GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(An UGC Autonomous Institution - Affiliated to JNTUH)
Ibrahimpatnam, Ranga Reddy District, Hyderabad - 501 506.

Department of Civil Engineering

GNITC - Regulation – R21

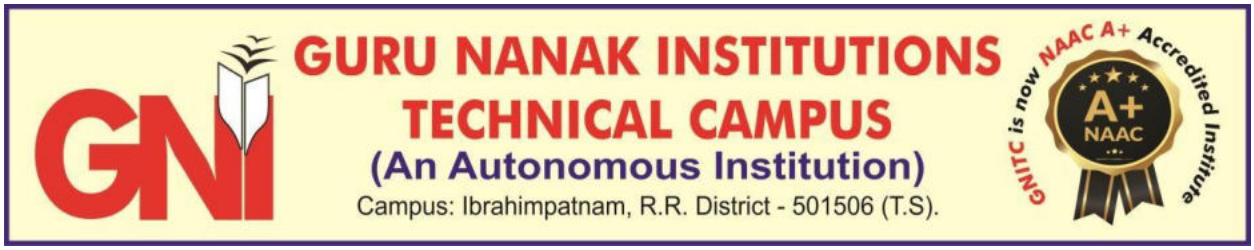
COURSE STRUCTURE AND DETAILED SYLLABUS

For

IV YEAR B.TECH

CIVIL ENGINEERING

(Applicable for the batches admitted from 2021-22)



GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

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Department of Civil Engineering

COURSE STRUCTURE

(Applicable from the batch admitted during 2021-22and onwards)

IV YEAR B. TECH. CE - I SEMESTER

S. No.	Group	Course Code	Course Title	Hours per Week			Credits
				L	T	P	
1	PC	21PC0CE26	Estimating, Costing and Valuation	3	0	0	3
2	PE	21PE0CE3X	Professional Elective-III	3	0	0	3
3	PE	21PE0CE4X	Professional Elective-IV	3	0	0	3
4	OE	21OE0XXXX	Open Elective – III	3	0	0	3
5	HS	21SSMB05	Business Economics and Financial Analysis	3	0	0	3
6	SEM	21PJ0CESE	Seminar	0	0	2	1
7	MINI	21PJ0CEMP	Mini Project	0	0	4	2
8	PROJ	21PJ0CE01	Project Stage-I	0	0	6	3
Total Credits							**21**

Professional Elective-III			
1	PE	21PE0CE3A	Irrigation & Hydraulics Structures
2	PE	21PE0CE3B	Geo-Environmental Engineering
3	PE	21PE0CE3C	Transportation Engineering-II / Introduction to Multimodal Urban Transportation Systems (NPTEL
Professional Elective-IV			
1	PE	21PE0EE4A	Remote Sensing & GIS
2	PE	21PE0EE4B	Design & Drawing of Irrigation Structures
3	PE	21PE0EE4C	Advanced Foundation Engineering / Municipal Solid Waste Management (NPTEL

IV YEAR B.TECH CE - II SEMESTER

S. No.	Group	Course Code	Course Title	Hours per Week			Credits
				L	T	P	
1	PE	21PC0CE5X	Professional Elective-V	3	0	0	3
2	PE	21PE0CE6X	Professional Elective-VI	3	0	0	3
3	OE	21OE0XXXX	Open Elective-IV	3	0	0	3
4	PROJ	21PJ0CE01	Project Stage-II (Main Project)	0	0	16	7
Total Credits							**16**

Professional Elective-V			
1	PE	21PE0CE5A	Environmental Engineering –II
2	PE	21PE0CE5B	Construction Engineering & Management
3	PE	21PE0CE5C	Pavement Design
Professional Elective-VI			
1	PE	21PE0CE6A	Ground Improvement Techniques
2	PE	21PE0CE6B	Disaster Management
3	PE	21PE0CE6C	Urban Transportation Engineering

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IV Year, B.Tech, Civil Engg. I-Sem.

L	T	P	C
3	0	0	3

ESTIMATING, COSTING AND VALAUATION (21PC0CE26)

Pre Requisites: Surveying and Building drawing

Course Objectives:

- Summarize the basic principal and standard methods for working out quantities in estimating
- Understand the material requirements as per specified norms and standards.
- Demonstration of the detailed estimate of buildings, roads and canal works.
- Work out rate analysis of the various items of work.
- Assess the valuation of buildings and provide practical knowledge of standard specification of items of buildings construction.

UNIT – I

Procedure Of Estimating: Methods of estimating; Main items of work; Deduction for openings; Degree of accuracy;

Methods of building estimates: Individual wall method; Centre line method; Arch masonry calculation; Estimate of steps. Specifications: Purpose, method and detailed specifications;

UNIT – II

Estimate Of Buildings**:** detailed estimation of residential building with masonry and R.C.C. structures.

Estimate of RCC works: Standard hooks and cranks; Estimate of RCC slab; RCC beam; and RCC column with foundation.

UNIT – III

Quantity estimation: Bituminous and C.C. Road work including earthwork, Irrigation canal work including earthwork.

UNIT – IV

Rate Analysis: introduction of rate analysis, rate analysis for building works, roads, and canals. Schedule of Rates, Labor costs.

UNIT- V

Valuation: Cost; Price & value; Methods of valuation; Out goings; Depreciation; Methods for Estimating cost depreciation; Valuation of building.

Miscellaneous Topics: Gross income; Net income; Scrap value; Salvage value; Obsolescence; Annuity; Capitalized value; Years purchase; Life of structures; Sinking fund Mortgage.

Course Outcomes

On successful completion of this course, it is expected that the students will be able to,

1. Understand the preparation of an Abstract Estimate and detailed estimate of building.
2. Determine earth work quantity for roads and canals.
3. Design bar bending schedule for reinforcement works
4. Evaluate the valuation of building for different specifications and create new technologies todevelop concrete estimating methods.
5. Will have the idea of rate analysis and costing of structure

TEXT BOOKS:

6. Estimating and Costing by B.N. Dutta, UBS publishers, 2020.
7. Estimating and Costing by G.S. Birdie, Publisher: Dhanpat Rai Books.
8. Punmia, B.C., Khandelwal, K.K., Project Planning with PERT and CPM, Laxmi publications, 2016

REFERENCES:

1. Standard Schedule of rates and standard data book by public works department.
2. I.S.1200 (Parts I to XXV – 1974, method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborthi, Laxmi publications.

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L	T	P	C
3	0	0	3

PROFESSONAL ELECTIVE - III
IRRIGATION AND HYDRAULIC STRUCTURES (21PE0CE3A)

Pre Requisites: Hydraulics, Hydrology & Water Resources Engineering,

Course Objectives:

The objectives of the courses are to enable the students

- To study the various types of reservoirs and dam.
- Enable the students understand types of gravity dams and causes of failures.
- Enable the students understand types of earth dams and causes of failures of earthen dams.
- To study various types of storage work and diversion headwork, their components and design principles for their construction.
- To understand s the various types of canal falls and cross drainage works

UNIT – I

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation – Life of Reservoir. Types of dams,factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT –II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile, and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT –III

Earth dams: Types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, measures for control of seepage. Spillways: types of spillways, Spillway gates.

UNIT – IV

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations-Silt Ejectors and Silt Excluders

Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT – V

Canal Falls - types of falls and their location, types of Canal escapes - types of canal modules, proportionality, sensitivity, setting and flexibility. Cross Drainage works: types, selection of suitable type of C/D work from various types.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. Know types of water retaining structures for multiple purposes and its key parameters considered for planning and designing.
2. Understand details in any irrigation system and its requirements.
3. Analyze and design of an irrigation system components.
4. Understand diversion head works, Types of diversion head works.
5. Understand Canals and principles of design of cross and distributary head regulators and types of canals.

TEXT BOOKS:

1. Irrigation Engineering and Hydraulic structures by Santhosh kumar Garg, Khanna Publishers.
2. Irrigation Engineering by K. R. Arora Standard Publishers.
3. Irrigation and Water Power Engineering by Punmia & Lal, Laxmi publications Pvt. Ltd., New Delhi

REFERENCES:

1. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
2. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers 2015.
3. Irrigation Theory and Practice by A. M. Micheal Vikas Publishing House 2015.
4. Irrigation and Water Resources Engineering by G.L. Asawa, New Age International Publishers.

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L	T	P	C
3	0	0	3

PROFESSONAL ELECTIVE - III
GEO-ENVIRONMENTAL ENGINEERING (21PC0CE3B)

Pre Requisites: Soil Mechanics & Environmental Engineering

Course Objectives: The objectives of the course are

- To study the sources of contamination and characterization of contaminated ground.
- To study the model of contaminable transport process.
- To identify appropriate remediation technique for the contaminated soil.
- To study the landfills, Leachate collection system, Cover system, Gas collection system

UNIT –I

Sources and Site Characterization: Scope of Geo-environmental engineering, various sources of contaminations, need for contaminated site characterization and characterization methods.

UNIT – II

Solid and Hazardous Waste Management: Classification of waste, Characterization of solid wastes, and Environmental Concerns with waste, waste management strategies.

UNIT - III

Contaminant Transport: Transport process, Mass-transfer process, Modeling, Bioremediation, Phytoremediation.

UNIT – IV

Remediation Techniques: Objectives of site remediation, various active and passive methods, remediation NAPL sites, Emerging Remediation Technologies.

UNIT – V

Landfills: Types of landfills, Site Selection, Waste Containment Liners, Leachate collection system, Cover system, Gas collection system.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. Scope of Geo-environmental Engineering, various sources of contaminations.
2. Understand Solid and Hazardous Waste Management.
3. Understand Contaminant Transport process, Mass-transfer process.
4. Identify appropriate remediation techniques for contamination and provide models.
5. Understand Landfills and its types.

TEXT BOOKS:

1. Sharma, H. D. and Reddy, K. R. – Geo-Environmental Engineering (2004)
2. Bedient, Refai & Newell - Ground Water Contamination (1999), Book Publisher: Pearson College Div; 2nd edition (August 1, 1999)

REFERENCES:

1. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Handbook (2012)
2. Reddi, L. N. and Inyang, H. I. – Geo-Environmental Engineering (2000)
3. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. - Hazardous Waste Management (1994)

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L	T	P	C
3	0	0	3

PROFESSONAL ELECTIVE - III
TRANSPORTATION ENGINEERING – II (21PC0CE3C)

Prerequisites: Transportation Engineering - I

Course Objective: The objective of the course is

- Impart Knowledge regarding the functioning of various components like rails, sleepers, Tracks, Geometric curves, Runways, Taxiways Aprons Wear houses, Jetties etc.
- Design elements like horizontal curves, vertical curves, super elevation etc.
- Analyze how signal systems, visual aids and Markings etc help in safe working of transportation systems.
- Impart Knowledge regarding the airport engineering and geo metric design of runway
- To study the Ports and Harbors.

UNIT – I

Introduction to Railways: Role of Indian Railways in national development– Railways for Urban Transportation – LRT, Mono Rail, Metro Rail & MRTS. Permanent Way: Components and their Functions: Rails - Types of Rails, Rail Fastenings, Concept of Gauges, Coning of Wheels, Creeps and kinks Sleepers – Functions, Materials, Density – Functions, Materials, Ballast, Sub-grade and Embankments, Ballast less Tracks.

UNIT – II

Geometric Design of Railway Track: Gradients and Grade Compensation, Super-Elevation, Widening of Gauges in Curves, Transition Curves, Horizontal/Vertical Curves.

UNIT – III

Track Maintenance and Operation: Points and Crossings - Turnouts, Stations and Yards - Level Crossings. Signaling and Interlocking - Track Circuiting - Track Maintenance.

UNIT – IV

Airport Engineering: Introduction to Air Transportation - Aircraft Characteristics - Factors Affecting Selection of site for Airport – Aprons – Taxiway – Hanger – Geometric design - Computation of Runway Length, Correction for Runway Length, Orientation of Runway, Wind Rose Diagram

UNIT –V

Port and Harbour Engineering: Requirements of Port and Harbour – Classification of port and Harbour. Features of a Habour, Planning of Habour, Breakwaters, Dry docks, jetties, Aprons, Transit shed and warehouses, Navigational aids, Maintenance of Port and Harbours, Inland water Transport.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. Geometric design of railway track.
2. Design various crossings and signals in Railway Projects.
3. Design of runways and taxiways.
4. Interpret and design the infrastructure for large and small airports
5. Plan the harbors and port projects including the infrastructure required for new ports and harbors.

TEXT BOOKS:

1. Venkataramaiah C(2016), "Transportation Engineering Vol II – Railways, Airports, Docks, Harbors, Bridges and Tunnels", Universities Press (India) Private Limited, Hyderabad
2. J S Mundrey, Railway Track Engineering (5th Edition) McGraw Hill Education 2017.

REFERENCE BOOKS:

1. Subhash C. Saxena (2008) Airport Engineering, Planning and Design, CBS Publishers and Distributors, New Delhi. (Reprint 2015)
2. R. Srinivasan (2016), Harbour, Dock and Tunnel Engineering 28th Edition, Charotar Publishing House Pvt. Ltd.
3. Saxena SC and Arora S C (2010) A Text Book of Railway Engineering Paperback – 2010, Dhanpat Rai Publications (Reprint 2015)
4. Robert Horonjeff, Francis X. McKelvey, Willian J Sproule, Seth B. Young (2010), Planning & Design of Airports, McGraw-Hill Professional.
5. Transportation Engineering by R. Srinivasa Kumar, University Press India

NPTEL

1. https://nptel.ac.in/courses/105107123/7
2. https://nptel.ac.in/syllabus/105107123/
3. https://nptel.ac.in/courses/114106025/

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IV Year, B.Tech, Civil Engg. I-Sem.

L	T	P	C
3	0	0	3

PROFESSONAL ELECTIVE - IV

REMOTE SENSING & GIS (21PE0CE4A)

Pre Requisites: Surveying

Course Objectives: The objectives of the course are

- To study the concepts of Remote Sensing, it's interpreting Techniques
- To study the concepts of Digital images.
- To study the concept of Geographical Information System (GIS), coordinate system GIS Data
- Knowledge on types, understand the students managing the spatial Data Using GIS and understand implementation of GIS interface for practical usage.

UNIT – I

Concepts of Remote Sensing: Basics of remote sensing- elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology & units, energy resources, energy interactions with earth surface features & atmosphere, atmospheric effects, satellite orbits, Sensor Resolution, types of sensors. Remote Sensing Platforms and Sensors, IRS satellites.

Remote Sensing Data Interpretation Visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of soil, water and vegetation. Concepts of Digital image processing, image enhancements, qualitative & quantitative analysis and pattern recognition, classification techniques and accuracy estimation.

UNIT- II:

Introduction to GIS: Introduction, History of GIS, GIS Components, GIS Applications in Real life, The Nature of geographic data, Maps, Types of maps, Map scale, Types of scale, Map and Globe, Co-ordinate systems, Map projections, Map transformation, Geo-referencing.

UNIT- III:

Spatial Database Management System: Introduction: Spatial DBMS, Data storage, Database structure models, database management system, entity-relationship model, normalization. Data models and data structures: Introduction, GIS Data model, vector data structure, raster data structure, attributes data, geo-database and metadata

UNIT- IV:

Spatial Data input and editing: Data input methods – keyboard entry, digitization, scanning, conversion of existing data, remotely sensed data, errors in data input, Data accuracy, Micro and Macro components of accuracy, sources of error in GIS.

Spatial Analysis: Introduction, topology, spatial analysis, vector data analysis, Network analysis, raster data analysis, Spatial data interpolation techniques

UNIT- V: Implementing a GIS and Applications: Awareness, developing system requirements, evaluation of alternative systems, decision-making using GIS. Applications of GIS: GIS based road network planning, Mineral mapping using GIS, Shortest path detection using GIS, Hazard Zonation using remote sensing and GIS, GIS for solving multi criteria problems, GIS for business applications.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. Describe different concepts and terms used in Remote Sensing and its data
2. Understand the Data conversion and Process in different coordinate systems of GIS interface
3. Understand spatial database management system.
4. Evaluate the accuracy of Data and implementing a GIS.
5. Understand the applicability of RS and GIS for various applications.

TEXT BOOKS

1. Remote Sensing and GIS by Basudeb Bhatta, Oxford University Press, 2nd Edition, 2011.
2. Introduction to Geographic Information Systems by Kang-Tsung Chang, Mc. Graw Hill Education (Indian Edition), 7th Edition, 2015.
3. Fundamentals of Geographic Information Systems by Michael N. Demers, 4th Edition, Wiley Publishers, 2012.

REFERENCES

1. Remote Sensing and Image Interpretation by Thomas M. Lilles and Ralph W. Kiefer, Wiley Publishers, 7th Edition, 2015.
2. Geographic Information systems – An Introduction by Tor Bernhardsen, Wiley India Publication, 3rd Edition, 2010.
3. Advanced Surveying: Total Station, GIS and Remote Sensing by Satheesh Gopi, R. Sathi Kumar, N. Madhu, Pearson Education, 1st Edition, 2007.
4. Textbook of Remote Sensing and Geographical Information systems by M. Anji Reddy, Publisher: BS Publications

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L	T	P	C
3	0	0	3

PROFESSONAL ELECTIVE - IV

DESIGN & DRAWING OF IRRIGATION STRUCTURES (21PE0CE4B)

Pre Requisites: Water Resources Engineering

Course Objectives: The objectives of the course are

- To explain the design of different irrigation structures
- To prepare drawing of hydraulic structure like surplus weir, siphon well drop.
- To prepare the trapezoidal notch fall, tank sluice with tower head.

Design and drawing of the following hydraulic structures

Group A

1. Surplus weir
2. Syphon well drop
3. Trapezoidal notch fall
4. Tank sluice with tower head

Group B

1. Sloping glacis weir
2. Canal regulator
3. Under tunnel
4. Type III syphon aqueduct

Final Examination pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks.0
The duration of examination will be FOUR hours.
However, the students are supposed to practise the drawings for Group B structures also for internal evaluation.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,after the completion of the course students will be able to carry the,

- Design of hydraulic structures and prepare drawing of these structures.

TEXT BOOKS

1. Water resources Engineering – Principles and Practice by Challa Satyanarayana Murthy, New Age International Publishers.
2. Irrigation Engineering and Hydraulic Structures by Santosh Kumar Garg, Publisher: Khanna Publishers.
3. Irrigation Engineering and Hydraulic Structures by SK Sharma, Publisher S Chand Publications.

REFERENCES

1. Irrigation Engineering and Hydraulic Structures by S. K. Garg, Standard Book House.

IV Year, B.Tech, Civil Engg. I-Sem.

L	T	P	C
3	0	0	3

PROFESSONAL ELECTIVE – IV

ADVANCED FOUNDATION ENGINEERING (21PE0CE4C)

Prerequisites: Geotechnical Engineering & Foundation Engineering

Course Objectives: The objectives of the course are

- To explain Meyerhoff bearing capacity theory and methods.
- To study the settlement of footings, predict the vertical and lateral capacity of piles, .Understand different types of sheet piles.
- To explain the well foundation, failure of well foundation and Terzaghi analysis and methods to predict the depth of embedment.
- To explain the problems and treatment methods of expansive soil.

UNIT – I

Introduction: Bearing capacity of footings subjected to eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soil – Elastic settlement of Footings embedded in sands and clays of infinite thickness – Footings on soil of finite thickness – Schmertamaunn's method - Janbu method.

UNIT -II

Pile foundations – Pile groups- Settlement of pile groups resting in sand and clays -under reamed piles- laterally loaded piles - ultimate lateral capacity – Broms Method- Reese and Matlock approach.

UNIT – III

Well foundations: Types of caissons, different shapes of well, components of well, functions of wells, sinking of wells, lateral stability by Terzaghi analysis, types of coffer dams

UNIT - IV

Cantilever and anchored sheet piles - Earth pressure diagram – Determination of depth of embedment in sands and clays – Braced cuts - Earth pressure diagrams – Forces in struts.

UNIT – V

Foundations in expansive Soils – Problems in expansive soils – mechanism of swelling – swell pressure and swelling potential – heave – Foundation practices – Sand cushion – CNS technique – under-reamed pile foundations – granular pile anchor technique, stabilization of expansive soils

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. Compute the safe bearing capacity of footings subjected to vertical and inclined loads
2. Predict the vertical and lateral capacity of pile foundation.
3. Knowledge on well foundation, failures of well foundation and analysis of well foundation.
4. Predict the depth of embedment of cantilever and anchored sheet pile.
5. Understand the problems of expansive soil and methods of construction in expansive soil.

TEXT BOOK

1. Das, B.M (1999) Principles of Foundation Engineering – 4thEdition, PWS Publishing, Singapore.
2. Bowles, J.E. (1988) Foundation Analysis and Design – 4th edition, McGraw – Hill International.
3. Soil Mechanics and Foundation Engineering by V N S Murthy, CBS Publishers and Distributors.

REFERENCES

1. Geotechnical Engineering Principal and Practices by Cuduto, PHI International.
2. Engineering by C. Venkataramah, New Age International Pvt. Ltd, Publishers (2002).
3. Analysis and Design of Substructures – Swami Saran, Oxford & IBH Publishing Company Pvt. Ltd (1998)
4. Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, Publishers (2002).

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L	T	P	C
3	0	0	3

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS (21PE0CE4C)

Prerequisites: Nil

Course Objectives: The objectives of the course are to prepare engineering students

- To study the Basic Principles and Methodology of Engineering Economics, Demands, Demands Determinants
- Knowledge on Macro Economic Concepts.
- Knowledge Production, Cost, Market Structures & Pricing.
- To study the Capital Budgeting Techniques, Introduction to Accounting

UNIT I

Introduction to Engineering Economics- Basic Principles and Methodology of Engineering Economics– Fundamental Concepts - Demand – Demand Determinants - Law of Demand- Demand Forecasting and Methods - Elasticity of Demand - Theory of Firm – Supply- Elasticity of Supply.

UNIT II

Macro Economic Concepts: National Income Accounting - Methods of Estimation- Various Concepts of National Income - Inflation – Definition – Causes of Inflation and Measures to Control Inflation - New Economic Policy 1991 (Industrial policy, Trade policy, and Fiscal policy) Impact on Industry.

UNIT III

Production, Cost, Market Structures & Pricing: Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions. Cost analysis: Types of Costs, Short run and Long run Cost Functions. Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT IV

Capital Budgeting Techniques: Significance of Capital Budgeting - cash flows-Time Value of Money-Choosing between alternative investment proposals- Methods of Appraisal Techniques- Pay Back Period - Average Rate of Return – Net Present Value- Internal Rate of Return – Profitability Index.

UNIT V

Introduction to Accounting: Accounting Principles (GAPP), concepts, conventions- - Double entry system of Book keeping – Accounting rules- Journal- ledger- Trial balance- Trading and Profit and Loss account- Balance Sheet. (Simple Problems).

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. To perform and evaluate present and future worth of the alternate projects
2. To appraise projects by using traditional and DCF Methods Evaluate the market structures and different Pricing Strategies
3. To carry out cost benefit analysis of projects and to calculate BEP of different alternative projects.

TEXT BOOK

1. Henry Malcom Steinar-Engineering Economics, Principles, McGraw Hill Pub.

2. D.D.Chaturvedi, S.L.Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.

3. Jain and Narang" Accounting, Kalyani Publishers.

REFERENCE BOOKS

1. Arora, M.N." Cost Accounting, Vikas Publication.

2. S.N.Maheshwari, Financial Management, Vikas Publishing House

3. V. Rajasekaranand R. Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.

4. Subhash Sharma and M. P. Vittal, Financial Accounting for Management, Text and Cases, Machmillan, 2012.

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IV Year, B.Tech, Civil Engg. I-Sem.

L	T	P	C
0	0	2	1

SEMINAR (21JE0CESE)

Student has to select a topic of his / her interest in consultation with the faculty in charge of seminar. He / She can collect information from the books, journals and internet and prepare a report. Make a power point presentation on the topics and present before a committee to evaluate the seminar. Seminar is separate for each student.

- The Objective of technical seminar is to test the students skills on comprehension of any subject of his own interest related to civil engineering profession. It comprises of seminar and report submission.
- The technical seminar will be conducted normally after the I- mid sessional examination of IV yr II-semester
- Three faculty members will be involved in the panel of assessment to evaluate the student's performance. The sessional marks will be awarded based on the seminar and report.
- The faculty in-charge of the project work will coordinate in all aspects of the technical seminar.
- Students are to take the guidance, if required from their guide of project work.

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IV Year, B.Tech, Civil Engg. I-Sem.

L	T	P	C
0	0	4	2

INDUSTRY ORIENTED MINI PROJECT / SUMMER INTERNSHIP (21PJ0CEMP)

Industry oriented mini project is a summer internship/training taken up by the students during their summer vacation after B. Tech. III year.

- Summer internship is planned to expose students to industrial practices.
- Students have to correlate the theory in classroom to the procedures adopted in construction.
- Students have to maintain a diary on the work carried out during their training at the industry and submit a detailed report of their experience within a month after joining for their B. Tech. IV year I semester and present a seminar.

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L	T	P	C
0	0	6	3

PROJECT STAGE - I (21PJ0CE01)

Each student shall start the project work during the IVth Year – I semester as per the instructions of the Project Guide/Project Supervisor assigned by the Head of the Department. Out of a total 100 marks allotted for the Project work, 30 marks shall be for CPE(Continuous Project Evaluation) and 70 marks for end semester Viva – Voce Examination.

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IV Year, B.Tech, Civil Engg. II-Sem.

L	T	P	C
3	0	0	3

PROFESSIONAL ELECTIVE - V
ENVIRONMENTAL ENGINEERING-II (21PE0CE5A)

Prerequisites: Environmental Engineering -II

Course Objectives: The objective of the course is.

- To study the source of solid waste, their properties and its handling, types of solid waste
- To study the hazardous waste and their disposal, hazardous waste and their disposal,
- Knowledge on legal aspects of hazardous waste management.
- To study the site remedial technologies for solid waste and hazardous waste.

UNIT-I

Solid Wastes: sources, types, composition, physical, chemical, and biological properties of solid wastes / sources and types of hazardous and infectious wastes in municipal solid wastes.
Solid waste generation and collection: Handling, Storage, Processing, Transportation.

UNIT-II

Disposal of Solid waste: Thermal conversion, biological and chemical conversion, recycling of material in municipal solid wastes, Land-filling, Composting, gas generation, closure of land-fills.
Hazardous Wastes: Fundamentals, fate, and Transport of contaminants, Toxicology origin, quantity and quality parameters.

UNIT-III

Biomedical / infectious Waste: Composition, Collection, Handling and Disposal.Legal aspects of Hazardous Waste Management: Collection, Conveyance, Treatment and Disposal.

UNIT-IV

Hazardous Waste Management Practices: Environmental Audits, Pollution Prevention.
Treatment and Disposal Methods: Physicochemical processes, Biological Methods, Stabilization and Solidification, Thermal Methods, Land Disposal.

UNIT-V

Site Remediation: Site and Subsurface Characterization, Remedial Technologies. Planning, Sitting and Permitting of Waste Management Facilities: Planning, developing a facilities plan, securing a site and obtaining permits.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. Identify the various type solid wastes, their properties and their treatment.
2. Analyze the types of hazardous waste, their disposal and their legal aspect.
3. Understand the methods of biomedical waste disposal.
4. Plan and design hazardous waste management practices
5. Apply the site remedial technology and aware the legal aspects of waste management

TEXT BOOKS

1. Integrated Solid Waste Management, Techobanglous, Thiesen and Vigil, McGraw Hill.
2. Hazardous Waste Management, Lagrega, Buckingham and Evans, McGraw Hill,N.Y.

REFERENCE BOOKS

1. Solid Waste Management in Developing Countries, A D Bhide, NagpurPublications.

NPTEL:

1. https://nptel.ac.in/syllabus/105102018

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PROFESSIONAL ELECTIVE - V

CONSTRUCTION ENGINEERING & MANAGEMENT (21PE0CE5B)

Prerequisites: Building Materials & Building Construction

Course Objectives: The objectives of the course are

- To study the understand overall Management process planning, coordination
- Knowledge on control of projects, explain students.
- Study on scientific methods of management, Network Techniques in construction management,
- Knowledge on Resource planning and Contracts management.

UNIT-I

Management process- Roles. Management theories. Social responsibilities. Planning and strategic management. Strategy implementation. Decision making: tools and techniques – Organizational structure. Human resource management- motivation performance- leadership.

UNIT-II

Classification of Construction projects, Construction stages, Resources Functions of Construction Management and its Applications. Preliminary Planning- Collection of Data-Contract Planning – Scientific Methods of Management: Network Techniques in construction management - Bar chart, Gant chart, CPM, PERT- Cost & Time optimization.

UNIT-III

Resource Planning- Planning for manpower, materials, costs, equipment. Labour- Scheduling. Forms of scheduling - Resource allocation. Budget and budgetary control methods

UNIT-IV

Contracts Management - Types of contract, contract document, Specification, important conditions of contract – tender and tender document - Deposits by the contractor - Arbitration. Negotiation - M. Book - Muster roll -stores.

UNIT-V

Management Information System - Labour Regulations: Social Security - welfare Legislation - Laws relating to wages, Bonus and Industrial disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act -other labour Laws - Safety in construction: legal and financial aspects of accidents in construction. Occupational and safety hazard assessment. Human factors in safety. Legal and financial aspects of accidents in construction. Occupational and safety hazard assessment

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. Understand the roles and responsibilities of a project manager
2. Prepare schedule of activities in a construction project
3. Identify the equipment used in construction
4. Understand safety practices in construction industry

TEXT BOOKS

1. Ghalot, P.S., Dhir, D.M., Construction Planning and Management, Wiley Eastern Limited, 1992.
2. Chitkara,K.K., Construction Project Management¸ Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
3. Punmia, B,C., Project Planning and Control with PERT and CPM, Laxmi Publications, New Delhi,1987.

REFERENCE:

1. Construction Management and Planning by Sengupta and Guha-Tata Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
2. Oberlender, Garold D., Project management for engineering and construction. Vol. 2. New York: McGraw-Hill, 1993.
3. Peurifoy, Robert Leroy, Cliff J. Schexnayder and Shapira A. Construction planning, equipment, and methods. No. 696 pp. McGraw-Hill, 2010.

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PROFESSIONAL ELECTIVE - V

PAVEMENT DESIGN (21PE0CE5C)

Pre Requisites: Transportation Engineering

Course Objectives: The objectives of the course are

- To study factors affecting pavement design.
- To Study material characteristics used in pavement design.
- To build knowledge on design aspects and methods for low volume roads, flexible, rigid pavements
- To build Knowledge on types of pavement failures and maintenance for pavements.

UNIT – I

Factors affecting Pavement Design: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane, Directional Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT – II

Stresses in Pavements: Vehicle-Pavement Interaction: Transient, Random & Damping Vibrations, Steady State of Vibration, Experiments on Vibration, Stress Inducing Factors in Flexible and Rigid pavements. Stresses in flexible pavements: Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two and Three Layered Systems, Fundamental Design Concepts. Stresses In Rigid Pavements: Westergaard's Theory and Assumptions, Stresses due to Curling, Stresses and Deflections due to Loading, Frictional Stresses, Stresses in Dowel Bars & Tie Bars

UNIT – III

Material Characteristics: CBR and Modulus of Sub-grade Reaction of Soil, Mineral aggregates – Blending of aggregates, binders, polymer and rubber modified bitumen, Resilient, Diametral Resilient and Complex (Dynamic) Moduli of Bituminous Mixes, Permanent Deformation Parameters and other Properties, Effects and Methods of Stabilization and Use of Geo Synthetics.

UNIT - IV

Design of Flexible Pavements: Flexible Pavement Design Concepts, Asphalt Institute's Methods with HMA and other Base Combinations, AASHTO, IRC Methods Design of Rigid Pavements: Calibrated Mechanistic Design Process, PCA, AASHTO & IRC Specifications, and Introduction to Prestressed and Continuously Reinforced Cement Concrete Pavement Design.

UNIT – V

Design of Pavement for Low Volume Roads: Pavement design for low volume roads, rural road designs – code of practice. Design of Overlays: Types of Overlays, Suitability, Design of overlays.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. Characterize the response characteristics of soil, aggregate, asphalt, and asphalt mixes
2. Analyze flexible pavements and rigid pavements.
3. Design a flexible pavement using IRC, Asphalt Institute, and AASHTO methods
4. Design a rigid pavement using IRC, and AASHTO methods

TEXT BOOKS:

1. Concrete Pavements, AF Stock, Elsevier, Applied Science Publishers
2. Pavement Analysis & Design, Yang H. Huang, Prentice Hall Inc

REFERENCES:

1. Design of Functional Pavements, Nai C. Yang, McGraw Hill Publications
2. Principles of Pavement Design, Yoder.J. & Witzorac Mathew, W. John Wiley & Sons Inc
3. Pavement and Surfacings for Highway & Airports, Micheal Sargious, Applied Science Publishers Limited.
4. IRC Codes for Flexible and Rigid Pavements design

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PROFESSIONAL ELECTIVE - VI

GROUND IMPROVEMENT TECHNIQUES (21PE0CE6A)

Prerequisites: Geo-Technical Engineering, Foundation Engineering

Course Objectives: The objectives of the course are.

- To know the needs of ground improvement techniques.
- To acquire the knowledge on the various ground improvement techniques available and their applications for different types of soils.
- To understand suitable ground improvement technique for given soil conditions.
- To understand the techniques required in improving in-situ soil, to identify basic deficiencies of various soil deposits**.**
- To know the problems of expansive soils and application of geosynthetics.

UNIT I:

Introduction to Engineering Ground Modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterize problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

UNIT II:

Mechanical Modification: Shallow Compaction Techniques- Deep Compaction Techniques- Blasting- Vibro compaction- Dynamic Tamping and Compaction piles.

UNIT III:

Hydraulic Modification: Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering-Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains,

UNIT IV:

Physical and Chemical Modification – Modification by admixtures, Modification Grouting, Introduction to Thermal Modification including freezing.

UNIT V:

Modification by Inclusions and Confinement - Soil reinforcement, reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. Know the necessity of ground improvement
2. Understand the various ground improvement techniques available

3. Select & design suitable ground improvement technique as per site conditions.
4. Understand Physical and Chemical Modification.
5. Understand Modification by Inclusions and Confinement.

TEXT BOOKS

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications
2. M. P. Moseley and K. Krisch (2006) – Ground Improvement, II Edition, Taylor and Francis

REFERENCES:

1. Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey
2. Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.
3. Xianthakos, Abreimson and Bruce - Ground Control and Improvement, John Wiley & Sons, 1994.
4. K. Krisch & F. Krisch (2010) - Ground Improvement by Deep Vibratory Methods, Spon Press, Taylor and Francis
5. Donald P Coduto – Foundation Design Principles and Practices, 2nd edition, Pearson, Indian edition, 2012.

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PROFESSIONAL ELECTIVE - VI

DISASTER MANAGEMENT **(21PE0CE6B)**

Course Objective:

The objective of the course is

- To understand basic concepts in Disaster Management, Definitions and Terminologies used in Disaster Management,
- To study the Types and Categories of Disasters, Challenges posed by Disasters
- To study the impacts of Disasters Key Skills.
- To study the Disasters, Environment and Development.

UNIT - I:

Introduction - Concepts and definitions: disaster, hazard, vulnerability, resilience, risks severity, frequency and details, capacity, impact, prevention, mitigation.

UNIT – II

Disasters - Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

UNIT - III

Disaster Impacts - Disaster impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.

UNIT – IV

Disaster Risk Reduction (DRR) - Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post disaster environmental response (water, sanitation, food safety, waste management, disease control, security, communications); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmers in India and the activities of National Disaster Management Authority.

UNIT - V

Disasters, Environment and Development - Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

1. The student will develop competencies in the application of Disaster Concepts to Management
2. Analyzing Relationship between Development and Disasters.
3. Ability to understand Categories of Disasters
4. Ability to minimize disaster risk
5. Ability to identify Disasters, Environment and Development.

TEXT BOOKS:

1. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
2. Singh B.K., 2008, Handbook of Disaster Management: Techniques & Guidelines, Rajat Publication.
3. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation

REFERENCE BOOKS:

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority)
2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
3. Disaster Medical Systems Guidelines. Emergency Medical Services Authority, State of California,EMSA no.214, June 2003
4. Inter-Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC:

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PROFESSIONAL ELECTIVE - VI
URBAN TRANSPORTATION ENGINEERING (21PE0CE6C)

Course objective: The objective of the course is,

- To study the estimate travel demand for an urban area.
- To study the Plan the transportation network for a city, identify the corridor and plan for providing good transportation facilities.
- Knowledge on evaluate various alternative transportation proposals.
- Knowledge on Modal split analysis , Route assignment

UNIT I:

Transport Planning Process: Scope – interdependence of land use and traffic – systems approach to transport planning – Transport surveys – definition of study area – zoning survey - types and methods – inventory on transport facilities - inventory of land use and economic activities.

UNIT II:

Trip Generation: Factors governing trip generation and attraction rates – multiple linear regression analysis – category analysis – critical appraisal of techniques.

UNIT III:

Trip Distribution Methods: Presentation of trip distribution data - PA matrix to OD matrix – Growth factor methods - gravity model and its calibration – opportunity model

UNIT IV:

Modal split analysis: Influencing factors – Earlier modal split models: Trip end type and trip interchange type – limitations – Disaggregate mode choice model – Log it model - binary choice situations – multinomial logit model – model calibration

UNIT V:

Route assignment: Description of highway network – route choice behaviour – shortest path algorithm - assignment techniques – all nothing assignment – multi path assignment – capacity restrained assignment – diversion curves

Course outcomes:

At the end of course, students can

1. Estimate travel demand for an urban area.
2. Plan the transportation network for a city.
3. Identify the corridor and plan for providing good transportation facilities.
4. Evaluate various alternative transportation proposals.
5. Design Route assignment techniques.

TEXT BOOKS:

1. Kadiyali, LR (1987), Traffic Engineering and Transportation Planning, Khanna Publishers, New Delhi.
2. Hutchinson, B.G. (1974). Principles of Urban Transport Systems Planning. McGraw Hill Book Company, New York.

REFERENCE BOOKS:

1. Papacostas, C.S., and Prevedouros, P.D. (2002). Transportation Engineering and Planning. 3rd Edition, Prentice - Hall of India Pvt Ltd.
2. NPTEL videos on Urban Transportation Planning, Dr. V. Tamizh Arasan, IIT Madras
3. Paul. H. Wright (1995), Transportation Engineering – Planning & Design, John Wiley & Sons, New York.
4. John W Dickey (1995), Metropolitan Transportation Planning, Tata McGraw-Hill publishing company Ltd, New Delhi.

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OPEN ELECTIVE –IV
(FOR OTHER DEPARTMENT)
WATERSHED MANAGEMENT (21OE0CE4A)

Prerequisites: Nil

Course Objective: The objective of the course is,

- To understand different watershed behavior.
- To be able to interpret runoff data and quantify erosion by using various modeling methods.
- To understand land use classification and impact of land use changes on hydrological cycle parameters.
- Knowledge on saline soils, Micro farming, biomass management.

UNIT - I

Introduction - concept of watershed, need for watershed management, concept of sustainable development. Hydrology of small watersheds

UNIT - II

Principles of soil erosion- causes of soil erosion, types of soil erosion, estimation of soil erosion from small watersheds, Control of soil erosion, methods of soil conservation – structural and non-structural measures.

UNIT - III

Principles of water harvesting, methods of rainwater harvesting, design of rainwater harvesting structures.

UNIT - IV

Artificial recharge of groundwater in small watersheds-, methods of artificial recharge.

UNIT - V

Reclamation of saline soils -. Micro farming -, biomass management on the farm.

Course Outcomes: At the end of the course, the student will be able to

1. Identify causes of soil erosion
2. Plan and design soil conservation measures in a watershed
3. Plan and design water harvesting and groundwater recharge structures
4. Plan measures for reclamation of saline soils

TEXT BOOKS:

1. Murthy, V.V.N. and M.K. Jha Land and Water Management, Kalyani Publishers, 2015
2. Watershed Management by Madan Mohan Das and M.D. Saikia, Prentice Hall of India, 2013
3. Watershed Management Muthy, J. V. S., New Age International Publishers, 199

REFERENCES:

1. Watershed Hydrology by P E Black, Prentice Hall Englewood Cliffs, 1991
2. Watershed Hydrology by R Suresh, Standard Publishers and Distributors, Delhi, 2007

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PROJECT STAGE – II (21PJ0CE02)

Each student shall start the project work during the IVth Year – II semester as per the instructions of the Project Guide/Project Supervisor assigned by the Head of the Department. Out of total 200 marks allotted for the Project work, 60 marks shall be for CPE (Continuous Project Evaluation) and 140 marks for end semester Viva – Voce Examination.