



SREE VAHINI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

B.Tech IV Year I Semester

S.No	Category	Subject code	Course Title	L	T	P	C
1	Professional Core	V231410131	Geotechnical Engineering - II	3	0	0	3
2	Management Course- II	V2314101M1	Advance Construction management	2	0	0	2
3	Professional Elective- IV	V231410141	1. Pre-stressed Concrete	3	0	0	3
		V231410142	2. Advanced Environmental Engineering				
		V231410143	3. Design & drawing of Irrigation Structures				
		V231410144	4. 12 week MOOC Swayam / NPTEL course recommended by the BoS				
		V231410145	5. 12 week MOOC Swayam / NPTEL course recommended by the BoS				
4	Professional Elective-V	V231410146	1. Advanced Structural Engineering	3	0	0	3
		V231410147	2. Environmental Impact Assessment				
		V231410148	3. Railways and Airport Engineering				
5	Open Elective- III	V231410151	1. Building Materials For Engineers	3	0	0	3
		V231410152	2. Environmental Impact Assessment				
		V231410153	3. Intelligent Transportation Systems				
6	Open Elective-IV	V231410154	1. Geo-Spatial Technologies	3	0	0	3
		V231410155	2. Solid Waste Management				
		V231410156	3. Applied Mechanics				
7	Skill Enhancement Course	V231410161	Skills on Civil Engineering software. (STAAD-Pro/E tabs/CAD/Revit/ BIM)	0	1	2	2
8	Audit Course	V2314101C1	Constitution of India	2	0	0	-
9	Internship	V231410181	Evaluation of Industry Internship	-	-	-	2
Total				19	1	02	21

B.Tech IV Year II Semester

S. No.	Category	Subject code	Course Title	L	T	P	Credits
1	PR	V2314201A1	Internship and Project	-	-	24	12



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IV Year I Semester	PROFESSIONAL CORE GEOTECHNICAL ENGINEERING-II (V231410131)	L	T	P	C
		3	0	0	3

Course Learning Objectives:

The objective of this course is:

1. To impart to the student knowledge of types of shallow foundations and theories required for the determination of their bearing capacity.
2. To enable the student to compute immediate and consolidation settlements of shallow foundations.
3. To impart the principles of important field tests such as SPT and Plate bearing test.
4. To enable the student to imbibe the concepts of pile foundations and determine their load carrying capacity.

Course Outcomes:

Upon the successful completion of this course:

CO1: Able to understand Soil exploration methods and field tests.

CO2: Able to understand earth pressure theories.

CO3: Able to understand stability of slopes.

CO4: Able to analyze the shallow foundations.

CO5: Able to analyze the deep foundations.

SYLLABUS:

UNIT– I

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – Plate load test – Standard Penetration and cone penetration. Earth Pressure theories: Rankine's & Coulomb's theory of earth pressure – Culmann's graphical method - earth pressures in layered soils.

UNIT– II

Stability of Slopes: Infinite and finite earth slopes in sand and clay – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices – Bishop's method -- Taylor's Stability Number-Stability of slopes of dams and embankments - different conditions.

Shallow foundations – Terzaghi's and Meyerhoff's bearing capacity theories, effect of water table; Combined footing and raft foundation; Contact pressure; Settlement analysis in sands and clays.

UNIT-III

Shallow Foundations – Bearing Capacity Criteria: Types of foundations and factors to be considered in their location –Bearing capacity– criteria for determination of bearing capacity



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– factors influencing bearing capacity – analytical methods to determine bearing capacity – Terzaghi's theory Meyerhof theory- IS Methods – effect of water table.

UNIT-IV

Shallow Foundations – Settlement Criteria: Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – Types of foundation settlements and their determination - allowable settlements of structures.

Design of Shallow Foundations:

Proportioning of footings for Equal Settlement — Combine footing -- Rectangular, Trapezoidal and Strap footing – Principles of Design of Raft Foundation.

UNIT-V

Pile Foundation: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae– Pile load test – Pile under lateral loading -- Load carrying capacity of pile groups in sands and clays – Negative Skin Friction.

TEXTBOOKS:

1. 'Principles of Foundation Engineering' by Das, B. M., -(2011)– 6th edition (Indian edition) Cengage learning
2. 'Basic and Applied Soil Mechanics' by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).
3. Soil mechanics & foundation engineering by Arora

REFERENCES:

1. 'Foundation Analysis and Design' by Bowles, J.E., (1988) – 4th Edition, McGraw-Hill Publishing Company, New York.
2. 'Theory and Practice of Foundation Design' by N.N.SOM & S.C.DAS PHI Learning Private limited.



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IV Year I Semester	MANAGEMENT COURSE-II ADVANCED CONSTRUCTION MANAGEMENT (V2314101M1)	L	T	P	C
		2	0	0	2

Course Learning Objectives:

- To Impart to the Student, Knowledge of Core Quality Management and Quality assurance and Quality Control differentiation and know when and how to apply each effectively.
- To impart to the Student knowledge of Application of different Cost estimation techniques, understanding of key Components of Project budget, implementation of cost control techniques
- To Impart to the Student knowledge about Key functions of materials management, Inventory management, Selection & Suppliers, Material requirement planning
- To import to the Student knowledge about fundamental Concepts of Building Information modelling, understanding the integration of BIM with other project documentation Etc.,
- To Impart to the Student knowledge about Core principals & Sustainable Construction and green building, including energy efficiency, Water Conservation and waste seduction, Sustainable techniques and practices, knowledge about GRIHA rating, IGEC rating, LEED rating etc,

Course Outcomes:

1. Able to apply Quality assurance principles, implement Safety protocols, perform Risk Assessment, manage documentation etc.,
2. Able to develop accurate cost estimates, Analyze Project costs, Analyze project costs, Implement Cost Control methods, Utilize Predictive Models.
3. Able to utilize BIM for data integration, improve Collaboration, perform clash detection, Apply BIM for Sustainability analysis.
4. Able to Incorporate Green Building Principles, Reduce Environmental Impacts, Implement green building Strategies, address Sustainability Challenges

SYLLABUS:

UNIT-I

Quality and Safety Management, Quality assurance and Control Principles and managing On-Site safety procedure to minimize risks

UNIT-II

Cost Estimation and Control methods for calculating project cost, managing budgets, and performing economic analysis such as benefit cost analysis.



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UNIT-III

Material and machinery management optimizing the procurement, use and maintenance of construction materials and heavy equipment.

UNIT-IV

Building Information Modeling (BIM) -The use of 3D Modeling and other technologies to improve Project Management, Collaboration and efficiency

UNIT-V

Sustainable Construction and Green Buildings techniques and Practices for reducing a project's Environmental impacts, including Green Building certification and waste management strategy

Text Books:-

1. Construction Safety Management, 1st Edition by Neeraj and Amarjit
2. Construction Quality management : Principles and practice by Tim Howrath
3. Estimating and Costing in Civil Engineering by B.N.Dutta
4. Construction Management and Machinery by B.Gupta
5. BIM for Dummies by Stefan Mordue, Paul Swaddle and David Philip
6. GRIHA Manual

References:

1. Safety management in Construction (Principles and Practices) by Sk. Bhattacharjee
2. Construction Quality Management Principles and Practice by Tim Howrath
3. Cost management of Construction Projects by Donald Towey
4. BIM and Construction Management: Proven tools, methods and work flows by Brad Hurdin and Daure Mccod
5. Sustainable Construction: Green building design and delivery by Charles J. Kibert



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IV Year I Semester	PROFESSIONAL ELECTIVE - IV PRESTRESSED CONCRETE (V231410141)	L	T	P	C
		3	0	0	3

Course Learning Objectives

- To understand the flexure, shear and Torsional stresses in pre stressed concrete Members
- To Understand important concepts in designing continuous beams
- To Understand role of end block and different types and their design procedures
- To Apply the concepts to statically indeterminate structure.
- To Apply the concepts to design composite construction

Course Outcomes

1. Design of sections for flexure, Axial Tension, Compression and bending, shear, bond
2. Analysis and design of continuous beams and procedure for calculation of deflections
3. Analysis and design of end blocks adopting different methods of anchoring procedure for calculation of stresses
4. Understand and Design of Continuous Prestressed Concrete Beams and Portal Frames
5. Understand and concept of composite and continuous construction using pre stressed concrete

Unit I

Flexural, shear; Torsional resistance and design of Prestressed concrete section. Types of flexural failure– code procedures- shear and principal stresses– Prestressed concrete members in torsion– Design of sections for flexure, Axial Tension, Compression and bending, shear, Bond

Unit II

Analysis of continuous beams –Elastic theory- Linear transformation and Concordant tendons-Deflections of pre-stressed concrete beams: Importance of control of deflections-factors influencing deflections -short term deflections of un-cracked member–prediction of long term deflections.

Unit III

Analysis of end blocks: By Guyon's method and Magnel's method, Anchorage zone stresses-Approximate method of design-anchorage zone reinforcement-transfer of pre stresses-pre tensioned members- Composite sections: Introduction Analysis for stresses-differential shrinkage- general design considerations.



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Unit IV

Statically Indeterminate Structures:

Advantages of Continuous Members—Effect of Pre stressing Indeterminate Structures-- Methods of Achieving Continuity-- Definitions of Common Terms--Methods of Analysis of Secondary Moments--- Concordant Cable Profile-Guyon's Theorem—Effect of Axial Deformation and Tertiary Moments---Ultimate Load Analysis of Continuous Prestressed Members---Determination of Concordant Tendon Profile-- Design of Continuous Prestressed Concrete Beams---Design of Prestressed Portal Frames.

Unit V

Composite Construction of Prestressed and in situ Concrete:

Composite Structural Members Types of Composite Construction—Analysis of Stresses—Differential Shrinkage ---Deflection of Composite Members -- Stresses at Serviceability Limit State---Flexural Strength of Composite Sections -- Shear Strength of Composite Sections -- Design of Composite Sections.

Text books

1. Prestressed Concrete, 4e by N.Krishna Raju, McGraw HillPu
2. Prestressed Concrete by N. Rajagopalan, Narosa Publishing
3. Prestressed Concrete by S. Ramamrutham, Dhanpatrai Publishing Company References
1. Prestressed Concrete Analysis and Design, Antone E.Naaman 2e, Techno Press 3000
2. Design of Prestressed Concrete- T.Y.Lin, Ned H.Burns3e, Wiley Publications



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IV Year I Semester	PROFESSIONAL ELECTIVE- IV ADVANCED ENVIRONMENTAL ENGINEERING (V231410142)	L	T	P	C
		3	0	0	3

Course Objectives:

- To explain the importance of self-purification of streams and to derive Streeter- Phelps equation and to discuss the effects of various pollutants on receiving streams.
- To introduce new concepts in biological treatment like nitrogen and phosphorous removal, anaerobic filters, RBC and U-tube aeration systems, their working principles and suitability.
- To understand the characteristics and the treatment and disposal methods of liquid wastes produced in Dairy industry, Sugar industry and Pulp & paper industry.
- To introduce various functional elements of urban solid waste management and to introduce various methods of solid waste treatment methods with special emphasis on recovery and reuse of solid waste.
- To introduce sources, global effects and the effects on human health, plants and materials of air pollution.
- To discuss about the effects of various meteorological parameters on air pollution and to explain various equipment for controlling particulate pollution and their suitability.
- To introduce sources, effects and controlling measures of noise pollution and to discuss noise rating systems and acceptable noise levels for various places.

Course Outcomes:

At the end of the course the student will be able to:

1. Understand the importance of self-purification and the effects of various pollutants on receiving streams.
2. Determine the critical D.O. deficit and the degree of treatment required for waste water at the treatment plant to maintain a minimum D.O. at any point in the stream.
3. Update his knowledge in biological treatment with new and more advanced treatment methods.
4. Understand the characteristics and suggest suitable methods of treatment and disposal of industrial wastewater.
5. Suggest suitable methods for collection, transport, recovery, reuse and treatment of urban solid waste.
6. Understand global implications of air pollution and suggest suitable methods of control of particulate pollution depending on concentration and size of the particulate matter.
7. Acquire knowledge on noise pollution and suggest suitable noise control techniques according to the situation.

UNIT– I

Stream Sanitation Introduction; Self- purification in streams; factors affecting self-purification; Dissolved Oxygen Balance in streams; Streeter- Phelps's Dissolved Oxygen



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Model; Zones of Self-purification; Impact of pollutants on stream waters and usage of stream water with special reference to flora and fauna.

Unit-II

New Concepts in Biological Waste Treatment (theory only)

Introduction; Nitrogen removal by biological nitrification and de-nitrification; Phosphate removal from the activated sludge process; Rotating Disc Biological Contactor; Anaerobic filters; U-Tube aeration systems.

UNIT– III

Industrial Wastewater Treatment

Introduction to Industrial Wastewater treatment; Sugar Plant: Quantity of liquid waste; Characteristics of liquid waste; Methods of its treatment and disposal. Dairy Industry: Quantity of liquid waste; Characteristics of liquid waste; Methods of its treatment and disposal. Pulp and Paper Industry: Quantity of liquid waste; Characteristics of liquid waste; Methods of its treatment and disposal.

UNIT– IV

Urban Solid Waste Management

Sources; Quantities and characteristics; Classification; Collection and transportation; Recovery and reuse; Treatment methods such as composting, incineration, sanitary landfill and pyrolysis. Sources and Classification of Air Pollution Stationary and mobile sources; Primary and secondary pollutants; Natural contaminants;

Particulate matter; Aerosols; Gaseous pollutants. Meteorology and Air Pollution Atmospheric stability and temperature inversions; Maximum Mixing Depth; Wind direction and speed; Plume behaviour; Gaussian Dispersion Model; Plume rise; Wind rose.

UNIT– V

Effects of Air Pollution

Global Effects: Global warming; Ozone depletion; Acid rains; Effects of air pollutants on human health; Effects on plants; Economical effects. Control of Air Pollution

Objectives; Types of collection equipment: Settling chamber; Inertial separators; Cyclones; Filters; Electrostatic Precipitators; Scrubbers. Noise Pollution

Introduction; Levels of noise; Noise rating systems; Measurement of noise; Sources of noise and their noise levels; Acceptable noise levels; Effects of noise; Control of noise.

TEXT BOOKS

1. Wastewater Treatment by M.N. Rao and A.K. Datta; Oxford & IBH Publishing Co. Pvt.Ltd., 2008.
2. Environmental Pollution Control Engineering by C.S.Rao, New Age International, 2006.



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IV Year I Semester	PROFESSIONAL ELECTIVE- IV DESIGN & DRAWING OF IRRIGATION STRUCTURES (V231410143)	L	T	P	C
		3	0	0	3

Course Learning Objectives:

1. The course is designed to make the students learn the hydraulic design principles of irrigation structures.

Course Outcomes:

1. At the end of the course the student will be able to understand, design and draw hydraulic structures of Surplus weir, Tank sluice with a tower head, Canal drop- Notch type, Canal regulator, Syphon aqueduct type III

SYLLABUS:

Unit I:

Design and drawing of Surplus weir

Unit II:

Design and drawing of Tank sluice with a tower head

Unit III:

Design and drawing of Canal drop- Notch type

Unit IV:

Design and drawing of Canal regulator

Unit V:

Design and drawing of Syphon aqueduct type III

Final Examination pattern: Any two question of the above five designs may be asked out of which the candidate has to answer one question. The duration of the examination is three hours.

TEXT BOOKS:

1. Water Resources Engineering – Principles and Practice by C. Satyanarayana Murthy, New age International Publishers.

REFERENCE BOOKS:

1. Irrigation Engineering and Hydraulic Structures by S.K.Garg, Standard Book House.
2. Irrigation and Water Power Engineering by B.C Punmia & Lal, Lakshmi Publications pvt. Ltd., New Delhi.



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IV Year I Semester	PROFESSIONAL ELECTIVE - V ADVANCED STRUCTURAL ENGINEERING (V231410146)	L	T	P	C
		3	0	0	3

Course Learning Objectives:

- The objective of this course is to:
- Familiarize students with the analysis and design of Raft Foundations and Retaining walls.
- Equip student with the concepts of designing different types of RCC water tanks.
- Understand concepts of flat slabs.
- Familiarize different types of Bunkers, Silos and Chimneys.
- Understand different types of transmission towers

Course Outcomes:

1. At the end of this course, the student will be able to
2. Design raft foundation sand different types of RCC retaining walls
3. Carry out analysis and design of different types of RCC water tanks
4. Solve the problems regarding design of RCC Bunkers, Silos and Chimneys
5. Understand the concepts of prefabricated construction.

SYLLABUS:

UNIT-I

Analysis and Design of Raft Foundations – Design of RCC Retaining walls: Cantilever and Counter fort

UNIT-II

Analysis and Design of RCC Water Tanks, Circular and Rectangular types- Intze tank including staging.

UNIT-III

Analysis and Design of Flat Slabs- Direct Design and Equivalent Frame Methods- Check for Punching shear

UNIT-IV

Analysis and Design of RCC Chimney, Concepts of loading **UNIT-**

V

Analysis and design of Pressed Steel Tanks



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B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

TEXT BOOKS:

1. 'Reinforced Concrete Structures' Vol-2 by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
2. 'Reinforced Concrete Structures' by N.Subramanian, Oxford Publishers
3. 'Design Drawing of Concrete and Steel Structures' by N. Krishna Raju University Press 2005.

REFERENCES:

1. 'Essentials of Bridge Engineering' by D.Johnson Victor, Oxford and IBM publication Co., Pvt. Ltd.
2. 'Reinforced concrete design' by S.U,Pillai and D.Menon, Tata Mc.Graw hill Publishing Company
3. Codes: Relevant IS: codes.



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IV Year I Semester	PROFESSIONAL ELECTIVE- V ENVIRONMENTAL IMPACT ASSESSMENT (V231410147)	L	T	P	C
		3	0	0	3

Course Learning Objectives:

The objective of this course is:

- To impart knowledge on different concepts of Environmental Impact Assessment
- To know procedures of risk assessment
- To learn the EIA methodologies and the criterion for selection of EIA methods
- To know pre-requisites for ISO14001 certification
- To know the procedures for environmental clearances and audit
- To appreciate the importance of stake holder participation in EIA

Course Learning Outcomes:

Upon successful completion of this course, the students will be able to:

1. Prepare EMP, EIS and EIA report, estimate cost benefit ratio of a project
2. Selection of an appropriate EIA methodology
3. Evaluation of impacts on environment
4. Evaluation of risk assessment
5. Know the latest acts and guidelines of MoEF & CC

UNIT-I:

Basic concepts of EIA: Elements of EIA-factors affecting EIA-Initial Environmental Examination- life cycle analysis preparation of Environmental Base map- Classification of environmental parameters – role of stakeholders in the EIA preparation – stages in EIA, Environmental economics, Cost/benefit Analysis - EIS and EMP. Identification of activities-application of remote sensing and GIS for EIA.

UNIT-II:

EIA Methodologies: Introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods. Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area.

UNIT-III

Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures - E I A with reference to surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, generalized approach for assessment of Air pollution Impact.



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UNIT-IV:

Assessment of Impact of development Activities on Vegetation and wildlife, Environmental Impact of Deforestation. Environmental Risk Assessment and Risk management in EIA: Risk assessment and treatment of uncertainty-key stages in performing an Environmental Risk Assessment- Advantages of Environmental Risk Assessment

UNIT-V

EIA: MoEF & CC Acts, Notifications and Guidelines: Provisions in the EIA notification, procedure for environmental clearance, and procedure for conducting environmental impact assessment report- evaluation of EIA report. Environmental legislation objectives, evaluation of Audit data and preparation of Audit report. Post Audit activities, Concept of ISO and ISO14000. Environmental compliance reports. Case studies and preparation of EIA statement for various Industries.

Text Books:

1. Environmental Impact Assessment, Canter Larry W., McGraw- Hill education Edi (1996)
2. Environmental Impact Assessment Methodologies, Y. Anjaneyulu, B. S. Publication, Sultan Bazar, Hyderabad.

References:

1. Environmental Science and Engineering, J.Glynnand Gary W.Hein KePrentice Hall Publishers
2. Environmental Science and Engineering, Suresh K. Dhaneja, S.K. Katania & Sons Publication, New Delhi.
3. Environmental Pollution and Control, H.S. Bhatia, Galgotia Publication (P) Ltd, Delhi



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IV Year I Semester	PROFESSIONAL ELECTIVE- V RAILWAY AND AIRPORT ENGINEERING (V231410148)	L	T	P	C
		3	0	0	3

Course Learning Objectives:

The objectives of this course are:

- To know various components and their functions in a railway track
- To acquire design principles of geometrics in a railway track.
- To know various techniques for the effective movement of trains.
- To acquire design principles of airport runway geometrics and pavements.
- To know the planning, construction and maintenance of Docks and Harbours.

Course Outcomes:

At the end of course, Student will be able to

1. Design geometrics in a railway track.
2. Plan track layouts and control movement of trains
3. Design airport geometrics and airfield pavements.
4. Plan, construct and maintain Docks and Harbours.

UNIT-I

Components of Railway Engineering: Permanent way components – Railway Track Gauge - 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: Alignment – Engineering Surveys - Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve –safe speed on curves – Transition curve – Compound curves – Reverse curves – Extra clearance on curves – widening of gauge on curves – vertical curves – cheek rails on curves.

UNIT– III

Turnouts & Controllers: Track layouts – Switches – Design of Tongue Rails – Crossings – Turnouts – Layout of Turnout – Double Turnout – Diamond crossing – Scissors crossing. Signal Objectives – Classification – Fixed signals – Stop signals – Signalling systems – Mechanical signalling system – Electrical signalling system – System for Controlling Train Movement – Interlocking – Modern signalling Installations.



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UNIT– IV

Airport Planning & Design: Airport Master plan – Airport site selection – Air craft characteristics–Zoninglaws–Airportclassification–Runwayorientation–Windrose diagram–Runway length– Taxiway design– Terminal area and Airport layout –Visual aids and Air traffic control.

UNIT– V

Runway Design: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design – Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation & Strengthening of Airfield pavements – Airport Drainage – Design of surface and subsurface drainage.

TEXT BOOKS:

1. Railway Engineering by Satish Chandra and Agarwal M.M., Oxford University Press, New Delhi
2. Airport Engineering by Khanna &Arora - Nemch and Bros, New Delhi.
3. Docks and Harbour Engineering by Bindra S.P.-Dhanpathi Rai & Sons, NewDelhi.

REFERENCES:

1. ‘Railway Engineering’ by Saxena & Arora -Dhanpat Rai, New Delhi.
2. ‘Transportation Engineering Planning Design’ by Wright P.H. & Ashfort N.J. - John Wiley & Sons.
3. ‘Airport Engineering’ by Virendra Kumar, DhanpatRai Publishers, NewDelhi.
4. ‘Transportation Engineering’ by Srinivasa Kumar R, University Press, Hyderabad
5. ‘Highway, Railway, Airport and Harbour Engineering’ by Subramanian KP, Scitech Publications (India) Pvt Limited, Chennai



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IV Year I Semester	OPEN ELECTIVE III BUILDING MATERIALS FOR ENGINEERS (V231410151)	L	T	P	C
		3	0	0	3

Objectives of the Course:

- Initiating the student with the knowledge of basic building materials and their properties.
- Imparting the knowledge of course pattern in masonry construction and flat roofs and techniques of forming foundation, columns, beams, walls, sloped and flat roofs.
- The student is to be exposed to the various patterns of floors, walls, different types of paints and varnishes.
- Imparting the students with the techniques of form work and scaffolding.
- The students should be exposed to classification of aggregates, moisture content of the aggregate.

Course Outcomes:

1. Upon the successful completion of the course:
2. The student should be able to identify different building materials and their importance in building construction.
3. The student is expected to differentiate brick masonry, stone masonry construction and use of lime and cement in various constructions.
4. The student should have learnt the importance of building components and finishing's.
5. The student is expected to know the classification of aggregates, sieve analysis and moisture content usually required in building construction.

UNIT I:

Stones, Bricks and Tiles:

Properties of building stones – relation to their structural requirements, classification of stones – stone quarrying – precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile – manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials

UNIT II:

Masonry:

Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls. Wood: Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fiber Reinforced Plastics, Steel, Aluminium.



SREE VAHINI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

UNIT III:

Lime and Cement: Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime. Cement: Portland cement- Chemical Composition – Hydration, setting and fineness of cement. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance – various tests for concrete.

UNITIV:

Building Components:

Lintels, arches, vaults, stair cases – types. Different types of floors – Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs – King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre fabricated roofs.

UNITV:

Finishings and Aggregates:

Damp Proofing and water proofing materials and uses – Plastering Pointing, white washing and distempering. Paints: Constituents of a paint – Types of paints – Painting of new/old wood- Varnish. Form Works and Scaffoldings. Aggregates - Classification of aggregate – Coarse and fine aggregates- particle shape and texture – Bond and Strength of aggregate – Specific gravity – Bulk Density, porosity and absorption – Moisture content of Aggregate-Bulking of sand – Sieve analysis.

Text Books:

1. Building Materials, S.S. Bhavikatti, Vices publications House private ltd.
2. Building Construction, S.S. Bhavikatti, Vices publications House private ltd.
3. Building Materials, B.C. Punmia, Laxmi Publications private ltd.
4. Building Construction, B.C.Punmia, Laxmi Publications (p) ltd.

References:

1. Building Materials, S.K. Duggal, New Age International Publications.
2. Building Materials, P.C.Vergheze, PHI learning(P) ltd.
3. Building Materials, M.L.Gambhir, Tata McGraw Hill Publishing Co. Ltd. NewDelhi.
4. Building construction, P.C.Vergheze, PHI Learning(P) Ltd.
5. Building Materials, Construction and Planning, S.Mahaboob Basha, Anuradha Publications, Chennai.



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(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

IV Year I semester	OPEN ELECTIVE III ENVIRONMENTAL IMPACT ASSESSMENT (V231410152)	L	T	P	C
		3	0	0	3

Course Learning Objectives:

The objective of this course:

- To impart knowledge on different concepts of Environmental Impact Assessment
- To know procedures of risk assessment
- To learn the EIA methodologies and the criterion for selection of EIA methods
- To know pre-requisites for ISO14001 certification
- To know the procedures for environmental clearances and audit
- To appreciate the importance of stake holder participation in EIA

Course Learning Outcomes

1. Upon successful completion of this course, the students will be able to:
2. Prepare EMP, EIS and EIA report, estimate cost benefit ratio of a project
3. Selection of an appropriate EIA methodology
4. Evaluation of impacts on environment
5. Evaluation of risk assessment
6. Know the latest acts and guidelines of MoEF & CC

SYLLABUS:

UNIT-I:

Basic concepts of EIA: Elements of EIA-factors affecting EIA-Initial environmental Examination- life cycle analysis preparation of Environmental Base map- Classification of environmental parameters – role of stakeholders in the EIA preparation – stages in EIA, Environmental economics, Cost/benefit Analysis - EIS and EMP. Identification of activities-application of remote sensing and GIS for EIA.

UNIT-II:

EIA Methodologies: Introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods. Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area.

UNIT-III

Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures - E I A with reference to surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Generalized approach for assessment of Air pollution Impact.



SREE VAHINI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

UNIT-IV:

Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation. Environmental Risk Assessment and Risk management in EIA: Risk assessment and treatment of uncertainty-key stages in performing an Environmental Risk Assessment- Advantages of Environmental Risk Assessment

UNIT-V

EIA: MoEF & CC Acts, Notifications and Guidelines: Provisions in the EIA notification, procedure for environmental clearance, procedure for conducting environmental impact assessment report- evaluation of EIA report. Environmental legislation objectives, evaluation of Audit data and preparation of Audit report. Post Audit activities, Concept of ISO and ISO14000. Environmental compliance reports. Case studies and preparation of EIA statement for various Industries.

Text Books:

1. Environmental Impact Assessment, Canter Larry W., McGraw-Hill education Edi (1996)
2. Environmental Impact Assessment Methodologies, Y. Anjaneyulu, B. S. Publication, Sultan Bazar, Hyderabad.

References:

1. Environmental Science and Engineering, J. Glynn and GaryW. Hein Ke – Prentice Hall Publishers
2. Environmental Science and Engineering, SureshK. Dhaneja, S.K.Katania & Sons Publication., NewDelhi.
3. Environmental Pollution and Control, H.S.Bhatia, Galgotia Publication(P) Ltd, Delhi.



SREE VAHINI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

IV Year I semester	OPEN ELECTIVE III INTELLIGENT TRANSPORTATION SYSTEMS (V231410153)	L	T	P	C
		3	0	0	3

Course Learning Objectives:

- To know the fundamentals of ITS
- To study sensor technologies and Data requirements of ITS
- To know ITS functional areas and user services
- To study various kinds of ITS architecture
- To study ITS applications in various fields of transportation engineering

Course Outcomes:

1. Identify the benefits of ITS from various types
2. Determine various sensor applications and ITS data collection techniques
3. Identify ITS user services and functional areas
4. Determine various ITS models, evaluation methods and ITS planning.
5. Determine the suitable ITS technology and assess its effectiveness to solve transportation problems

SYLLABUS

UNIT-I

Fundamentals of ITS: Definition of ITSs, the historical context of ITS from both public policy and market economic perspectives, Types of ITS; Historical Background, Benefits of ITS.

UNIT-II

Sensor technologies and Data requirements of ITS: Importance of telecommunications in the ITS system, Information Management, Traffic Management Centers (TMC). Application of sensors to Traffic management; Traffic flow sensor technologies; Transponders and Communication systems; Data fusion at traffic management centers; Sensor plan and specification requirements; Elements of Vehicle Location and Route Navigation and Guidance concepts; ITS Data collection techniques – Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), GIS, video data collection.

UNIT-III

ITS functional areas – Advanced Traffic Management systems (ATMS), Advanced Trav Information systems(ATIS), Commercial Vehicle Operations(CVO), Advanced Vehicle Control systems(AVCS), Advanced Public Transportation systems(APTS), Advanced Rural Transportation systems (ARTS).



SREE VAHINI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

ITS User Needs and Services – Travel and Traffic management, Public Transportation Management, Electronic Payment, Commercial Vehicle Operations, Emergency Management, Advanced Vehicle safety systems, Information Management.

UNIT-IV

ITS Architecture – Regional and Project ITS architecture; Concept of operations; ITS Models and Evaluation Methods; Planning and human factor issues for ITS, Case studies on deployment planning and system design and operation; ITS and safety, ITS and security, ITS as a technology deployment program, research, development and business models, ITS planning.

UNIT-V

ITS applications: Traffic and incident management systems; ITS and sustainable mobility, travel demand management, electronic toll collection, ITS and road-pricing.; Transportation network operations; commercial vehicle operations and intermodal freight; public transportation applications; ITS and regional strategic transportation planning, including regional architectures: ITS and changing transportation institutions Automated Highway Systems- Vehicles in Platoons – Integration of Automated Highway Systems. ITS Programs in the World – Overview of ITS implementations in developed countries, ITS in developing countries

TEXT BOOKS:

1. Fundamentals of intelligent transportation systems planning By Mashrur A. Chowdhury, Adel Wadid Sadek
2. ITS Hand Book 2000: Recommendations for World Road Association (PIARC) by Kan Paul Chen, John Miles.

REFERENCES:

1. Sussman, J.M., Perspective on ITS, Artech House Publishers, 2005.
2. National ITS Architecture Documentation, US Department of Transportation, 2007



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(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

IV Year I semester	OPEN ELECTIVE IV GEO-SPATIAL TECHNOLOGIES (V231410154)	L	T	P	C
		3	0	0	3

Course Objectives:

- Understand the various spatial and non-spatial data types and database management techniques
- Develop the concepts and professional skills in utility of geo spatial techniques
- Improve the working knowledge of geospatial techniques infield problems

Course Outcomes:

At the end of the course the student will be able to:

1. Understand the geospatial technology relating to the data acquiring and processing that is associated with geographic locations
2. Apply Geospatial techniques in the decision support systems useful for decision makers and community services.
3. Ability to solve the problems related to the natural resource management, environment, urban planning and Infrastructure development, etc.
4. Able to generate the thematic maps using Geospatial techniques
5. Apply the concept of Geospatial Techniques to the Civil Engineering problems

UNIT-I

Introduction – Basic concepts, socioeconomic challenges, fundamentals of geographical information systems (GIS), history of geographical information system, components of geographical information systems. Projections and Coordinate Systems – Map definitions, representations of point, line, polygon, common coordinate system, geographic coordinate system, map projections, transformations, map analysis.

UNIT-II

Data Acquisition: Data Types, Spatial, Non-Spatial (Attribute) Data, Data Format – Vector and Raster Data, Manual Digitizing, Scanner, Aerial Photographic Data, Remotely Sensed Data, Digital Data, Cartographic Database, Digital Elevation Data.

Data Management: Data Storage and Maintenance, Data Compression, Data Quality and Standards, Precision, Accuracy, Error – Geometric errors and corrections, Radiometric errors and corrections, types of Systematic and Non-systematic errors.

UNIT-III

Data Modeling: Spatial Data Analysis, Data Retrieval Query, Simple Analysis, Recode Overlay, Vector Data Model, Raster Data Model, Digital Elevation Model, Cost and Path Analysis, Knowledge Based System.



SREE VAHINI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

GIS Analysis and Functions: Organizing data for analysis, analysis function, maintenance and analysis of spatial data, buffer analysis, overlay analysis, transformations, conflation, edge matching and editing, maintenance and analysis of spatial and non-spatial data.

UNIT–IV

Applications of GIS: Environmental and Natural Resource Management, Soil and Water Resources, Agriculture, Land Use Planning, Geology and Municipal Applications, Urban Planning and Project Management, GIS for decision making under Uncertainty, standard GIS packages, Introduction to Global Positioning Systems (GPS) and its applications.

UNIT– V

Introduction to Remote Sensing: General background of Remote Sensing Technology, Objectives and Limitations of Remote Sensing, Electro-Magnetic Radiation, Characteristics, Interaction with Atmosphere and Earth Surface, Remote Sensing Platforms and Sensors, Satellite Characteristics, Digital Image Processing, IRS Series and High Resolution Satellites, Remote Sensing Applications to Watershed Modeling, Environmental Modeling, Urban Planning and Management.

Text book:

1. Demers, M.N, (2013). 'Fundamentals of Geographic Information Systems' Wiley India Pvt. Ltd.,
2. Burrough, P.A., and Mc Donnell R.A.(1998). Principles of Geographical Information Systems. Oxford University Press, New York.
3. Kang-tsung Chang. (2006). Introduction to Geographical Information Systems. Tata McGraw- Hill Publishing Company Ltd., Third Edition, New Delhi.
4. George Joseph,(2013). 'Fundamentals of Remote Sensing' Universities Press.

References:

1. Sabins F.F. Jr. (1978). Remote Sensing Principles and Interpretations. W.H. Freeman and Company, San Francisco.
2. Tor Bernhardsen. (2002). Geographical Information System. Wiley India (P) Ltd., Third Edition, New Delhi.
3. Hoffman-Wellenhof, B, et al. (1997). GPS Theory and Practice. Fourth Edition, Springer Wein, New York.
4. Lilys and T.M., and Kiefer R.W. (2002). Remote Sensing and Image Interpretation. John Wiley and Sons, Fourth Edition, New York.
5. Choudhury S., Chakrabarti, D., and Choudhury S. (2009). An Introduction to Geographic Information Technology. I.K. International Publishing House (P) Ltd, New Delhi.



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(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

IV Year I semester	OPEN ELECTIVE IV SOLIDWASTEMANAGEMENT (V231410155)	L	T	P	C
		3	0	0	3

UNIT I

Introduction: Definition of solid waste – waste generation-sources and types of solid waste – sampling and characterization – Determination of composition of Municipal Solid Waste – Onsite storage and handling of solid waste – Future changes in waste composition, major legislation, monitoring responsibilities.

UNIT II

Collection and Transport of Solid Waste: Type and methods of waste collection systems, analysis of collection systems-Optimization of collection routes– alternative routes for collection system. Transfer and Transport: Need for transfer operation, transport means and methods, transfer station types and design requirements. Separation and Processing and Transformation of Solid Waste- Waste as a Resource- Disposable Materials, Recycling, Collection, Processing, and Potential for Reuse.

UNIT III

Processing and disposal: unit operations used for separation and processing, Materials Recovery facilities, Source reduction and waste minimization, Metal Separation & Recovery Waste transformation through combustion and composting, anaerobic methods for materials recovery and treatment – Energy recovery – biogas generation and cleaning– Incinerators.

UNIT IV

Landfills: Classification, Site selection, design and operation, methods of filling, drainage and leachate collection systems –designated waste landfill remediation, reclamation, environmental closure.

UNITV

Hazardous Waste Management: Definition and identification of hazardous wastes-sources and characteristics – hazardous wastes in Municipal Waste – Hazardous wastes regulations – minimization of Hazardous Waste-compatibility, handling and storage of hazardous waste-collection and transport, e-waste - sources, collection, Design and operation of facilities for physical, chemical and thermal treatment of hazardous waste – Solidification, chemical fixation and encapsulation, incineration – reuse after treatment.

References:

1. George Tchobanoglous “Integrated Solid Waste Management”, McGraw Hill Publication, 1993.
2. Charles A.Wentz; “Hazardous Waste Management”, McGraw Hill Publication,19



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(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

IV Year I semester	OPEN ELECTIVE IV APPLIED MECHANICS (V231410156)	L	T	P	C
		3	0	0	3

Course Objectives:

1. To solve the resultant of any force system.
2. To analyze the types of friction for moving bodies and problems related to friction.
3. To determine the centroid of an area and center of gravity of body.
4. To understand the concept of area moment and mass moment about any axes.
5. Understand the work-energy principle

Course Outcomes: After completion of the course the student is able to

1. Determine the resultant of coplanar concurrent and special force systems and analyse the bodies for equilibrium to find the unknown forces.
2. Analyze the bodies on rough horizontal and inclined planes and connected Bodies
3. Determine the centroid of composite areas, centre of gravity of composite bodies
4. Determine the moment of inertia of simple areas and mass moment of inertia of simple bodies.
5. Apply work-energy principle to solve the rigid body problems.
6. Appraise the influences of human factor considerations on engineering design.

UNIT-I

Introduction to Mechanics: Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space -Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

UNIT-II

Friction: Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions – Types of friction – Dry friction – Ladder friction – Wedge friction – Screw friction – Simple Screw Jack

UNIT-III

Centroid and Center of Gravity: Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity - Center of gravity of composite bodies.

UNIT-IV

Area moments of Inertia: Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration - Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures.



SREE VAHINI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

Mass Moment of Inertia: Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies – Product of Inertia.

UNIT-V

Kinetics of Rigid Bodies: Types of motion, D'Alembert's principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; kinetic of rigid body rotation.

TEXT BOOKS:

1. Engineering Mechanics by R.K.Bansal, Laxmi Publications(P) Ltd.
2. Engineering Mechanics by S.S.Bhattacharya and K. G.Rajashekarappa, New Age International (P) Ltd Publishers.

REFERENCES:

1. Engineering Mechanics by S.P. Timoshenko & D.H. Young, J.V.Rao, Sukumar Pati, McGraw Hill Education.
2. Engineering Mechanics Statics and Dynamics by R.C.Hibbeler, Pearson Education India.
3. Engineering Mechanics Statics and Dynamics by Tayal A.K, Umesh Publications.
4. Engineering Mechanics: Statics and Dynamics by S.Rajasekaran and G.Sankarasubramaniam, Vikas Publishing house Pvt Ltd.



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(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

IV Year I Semester	SKILL ENHANCEMENT COURSE SKILLSONCIVILENGINEERINGSOFTWARE (V231410161)	L	T	P	C
		0	1	2	2

1. Introduction to ETABS
2. 3Danalysis of multi-storey buildings
3. Analysis of continuous beams
4. Analysis of portal frames
5. Analysis of trusses



SREE VAHINI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

IV Year I Semester	AUDIT COURSE CONSTITUTION OF INDIA (V2314101C1)	L	T	P	C
		2	0	0	-

Course learning Objectives:

- Understand the concept of Indian constitution directive principle of state policy
Analyze the History, features Evaluate Preamble Fundamental Rights and Duties
- Understand the structure of Indian government
- Understand the structure of state government role of Governor and Chief Minister
Secretariat Differentiate between structure and functions of state secretariat
- Understand the local Administration district administration Mayor and elected representatives of Municipalities Zilla Panchayat block level organization
- Know the role of Election Commission role of Chief Election commissioner and
Commissioner state election commission SC/ST/OBC and women

Course Outcomes

1. Understand historical background of the constitution making and its importance for building a democratic India.
2. Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.
3. Understand the value of the fundamental rights and duties for becoming good citizen of India.
4. Analyze the decentralization of power between central, state and local self-government.
5. Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

UNIT-I

Introduction to Indian Constitution: Constitution meaning of the term, Indian Constitution – Sources and constitutional history, Features -Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre-State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organization, Structure and Functions

UNIT-IV

A. Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation
Panchayati Raj: Functions PRI: Zilla Panchayat, Elected officials and their roles, CEO Zilla Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials- Importance of grass root democracy



SREE VAHINI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission; Functions of Commissions for the welfare of SC/ST/OBC and women

References:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A.Siwach, Dynamics of Indian Government & Politics
4. D.C.Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C.Johari, Indian Government and Politics Hans

References

1. J. Raj Indian Government and Politics
2. M.V.Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
3. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right),
4. Challenges to Civil Rights Guarantees in India, Oxford University Press 2012
resources:
5. nptel.ac.in/courses/109104074/8
6. nptel.ac.in/courses/109104045/
7. nptel.ac.in/courses/101104065/
8. www.hss.iitb.ac.in/en/lecture-details
9. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution



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(AN AUTONOMOUS INSTITUTION)
TIRUVURU – 521 235, NTR Dist, Andhra Pradesh, India
B. TECH CIVIL ENGINEERING
(V23 – IV YEAR COURSE STRUCTURE & SYLLABUS)

IV Year II semester	INTERNSHIP AND PROJECT (V2314201A1)	L	T	P	C
		-	-	-	12