepreneurial motivations.

UNIT V STARTUPS AND INCUBATION

Startups – Definition, Role of startups in India, Governmental initiatives to foster entrepreneurship across sectors. Funding opportunities for startups. Business Incubation and its benefits, Pre-Incubation and Post - Incubation process.

Textbooks:

1. D F Kuratko and T V Rao, “Entrepreneurship” - A South-Asian Perspective – Cengage Learning, 2012.
(For PPT,Case Solutions Faculty may visit: login.cengage.com)
2. Nandan H, “ Fundamentals of Entrepreneurship”, PHI, 2013

Reference Books:

1. Vasant Desai, “Small Scale Industries and Entrepreneurship”, HimalayaPublishing 2012.
2. Rajeev Roy “Entrepreneurship”, 2nd Edition, Oxford, 2012.
3. B.Janakiram and M.Rizwanal “Entrepreneurship Development: Text & Cases”, Excel Books, 2011.
4. Stuart Read, Effectual “Entrepreneurship”, Routledge, 2013.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: TIRUPATI

Year: III

Semester: II

Branch of Study: CE

Subject Code 19AOE9901	Subject Name English For Research Paper Writing	L 2	T 0	P 0	Credit: 2
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Course Outcomes:

Students will be able to:

1. Improve writing skills and level of readability.
2. Learn what to write in each section, avoiding plagiarism.
3. Understand the review of research literature
4. Apply skills in writing a Title, abstract and literature
5. Learn the skills of drafting Summations

Syllabus

Unit -1

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness.

Unit -2

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction.

Unit -3

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

Unit – 4

Key skills for writing a title – an abstract – an introduction – review of literature

Unit:5

Key skills for writing methodology – results – discussions – conclusions.

References:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: TIRUPATI

Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19AHE9911	Environmental Waste Management	2	0	0	2

Course Outcomes:

CO-1. To examine the various types of solid waste and methods to categorize it

CO-2. To find out methods to reduce solid waste at the source

CO-3. To carry out analysis and audit of waste

CO-4. To understand people's responsibility in reducing and managing waste

UNIT I : INTRODUCTION

Problem of Wastes, Types of Solid Waste, Categories of solid waste, Effects of Excess Waste Generation, Waste Characterization

UNIT II : WASTE REDUCTION AT SOURCE

Solid Waste Reduction, Waste reduction strategies - How to Start a Waste Reduction Program Guidelines, Economic benefits of Waste Reduction, Operation on daily basis.

UNIT III : WASTE ANALYSIS AND AUDIT

Introduction to Terminology of Waste, Waste Analysis, Introduction to Waste Audit, Checklist for performance audit in Waste Collection, Segregation, Transport and Treatment.

UNIT IV: PEOPLE'S RESPONSIBILITY OF WASTE MANAGEMENT

Responsibility of Waste Management, Polluter Pays Principle (PPP), Assimilative Capacity and the Precautionary Principle, World Scenario in Scrap Trade Extended Producer Responsibility (EPR), Carrying Capacity and Precautionary Principles.

UNIT V : WASTE REDUCTION TOWARDS ZERO WASTE

Sustainable Living, Waste Reduction at Business (Producer) Level, Waste Reduction at Individual Level: Zero Waste Living and Waste Reduction at Domestic and community Level.

TEXT BOOKS:

1. Karia G.L., and Christian R.A., (2001), "Wastewater Treatment Concepts and Design Approach", Prentice Hall of India Pvt. Ltd., New Delhi.
2. Tchobanoglous, G, Theisen, H, and Eliassen, R (1977).Solid Waste Engineering. Principles and Management Issues McGraw Hill Book Company, New York.
3. Srilatha,H.R., Krishna, N., Sudhakar Bada, K. and Madhukara, K. 1995. Fungal pretreatment of orange processing waste by solid state fermentation for improved production of methane

REFERENCES:

1. Metcalf and Eddy Inc., (2003), "Wastewater Engineering - Treatment and Reuse", 4th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

(AUTONOMOUS)

AK19 Regulations

III B.Tech

Semester-II

Branch : Common to all

Subject Code 19AHE9902	Subject Name Principles of Effective Public Speaking	L 3	T 0	P 0	Credit: 3
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Course Objectives:

1. Gain and demonstrate the basic skills of effective oral communication, for use throughout your academic career and beyond.
2. Learn and develop the skills necessary to maximize public speaking effectiveness, including effective research and organization of information, how to make the most of presentation aids (and not become reliant on them!), and understanding the speaker-audience relationship.
3. Develop critical thinking and listening skills, enabling you to maximize your own understanding as an audience member, and offer considered and constructive critiques of others' speeches.
4. Become more confident in public speaking arenas, whether as a formal speech giver or as a participant in group settings. Improvement will be valued over perfection.

Unit -1

Introduction to Public Speaking:

Basic communication concepts, processes, and models Communication concepts and principles and public speaking Steps and methods of speech preparation; Ethics in public speaking

Unit -2

Listening and Speech Criticism:

Effective listening, the listening process, and types of listening; Listening barriers; Identifying and improving listening styles; Evaluating speech and effective speech techniques.

Unit -3

Selecting Topic and Knowing your Audience:

Identifying sources; Tools and techniques for selecting and refining speech topics; Identifying speech purposes; Central idea statement; The central idea; Audience analysis techniques.

Unit – 4

Speaking with a Purpose:

Informative, persuasive, and ceremonial speeches
Unit:5

Delivering your speech and using Visual Aids.

The mechanics of verbal and nonverbal communication in speech delivery; Modes of speech delivery; Speaking style and language; Effective delivery techniques; Incorporating presentation aids

Course Outcomes:

Students will be able to:

- 1. Apply knowledge of principles, concepts and skills learned in speech preparation.**
- 2. Develop skills in effective listening.**
- 3. Evaluate the delivery of speeches.**
- 4. Develop skills in speech composition.**
- 5. Use supporting materials and presentation aids in speech preparation.**

References:

1. DeVito, J.A. (2009). The Essential Elements of Public Speaking. (3rd ed.) Boston:Pearson Education, Inc.
 2. Lucas, S.E. (2009). The Art of Public Speaking. (10th ed.) New York: McGraw - Hill Co.
- Zarefsky, D. (2011). Public Speaking: Strategies for Success. (6th ed. Boston: Pearson Education, Inc).

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: TIRUPATI

Year: III

Semester: II

Branch of Study: CE

Subject Code 19AMC9902	Subject Name CONSTITUTION OF INDIA	L 2	T 0	P 0	Credits: 2
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Course Outcomes:

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
4. Discuss the Powers and functions of Governor, President, Judiciary.
5. Discuss the functions of local administration bodies.

Unit:1

History of Making of the Indian Constitution - History Drafting Committee, (Composition & Working)

Unit:2

Philosophy of the Indian Constitution - Preamble Salient Features

Unit:3

Contours of Constitutional Rights & Duties - Fundamental Rights - Right to Equality - Right to Freedom - Right against Exploitation - Right to Freedom of Religion - Cultural and Educational Rights - Right to Constitutional Remedies - Directive Principles of State Policy - Fundamental Duties.

Unit:4

Organs of Governance - Parliament – Composition - Qualifications and Disqualifications - Powers and Functions - Executive, President, Governor - Council of Ministers -Judiciary, Appointment and Transfer of Judges, Qualifications - Powers and Functions.

Unit:5

Local Administration - District's Administration head: Role and Importance - Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation - Pachayati raj: Introduction, PRI: ZillaPachayat - Elected officials and their roles, CEO Zilla Panchayat: Position and role - Block level: Organizational Hierarchy (Different departments) - Village level: Role of Elected and Appointed officials - Importance of grass root democracy.

Suggested books for reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: TIRUPATI

Year: III

Semester: II
CE

Branch of Study:

Subject Code	Subject Name	L	T	P	Credits
19APC0123	Remote Sensing and GIS Lab	0	0	3	1.5

Course Outcomes: After the completion of the course student should be able to

1. To understand spatial technologies, mapping the field problems and solution convergence through GIS.

LIST OF THE EXPERIMENTS

1. Development of georeferencing of maps either from cadastral or AutoCAD based map.
2. Identification of best locations of ground control points and mosaicing the different sources of maps of information like topo sheets & satellite data and other drawings.
3. Digitization and GIS coordination
4. GIS interface and features using open Source Software QGIS.
5. Case example on mapping like water distinguish, Road alignment road network etc.,

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Year: III

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19APC0124	Transportation Engineering lab	0	0	3	1.5

Course Outcomes: After the completion of the course student should be able to

1. Asses properties of highway construction materials

LIST OF EXPERIMENTS

I. ROAD AGGREGATES:

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Abrasion Test.
5. Shape tests

II. BITUMINOUS MATERIALS :

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III TRAFFIC FIELD STUDIES

1. Traffic Volume Studies at Mid-block and Data Analysis
2. Traffic Volume Studies at Intersection and Data Analysis

LIST OF EQUIPMENT:

1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Length and elongation gauges
7. Bitumen penetration test setup.
8. Bitumen Ductility test setup.
9. Ring and ball apparatus
10. Penskey – Morten's apparatus
11. Relevant IS Codes