VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD-31

Approved by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

Sponsored by
VASAVI ACADEMY OF EDUCATION
Hyderabad

SYLLABUS BOOK FOR
B.E (CIVIL) VII and VIII SEMESTER
UNDER CBCS WITH EFFECT FROM 2026–2027
(For the students admitted in 2023-24)

DEPARTMENT OF CIVIL ENGINEERING
+91-40-23146010, 23146011
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Website: www.vce.ac.in

DEPARTMENT MISSION

"To strive for excellence in order to make the students better citizens with technical knowledge andsocial awareness"

DEPARTMENT VISION

"To impart knowledge in the latest technologies to the students of civil engineering to fulfil the growing needs of the society."

Institution Vision

"Striving for a symbiosis of technological excellence and human values."

Institution Mission

"To arm young brains with competitive technology and nurture holistic development of the individuals for a better tomorrow."

Department Vision

To strive for excellence in order to make the students better citizens with technical knowledge and social awareness

Department Mission

To impart knowledge in the latest technologies to the students of civil engineering to fulfil the growing needs of the society.

Program Educational Objectives (PEOs):

1. To provide a better understanding of basic sciences and fundamentals of civil engineering.

2. To develop competence in latest technologies to serve the industry or pursue higher studies.

3. To inculcate professionalism with effective communication skills and ethical values.

Program Outcomes (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

1. Understand various concepts of basic engineering sciences and mathematics to learn advanced concepts of Civil Engineering and apply them to practical problems.

2. Apply principles of various specializations of Civil engineering including structural engineering, transportation engineering, environmental engineering, water resources engineering and Geotechnical engineering to tackle engineering problems.

3. Acquire knowledge of ethical practices, communication skills, technical report writing skills and collaborative effort leading to lifelong learning.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)
BE (CIVIL ENGINEERING) VII-SEMESTER ACADEMIC YEAR 2026-2027
(Students Admitted in 2023-24)

Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U23PC710CE	Finite Element Method	3	-	-	3	60	40	3
U23PC720CE	Estimation & Specifications	2	1	-	3	60	40	3
U23PC730CE	Water Resources Engineering	3	-	-	3	60	40	3
U23PC740CE	Foundation Engineering	3	-	-	3	60	40	3
U23PE7XXCE	Professional Elective – I	3	-	-	3	60	40	3
U23PE7XXCE	Professional Elective – II	3	-	-	3	60	40	3
PRACTICALS								
U23PC711CE	Finite Element Method Lab	-	-	2	-	50	30	1
U23PE72XCE	Professional Elective-I Lab	-	-	2	-	50	30	1
U23PE73XCE	Professional Elective-II Lab	-	-	2	-	50	30	1
U23PW712CE	Project Seminar	-	-	2	-	-	30	1
	NPTEL Certificate Course	-	-	-	-	-	-	2
Note: The left over hours are to be allotted to Sports / Library / Mentor Interaction / CC / RC / TC / PDC based on the requirement.								
Total		**17**	**1**	**8**		**510**	**360**	**24**
Grand Total		**26**				**870**		

PROFESSIONAL ELECTIVE – I		
1	U23PE710CE	Applications of Artificial Intelligence and Machine Learning in Civil Engineering
2	U23PE720CE	Design of Concrete Structures
PROFESSIONAL ELECTIVE – II		
1	U23PE730CE	Traffic Engineering
2	U23PE740CE	Geoinformatics

PROFESSIONAL ELECTIVE – I Lab		
1	U23PE721CE	Applications of Artificial Intelligence and Machine Learning in Civil Engineering Lab
2	U23PE722CE	Design of Concrete Structures Lab
PROFESSIONAL ELECTIVE – II Lab		
1	U23PE731CE	Traffic Engineering Lab
2	U23PE732CE	Geographical Information Systems Lab

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
FINITE ELEMENT METHOD

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code: U23PC710CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Understand variational approach and compute stiffness matrices for bars, trusses and beam 2. Formulate stiffness matrix of beam, strain-displacement, stress strain relationships for elastic continuum and understand plane stress and plane strain problems 3. Understand the formulation of finite element method and determine stiffness matrices for CST and 4 noded rectangular elements for plane stress and plane strain problems 4. Understand the concept of isoparametric finite elements and formulate shape functions for Lagrangian and serendipity elements 5. Understand formulation of stiffness matrices for axisymmetric elements	1. Apply variational principles to simple problems and solve problems of bars, trusses and beams 2. Compute stiffness matrix of beam elements and write strain displacement, stress-strain relationship for elastic continuum and write stiffness matrices for plane stress and plane strain problems 3. Compute stiffness matrices for CST and 4 noded rectangular elements for plane stress and plane strain problems. 4. Formulate stiffness matrix for four noded quadrilateral elements and eight noded parabolic elements and write shape functions for Lagrangian and serendipity elements 5. Compute stiffness matrices for three noded ring element and four noded tetrahedral elements

UNIT-I: Introduction: Variational approach, Rayleigh – Ritz, and Galerkin's methods. Stiffness matrix for two noded bar, truss and beam elements, problems with 3 degrees of freedom.

UNIT –II: Analysis of Frames: Two noded beam element with 3 degrees for freedom per node. Transformation, generation of stiffness matrix for frames. Strain displacement and stress-strain relationship in an elastic continuum (linear problems). Equations of equilibrium, and boundry conditions.

UNIT-III: 2D Analysis: Principle of virtual displacement. Plane stress and plane strain problems, Determination of stiffness matrix for three noded triangular element (constant strain triangle) and 4 noded rectangular element for plane stress and plane strain problems. Convergence criteria for selection of displacement models. Discrimination of continuum. Assembly of global stiffness and load matrices. Displacement boundary conditions.

UNIT- IV: Isoparametric finite elements: Direct construction of shape functions for higher order elements using natural co-ordinate system. Shape functions for eight noded parabolic curved isoparametric element. Determination of element stiffness matrix for four noded quadrantal element. Use of Jacobian and Gauss quadrature techniques. Load matrix for eight noded rectangular isoparametric element (for body forces and surface traction)

UNIT–V: Axisymmetric Problems: Strain displacement and stress-strain for axisymmetric problems. Stiffness matrix for three noded ring element. Volume co-ordinates and stiffness matrix for four noded tetrahedron element.
Introduction to Software packages: ANSYS, ABAQUS and MARCMENTAT

Learning Resources:

1. Rama Rao M.V., Pownuk A., Finite Element Analysis of Structures using MATLAB, BS Publications, 2024.
2. Zienkiewicz O.C., Taylor R.L. and Zhu J.Z., The Finite Element Method, (Its Basics and fundamentals) Vol. I, McGraw Hill, 2013.
3. Krishna Moorthy C.S., Finite Element Analysis, McGraw Hill, 2017.
4. Desai C.S. and Abel J.F., Introduction to the Finite Method, Van Nostrand, 2002
5. Chandrupatla T.R., Finite Element Analysis for Engineering and Technology, Universities Press, 2004
6. Daryl L. Logan, "A First Course in the Finite Element Method" 6th Edition, Cengage Publishers, 2023

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF CIVIL ENGINEERING

ESTIMATION AND SPECIFICATIONS

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):2 : 1 : 0	SEE Marks:60	Course Code: U23PC720CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Understand the concept of quantity Estimation and prepare estimates and bar bending schedules for various RCC works 2. Learn to prepare rate analysis for various item of works in construction. 3. Acquire knowledge on various types of specifications used in construction 4. Acquire knowledge on various types of contracts, tenders 5. Interpret case studies on Public-Private Partnerships with an emphasis on the construction industry, like BOT, BOOT and DPR.	1. Estimate the quantities of materials used in various construction works. 2. Compute and prepare bar bending schedules. 3. Prepare rate analysis for various quantities 4. List the various types of specifications, contracts used in construction and examine various documents related to construction. 5. Interpret case studies on Public-Private Partnerships with an emphasis on the construction industry.

UNIT–I: Introduction to Estimates: Purpose of Estimating, Different types of estimates. Units of measurements.

UNIT-II: Detailed Estimates: Working out the detailed estimate for Flat roof building -load bearing, Framed structure, Bituminous and C.C Road work and Irrigation canal work including earthwork.

UNIT–III: Estimation of steel quantities: Estimation of steel quantities for Slabs, Beams, Columns; Footings –Retaining wall, Bar Bends schedule.

UNIT–IV: Rate Analysis: Preparation of analysis of rates and theoretical requirements of materials as per the standard data for Major items of works of a building, emerging construction materials and all items of work for bituminous and concrete road works. Introduction to SSR, CPWD, MES.

UNIT–V: Specifications: Necessity, Types of Specifications -General and detailed specification of works, Measurement Book and muster roll-Software based approach.

Valuation–Purpose, Concept of time – value of money, Sinking fund, Capitalized value, Depreciation.

Project Delivery Methods: Project Delivery Methods - Design Build (DB), Design Bid Build (DBB), Detailed Project Report (DPR), Concept of Public Private Partnership (PPP) - Build Operate Transfer (BOT), Build Own Operate Transfer (BOOT), Recent developments - case studies.

Learning Resources:

1. Dutta B.N. Estimating and Costing in Civil Engineering (Theory and Practice), CBS Publishers & Distributors Pvt. Ltd., 29th Edition, 2025.
2. Patil, B.S. Civil Engineering Contracts and Estimation, Orient Black Swan, 5th Edition, 2025.
3. Upadhyay A.K. Civil Estimating & Costing: Including Quality Surveying, Tendering and Valuation, S K Kataria and Sons, 2020.
4. Leonard Holm, John E. Schaufelberger, Dennis Griffin, Thomas Cole Construction Cost Estimating: Process and Practices, Pearson Education, 2nd Edition, 2019.
5. Chakra borty M. Estimating, Costing, Specification & Valuation In Civil Engineering , (Published by Author), 2010.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

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DEPARTMENT OF CIVIL ENGINEERING

WATER RESOURCES ENGINEERING

SYLLABUS FOR B.E.VII-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:U23PC730CE
Credits:3	CIE Marks:40	Duration of SEE:3Hrs

COURSEOBJECTIVES	**COURSEOUTCOMES**
Objectives of this course are to:	Upon the completion of this course, the students will be expected to:
1. To compute rainfall, runoff, and flood estimation techniques. 2. To develop understanding of irrigation engineering, including crop water requirements, canal design, and irrigation methods. 3. To explain the different components of diversion head works and theories explaining the causes of failures. 4. To describe the various aspects of reservoirs, types, and functions of spillways and energy dissipators. 5. To study construction and design aspects of gravity dams and earth dams.	1. Estimate floods, rainfall, and runoff using different methods for peak flow estimation and plotting a hydrograph 2. Apply irrigation engineering concepts such as duty, delta, crop water requirements, and design of canals using empirical theories. 3. Evaluate the components and performance of diversion headworks and canal regulation structures using Bligh's Theory and Khosla's Theory. 4. Estimate reservoir capacity and life considering sedimentation, and explain types of spillways and energy dissipators. 5. Describe the design and construction of gravity and earth dams, including stability and seepage control aspects.

UNIT-I: Precipitation: Hydrologic cycle, measurement of rainfall, estimation of mean rainfall over a catchment, infiltration, evaporation, runoff, peak flow estimation, Hydrographs, Components of Hydrograph, Factors affecting hydrograph, Unit Hydrograph, Method of superposition, S – Curves method.

UNIT-II: Irrigation: Duty, delta, and base period of crops, methods of irrigation, irrigation efficiencies, depth of irrigation, wilting point, Consumptive use, types of canals, balancing depth of cutting, Kennedy's and Lacey's theories, and design of lined and unlined canals.

UNIT-III: Diversion head works& Canal regulation works: Diversion head works: Components, causes of failures, difference between weir and barrage, Bligh's creep theory, Khosla's theory.
Canal regulation works: Canal falls- types, types of regulators, functions of cross regulator and head regulator, Cross drainage works-types, Canal outlets.

UNIT-IV: Reservoir Planning and Spill Ways & Energy Dissipation.
Reservoir Planning: Selection of site, zones of storage in a reservoir, storage capacity analysis, Reservoir sedimentation, Flood routing through retarding basin, Estimation of life of a reservoir.
Spill Ways & Energy Dissipation: Types of spill ways, Energy dissipators, hydraulic jump & bucket type dissipators

UNIT-V: Storage Head Works:
Types of dams, advantages &disadvantages, selection criteria, forces acting on dams, stability analysis, seepage control measures, elementary profile and practical profile, low and high gravity dams.
Earth dams: Types, Methods of construction, Seepage analysis for homogenous and Zoned embankment dams, Seepage control measures.

Learning Resources:

1. K. Subramanya, "Engineering Hydrology", 6th Edition, McGraw Hill Education, 2024.
2. V. T. Chow, D. R. Maidment, L. W. Mays, "Applied Hydrology", McGraw Hill Education, Reprint 2017
3. K. C. Patra, "Hydrology and Water Resources Engineering", 2nd Edition (Reprint 2015), Narosa / Alpha Science.
4. S. K. Garg, "Water Resources Engineering (Irrigation Engineering & Hydraulic Structures, Vol. II)", Khanna Publishers, Revised Edition 2019
5. M. M. Dandekar & K. N. Sharma, "Water Power Engineering", Vikas Publishing House, Reprint Edition 2009
6. H. M. Raghunath, "Irrigation Engineering and Hydraulic Structures", Wiley India, Revised Edition 2011
7. http://nptel.ac.in/courses/105104103/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of each Internal Test : 90 Minutes

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DEPARTMENT OF CIVIL ENGINEERING

FOUNDATION ENGINEERING

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U22PC740CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	Upon the completion of the course, students are expected to
1. Evaluation of shear parameters of soil 2. Evaluation of lateral earth pressure and stability of slopes. 3. Examination of soil exploration and select an appropriate drilling, sampling and field property measurement tools for different soil profiles. 4. Calculation of bearing capacity of soils for shallow foundation and pile load capacity.	1. Determine and judge shear strength in soils under given field conditions 2. Evaluate lateral earth pressure using Rankine's theory and assess stability slopes in soils under given field conditions. 3. Appraise site investigation methods adopted in determining index and engineering properties of soil under given field situation. 4. Evaluate bearing capacity, settlements and adapt appropriate parameters for the design of foundations for given field condtion and soil type using analytical approach. 5. Evaluate the capacity of pile foundation and pile groups using analytical methods under static and dynamic normal loadings including negative skin friction.

UNIT-I: Shear Strength: Significance of Shear strength in soils–Mohr-Coulomb model–shear parameters-Determination of shear strength–Direct sheartest, large shear box testTri-axial compression tests (Unconsolidated Undrained (UU), Consolidated Undrained (CU) and Consolidated Drained (CD)), UCC test, Vanesheartest. Stress- strain behavior of soils-Stress path-Skemptons pore water parameters

UNIT-II: Earth Pressure: States of earth pressure-Active ,passive,atrest condition; Rankine's theory: computation of active and passive earth pressure in cohesion less and c-φ soils; Coulomb's Wedge theory; Introduction to application of lateral earth pressure to earth retaining structures
Slope stability: Definition and classification of slopes-types and slope failures-Factors of safety with respect to cohesion, angle of shearing resistance, Height. Analysis of stability of slope using Swedish slip circle method, Modified Bishop's methodand Taylor's stability number.

UNIT-III: Site investigation: Need for investigation. Designing an investigation.Recommendations on location and depth of foundation. Soil boring methods, samplers and sampling techniques. In-situ testing-Penetration tests- Ground water observations, PMT, introduction to Geophysical exploration. Report preparation and presenting results of site investigation. Introduction to resilient modulus.

UNIT-IV:Shallow foundations: Types of foundations,Terzaghi'sequation for bearing capacity in soils–it's modification for continuous, square, rectangular and circular footings, general and local shear failure conditions--IS code method for bearing capacity, Plate load test.Computation of allowable bearing pressure. Introduction to combined and mat footings

UNIT-V: Pile Foundations: Classification of piles. Pile capacity–static pileformulae, dynamic pile formulae, pile load test, determination of point resistance and skin friction as per IS code. Bearing capacity of pile groups, negative skin friction.

Learning Resources:

1. Gopal Ranjan, Rao A.S.,"Basicand Applied Soil Mechanics", New age publishers, 5th Edition, 2023.
2. Principles of Foundation Engineering by Braja M. Das -9th Edition, 2019
3. J. E. Bowels, "Foundation Analysis and Design", McGraw-Hill, 5th Edition
4. Design of Foundation Systems: Principles and Practices by Nainan P. Kurian, 3rd Edition
5. Murthy V.N.S.,"A Text book of Soil Mechanics &Foundation Engineering",CBSPublishers, 2018.
6. Venkat ramaiahC.,"Geo-technical Engineering",New Age Publishers, 6thEdition, 2018.

7. Foundation Engineering- P. C. Varghese– PHI Learning Pvt. Ltd.
8. Soil Mechanics in Engineering Practice By Karl Terzaghi, Ralph B. Peck, Gholamreza Mesri, 3rd Edition
9. Soil Mechanics SI version by T. William Lambe and Robert V. Whitman-Wiley India edition
10. Craig's Soil Mechanics By Jonathan Knappett, R.F. Craig-CRC publisher 9th Edition, 2020
11. ShenbagaKaniraj,"DesignAids In Soil Mechanics and Foundation Engineering", Mc Graw Hill Education(India) Private Limited, 2017.
12. https://nptel.ac.in/courses/105/105/105105176/
13. https://ocw.mit.edu/courses/1-361-advanced-soil-mechanics-fall-2004/pages/syllabus/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN CIVIL ENGINEERING

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U23PE710CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are	Upon the completion of this course the students will be expected to:
1. To introduce Artificial Intelligence and Machine Learning concepts. 2. To explain about supervised learning, unsupervised learning and reinforcement learning. 3. To demonstrate civil engineering application in Artificial Intelligence and Machine Learning	1. Understand the basic concepts of Artificial Intelligence (AL) and Machine Learning (ML). 2. Solve the problems of linear regression and classification. 3. Describe unsupervised learning algorithms. 4. Solves the problems on reinforcement learning 5. Understand AI & ML applications in Civil Engineering

UNIT-I: Introduction to AI: Overview of Artificial Intelligence(AI), History of AI, State of the Art, classification, AI, ML, and DL, Introduction to Neural Networks, Neural Net Architectures, Uses of Neural Networks, Evaluation of Networks.

UNIT-II: Supervised Learning: Linear Regression – Mathematical formulation, Overfitting and Cross-Validation, Classification – Generative classifiers, Formulation, Regression versus Classification. Support vector machines, Decision Trees.

UNIT-III: Unsupervised Learning: Clustering, Associations, hierarchical, partition based clustering, overlapping clustering, K-Means algorithm, Gaussian mixture models algorithm.

UNIT-IV: Reinforcement Learning: Learning from rewards, Passive reinforcement learning, active reinforcement learning, and generalization in reinforcement learning, Q-learning Algorithm, proximal policy optimization algorithm.

UNIT-V: Applications to Civil Engineering Problems: Concrete strength prediction, traffic flow classification and prediction, soil classification, flood prediction and risk assessment, water quality prediction, clustering in geotechnical engineering, pattern recognition in traffic flow analysis, structural control and optimization, construction site management.

Learning Resources:

1. Kishan Mehrotra, C.K. Mohan & R. Sanjay "Artificial Neural Networks", Penram International Pub. (India) Pvt. Ltd, Reprint 2023.
2. S.N.Sivanandam & S.N.Deepa "Principles of Soft Computing" 3rd Edition wiley India, 2018.
3. Kevin P Murphy "Machine Learning – A Probabilistic Perspective" MIT Press, Reprint 2021.
4. Stephen Marsland "Machine Learning", CRC Press, Reprint 2022.
5. James.A. Goulet "Probabilistic Machine Learning for Civil Engineers"; MIT Press 2020.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

DESIGN OF CONCRETE STRUCTURES

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U23PE720CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	Upon the completion of the course, students are expected to
1. Design codes of practice for Reinforced Concrete 2. Design of concrete structures viz., combined footing, retaining walls, water tanks and bridges as per standard codes of practice	1. Design rectangular combined footing and understand the principles of design of trapezoidal footing with limit state method according to IS456: 2000. 2. Analyse and design cantilever and counter fort retaining walls for different load conditions with limit state method according to IS456: 2000. 3. Analyse and design water tanks, resting on ground and overhead water tanks according to IS3370: 2009. 4. Understand IRC loadings for the analysis of bridges according to IRC5: 2000 and IRC6: 2000. 5. Design Slab bridge and T-beam bridge with IRC loadings according to IRC21: 2000.

UNIT-I: Combined Footing and Retaining walls: Limit state design &detailing of combined rectangular footing and principles of design of trapezoidal footing. Limitstate design &detailing of cantilever and counterfort retainingwalls subjected to different earth pressure conditions.

UNIT-II: Water Tanks: Elastic Design &Detailing for RCC circular and rectangular ground level and over-head water tanks-Design of staging. Principles of Design of Intze tanks.

UNIT-III: Bridges: IRC loadings; Elastic design and detailing of two lane, simply supported RC slab Bridge using effective width method. Elastic design and detailing of two lane, simply supported RC T-beam bridge using effective width method, Pigeaud's method and Courbon's method.

Learning Resources:

1. Krishna RajuN.,"DesignofBridges",Oxford&IBHPublicationCompany,2019.
2. Praveen Naga rajan,"Design of Concrete Bridges",Wiley,2020.
3. Jagadeesh T.R.and Jayaram M.A,"Design of Bridge Structures",PHI Learning Private Limited, 2020
4. Bhavikatti S.S.,"Advanced R.C.C.Design",Volume-II, New Age International, 2016.
5. Shah H.J.,"Reinforced Concrete",Volume-II,Charotar Publishing House,2014.
6. Punmia B.C., Ashok kJain, Arun K Jain, "Limit State Design of Reinforced Concrete",Laxmi Publications, 2016.
7. Krishna Raju N.,"Advanced Reinforced Concrete Design", CBS Publishers, 2016.
8. IS:456-2000, Code of Practice for Plain and Reinforced concrete, Bureau of Indian Standards, New Delhi, India.
9. IS:3370-2009, Part I and Part II Code of Practice for Concrete Structures for Storage of Liquids, Bureau of Indian Standards, New Delhi,India.
10. IRC5-2000, Standard specification and code of practice for roadbridges, SectionI, General Features of Design, IRC, New Delhi, India.
11. IRC6-2000, Standard specification and code of practice for road bridges, Section II, Loads and Stresses, IRC, New Delhi, India.
12. IRC112-2011, Code of Practice for concrete road bridges, IRC, New Delhi, India
13. SP34:Hand book on Concrete Reinforcement and Detailing (With Amendment1), Bureau of Indian Standards, New Delhi, India
14. IS:875-1987 Code of Practice For Design Loads (Other Than Earthquake) For Buildings And Structures Parts (1,2,3,4&5), Bureau of Indian Standards, New Delhi, India

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	: 2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

TRAFFIC ENGINEERING

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U23PE730CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to	At the end of the course, students will be able to
1. Learn to analyze traffic flow and use basic mathematical tools to study traffic patterns and delays. 2. Measure and improve the capacity and quality of different types of roads. 3. Design safe & efficient intersections and traffic signals using modern tools and methods. 4. Conduct safety checks on roads and reduce negative impact of traffic on the environment. 5. Design safe and convenient facilities for pedestrians, cyclists, and buses.	1. Analyze and apply traffic stream models and statistical distributions to evaluate and interpret traffic flow characteristics and delay patterns. 2. Calculate and assess the capacity and level of service for various roadway types using Indo HCM guidelines to enhance traffic efficiency. 3. Design and optimize traffic intersections and signal coordination systems using principles of intersection design and traffic simulation tools 4. Conduct comprehensive road safety audits and implement strategies to mitigate the environmental impacts of traffic, promoting sustainable transportation solutions. 5. Design and implement pedestrian facilities, cycle tracks, and bus bays according to urban road design standards to enhance safety and accessibility for non-motorized road users.

UNIT-I:Fundamental Concepts in Traffic Engineering and Statistical Analysis– Relationship between traffic characteristics –Traffic stream models,Delay studies, Gap acceptance studies. Statistical distributions for traffic engineering – Discrete distributions, Binomial distribution, Poisson distribution, Normal distribution, Exponential distribution.

UNIT-II: Capacity and Level of Service Analysis for Traffic Facilities– Concepts of Capacity and Level of Service, Computation of capacity and level of service for two lane highways, Multilane highways and freeways using Indo HCM guidelines.

UNIT-III Traffic intersection Design and Signal Coordination: Design principles for intersections, Channelization design, Rotary design, Design principles of signals, Signal design, Delay at signalized intersections, Introduction to latest traffic simulation packages /VISSIM, Signal Coordination -Signal Co-ordination methods, Simultaneous, Alternate, Simple progression and Flexible progression Systems.

UNIT-IV Traffic safety and Environmental Impact Mitigation: Traffic Safety –An overview of Road safety audit, stages of Road safety audit, road safety audit case studies.
Detrimental effects of Traffic on the Environment, Air pollution; Noise Pollution; Measures to curtail environmental degradation due to traffic. Sustainable Transportation: Sustainable modes, Transit Oriented Development, ITS based benefits for Environment.

UNIT-V Design and Integration of Pedestrian and Non-Motorized Transportation Facilities: Requirements of Pedestrians; Pedestrian facilities on Urban Roads; Cycle Tracks : Guidelines and Design standards; Bus Bays: Types and Guide Lines for layout Design. Design of Subways and foot over bridges.

Learning Resources:

1. Traffic Engineering and Transportation Planning, Kadiyali L.R., Khanna Publishers,2024
2. Principles of Highway Engineering and Traffic Analysis, Fred L. Mannering, and Scott S. Washburn, Jhon Wiley & Sons, 7rd Edition, 2020.
3. Highway Capacity Manual, Transportation Research Board, Washington, DC, 2010
4. Indian Highway Capacity Manual (INDO-HCM), Chandra, Satish, Gangopadhyay, S, Velmurugan, S, Ravinder, Kayitha, CSIR-CRRI, 2017.
5. Traffic and Highway Engineering, Nicholas J. Garber, and Lester A. Hoel, Cengage Learning India, 2019, Fifth Edition.

6. Traffic Engineering Design: Principles and Practice, Mike Slinn, Peter Guest, Paul Matthews, Butterworth-Heinemann, 2005, Second Edition.
7. Traffic Engineering, Roger P. Roess, Elena S. Prassas, and William R. McShane, Pearson, 2019, Fifth Edition.
8. McShane, W.R., Roess, R.P. and Prassas, E.S., Traffic Engineering. Prentice Hall, EnglewoodCliffs, Fourth Edition, 2010.
9. NPTEL course on Traffic Engineering

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

GEOINFORMATICS

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U23PE740CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	Upon the completion of the course, students are expected to
1. Introduce the fundamentals of Geoinformatics, spatial data, coordinate systems, map projections and cartographic principles for geospatial data representation and visualization. 2. Familiarize students with the principles of Remote Sensing, Photogrammetry and GNSS for spatial data acquisition, mapping and earth observation applications. 3. Develop an understanding of spatial data models, geodatabases and GIS-based spatial analysis techniques for solving engineering and planning problems. 4. Provide knowledge of Enterprise GIS concepts, geospatial data visualization methods and applications of geospatial technologies in infrastructure, environmental and urban systems. 5. Expose students to geospatial programming, Web GIS, Mobile GIS, IoT-enabled geospatial applications and emerging technologies such as GeoAI and Digital Twins.	1. Explain the fundamental concepts of Geoinformatics, spatial data, coordinate systems, map projections and cartographic principles for geospatial applications. 2. Interpret remote sensing imagery and explain the principles of photogrammetry and GNSS for spatial data acquisition and mapping applications. 3. Apply spatial data models, geodatabases and GIS-based spatial analysis techniques to solve engineering and planning problems 4. Analyze geospatial information using Enterprise GIS concepts, visualization techniques and geospatial applications in transportation, utilities, urban planning, environmental management and disaster management. 5. Demonstrate the use of geospatial programming, Web GIS, Mobile GIS and emerging geospatial technologies for workflow automation and decision-support applications.

UNIT–I: INTRODUCTION TO GEOINFORMATICS AND CARTOGRAPHY

Introduction to Geoinformatics: Components of Geoinformatics–GIS, Remote Sensing, Photogrammetry and GNSS. Applications in Civil Engineering, Urban Planning, Transportation, Utilities, Smart Cities and Environmental Management.

GIS Data and Spatial Data Sources: Spatial and non-spatial data, metadata and data standards. Data acquisition through digitization, georeferencing, CAD integration, GPS/GNSS surveys, remote sensing imagery, drone surveys and Digital Elevation Models (DEMs). Common geospatial data formats.

Coordinate Systems and Map Projections: Geographic and projected coordinate systems, datums, map projections and their applications.

Cartographic Principles: Map elements, symbolization, thematic mapping and principles of effective map design.

UNIT–II: REMOTE SENSING, PHOTOGRAMMETRY AND GNSS

Remote Sensing Fundamentals: Electromagnetic spectrum, spectral signatures, satellite sensors and platforms, image resolutions and applications of remote sensing.

Image Processing and Interpretation: Elements of image interpretation, image corrections, georeferencing, image enhancement and basic classification techniques for land use/land cover mapping.

Photogrammetry: Principles of photogrammetry, aerial photographs, scale, stereoscopy, image orientation, orthophotos, Digital Elevation Models (DEMs) and applications in mapping and 3D modelling.

Global Navigation Satellite Systems (GNSS): Fundamentals of GPS/GNSS, satellite constellations, positioning principles, sources of errors and accuracy enhancement techniques.

UNIT–III: SPATIAL DATA MODELLING AND ANALYSIS

Spatial Data Models: Vector, raster and TIN data models, their characteristics, advantages, limitations and applications.

Topology and Spatial Relationships: Concepts of topology, connectivity, adjacency and containment. Spatial relationships, spatial queries and their significance in GIS analysis.

Geodatabases and Data Management: Geodatabases, feature classes, attributes and basic principles of spatial database design.

Spatial Analysis Techniques: Attribute and spatial queries, buffering, proximity analysis, overlay analysis, terrain analysis using DEMs and basic network analysis. Applications in transportation, urban planning, environmental management and infrastructure development.

UNIT–IV: GEOSPATIAL APPLICATIONS

Enterprise GIS and Spatial IT: Enterprise GIS architecture, Spatial Data Infrastructure (SDI), geospatial data sharing portals, enterprise workflows, quality assurance and quality control (QA/QC), and integration of GIS with enterprise systems such as ERP, SCADA and CRM.

Geospatial Data Visualization and Applications: Thematic mapping, cartographic outputs, 3D visualization, dashboards and story maps for communicating geospatial information. Applications of geospatial technologies in transportation, utilities, urban planning, environmental management, disaster management and smart cities.

UNIT–V: GEOSPATIAL PROGRAMMING AND EMERGING TECHNOLOGIES

Geospatial Programming and Workflow Automation: Introduction to Python scripting for geospatial applications, automation of geoprocessing tasks, workflow automation using geoprocessing tools and model builders, and spatial ETL concepts for data integration and transformation.

Web GIS: Fundamentals of Web GIS, client–server architecture, web mapping services (WMS, WMTS), web map APIs, tile services and integration of GIS with web applications.

Mobile GIS and IoT Applications: Mobile GIS for field data collection, GPS-enabled mobile devices, sensor networks, real-time spatial data acquisition and integration of IoT with GIS applications.

Emerging Trends in Geospatial Technologies: GeoAI, Digital Twins, cloud-based geospatial platforms and advanced geospatial applications.

Learning Resources:

1. Kang-Tsung Chang, Introduction to GIS, Tata McGraw Hill Edition, 2022.
2. Anji Reddy M., Remote Sensing and Geographic Information System, BS Publications 2012

3. John R Jensen, Ryan R Jensen, Introduction to Geographic Information System, 2023
4. John A. Richards, Remote sensing Digital Image Analysis, 2022
5. T. Schenk, Introduction to photogrammetry, 2005
6. Leick, A., GPS Satellite Survey, John Wiley: NJ, 2020
7. Hofmann, B., Lichtenegger H. and Collins J., Global Positioning System: Theory and Practice, Springer: Berlin, 2012.
8. Hofmann-Wellenhof, Bernhard, Lichtenegger, Herbert, Wasle, Elmar, GNSS – GPS, GLONASS, Galileo and more, 2013.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
FINITE ELEMENT METHOD LAB

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0:0 : 2	SEE Marks:50	Course Code: U23PC711CE
Credits:1	CIE Marks:30	Duration of SEE:3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Analyse one dimensional elements i.e. bars, plane trusses, beams and plane frames 2. Analyse plates subjected to in-plane and out-of-plane loading under conditions of plane stress and plane strain 3. Analyse axi-symmetric and 3D problems	1. Perform analysis of bars, plane trusses, beams and plane frames 2. Perform analysis of plates under conditions of plane stress and plane strain 3. Perform analysis of axi-symmetric and 3D problems 4. Practice working as a team member and lead a team. 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

List of Experiments:

The programming is carried out for the following problems using FEM:

1. Analysis of Stepped bars
2. Analysis of Plane trusses
3. Analysis of Beams with 2 degrees of freedom at each node
4. Analysis of Plane frames
5. Analysis of Plates subjected to in-plane loading under conditions of plane stress/Plane strain:
   a) Using CST elements
   b) Using LST elements
   c) 4-node quadrilateral elements
   d) 8-node quadrilateral elements

6. Analysis of Plates subjected to out-of-plane loading under conditions of plane stress/plane strain:
    a) 4-node quadrilateral elements
    b) 8-node quadrilateral elements
7. Solutions to axisymmetric domain problems using
    a) 3-node triangular axisymmetric elements
    b) 6-node triangular axisymmetric elements
    c) 8-node quadrilateral axisymmetric elements
8. Solutions to Solid beam problems using 8-node hexahedral (brick) elements

Learning Resources:

1. "Programming in ANSI C" 9th Edition Balagurusamy Paper back–11thJuly 2024 by E Balagurusamy
2. MATLAB
3. ANSYS Software Package
4. ABAQUS

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18

Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

ARTIFICIAL INTTELIGENCE APPLICATIONS IN CIVIL ENGINEERING LAB

SYLLABUS FOR B.E. VIII- SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks: 50	Course Code: U23PE711CE
Credits: 1	CIE Marks: 30	Duration of SEE: 3 Hrs.

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are:	Upon the completion of this course the students will be expected to:
1. To implement AI & ML applications of Civil Engineering using MATLAB Software.	1. Understand the basic concepts of the IDE of MATLAB software. 2. Generate 2D and 3D graphs using the software. 3. Develop AI&ML applications in Civil Engineering using the software.

List of programs/algorithms:

1. Introduction to arrays and matrices.
2. Writing Script files
3. Plotting functions.
4. Creating and editing plots.
5. Using condition and iterative statements.
6. curve fitting
7. Regression Analysis.
8. Classifier
9. Clustering
10. Association

No. of Internal Tests: 01 Max. Marks for Internal Test: 12

Marks for day-to-day laboratory class work 18
Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

DESIGN OF CONCRETE STRUCTURES LAB

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0:0 : 2	SEE Marks:50	Course Code: U23PE741CE
Credits:1	CIE Marks:30	Duration of SEE:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Determine the stability for cantilever retaining wall. 2. Design steps for foundation of retaining wall 3. Determine base pressure for combined footing due to concentric load and eccentric load 4. Determine the design criteria for water tank with riged base 5. Design for RCC deck slab for a road bridge and T Beam bridge	1. Checking the stability equation for cantilever retaining wall. 2. Understand design concept for foundation retaining wall 3. Evaluation of base earth pressure combined footing 4. Understand water tank design with riged base 5. Understanding RCC deck slab design and T beam bridge (RCC).

List of Experiments:
The following experiments are to be conducted by developing spread sheets in MS-EXCELL

CYCLE-I

1. Stability check for a cantilever retaining wall
2. Foundation design of retaining wall(cantilever)
3. Foundation design of retaining wall with shear key
4. Base pressure calculation for combined footing due to concentric load
5. Base pressure calculation for combined footing due to eccentric load

CYCLE-II

6. Design of surface water tank with rigid base(50kL)
7. Design of surface water tank with flexible base (50kL)
8. Design of elevated water tank(intz tank)
9. Design of RCC deck slab of a road bridge

10. Design of RCC T beam girder for Road Bridge.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			13
Course Project			5

Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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DEPARTMENT OF CIVIL ENGINEERING
TRAFFIC ENGINEERING LAB

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0:0 : 2	SEE Marks:50	Course Code: U23PE731CE
Credits:1	CIE Marks:30	Duration of SEE:3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Analysing characteristics of traffic 2. Various parameter related to delay, speeds and headways 3. Understand the simulation tool in Traffic Engineering	1. Gain Knowledge about various traffic surveys 2. Analyse traffic parameters for various studies. 3. Simulate real world scenario of traffic 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

List of Experiments:

1. Headway-studies
2. Gap Acceptance studies
3. Pedestrian Survey
4. Intersection-Delay studies
5. Introduction to PTV VISSIM Interface
6. Creation of a Basic Road Network
7. Traffic Volume Input and Vehicle Composition
8. Simulation of Uninterrupted Traffic Flow
9. Signalized Intersection Modelling
10. Signal Timing Design and Analysis

No. of Internal Tests: 01 Max. Marks for Internal Test: 12

Marks for day-to-day laboratory class work 18
Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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DEPARTMENT OF CIVIL ENGINEERING

GEOGRAPHICAL INFORMATION SYSTEMS LAB

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0:0 : 2	SEE Marks:50	Course Code: U23PE732CE
Credits:1	CIE Marks:30	Duration of SEE:3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Provide practical exposure to GIS software and geospatial technologies for handling, managing, and visualizing spatial data relevant to Civil Engineering applications. 2. Develop proficiency in acquiring, creating, editing, and managing geospatial datasets through georeferencing, digitization, geodatabase creation, GPS/GNSS data collection, and coordinate system transformations. 3. Enable students to perform spatial analysis, image interpretation, thematic mapping, and spatial database management for informed decision-making using GIS techniques. 4. Familiarize students with modern geospatial tools such as web GIS, interactive mapping, and multi-criteria spatial analysis for solving real-world engineering problems. 5. Develop the ability to integrate geospatial data, analytical methods, and cartographic visualization to address Civil Engineering applications in transportation, urban planning, environmental management, utility planning, and disaster management.	1. Create GIS projects and efficiently handle vector, raster, and GPS/GNSS datasets using appropriate GIS software. 2. Perform georeferencing, coordinate system transformations, digitization, and geodatabase creation while integrating spatial and attribute data with proper metadata. 3. Prepare thematic maps, interpret multispectral satellite imagery, and perform basic image classification for geospatial visualization and analysis. 4. Apply GPS/GNSS techniques, spatial querying, buffering, overlay analysis, proximity analysis, and spatial database management to support engineering decision-making. 5. Develop interactive web maps, perform multi-criteria site suitability analysis, and apply GIS techniques to solve Civil Engineering problems through integrated geospatial case studies.

List of Experiments:

1. Creation of a GIS project and handling of vector, raster and GPS/GNSS datasets.
2. Georeferencing of scanned maps/satellite imagery and coordinate transformation of spatial datasets.
3. Creation of geodatabases, feature classes and attribute tables with metadata documentation.
4. Digitization of spatial features and integration of spatial and attribute data.
5. Preparation of thematic maps using appropriate map elements, symbolization and map layout techniques.
6. Interpretation of multispectral satellite imagery for land use/land cover mapping and basic image classification.
7. Collection of GPS/GNSS data and assessment of positional accuracy, datums and projection effects.
8. Spatial querying, buffering, overlay analysis and proximity analysis for decision-support applications.
9. Design and management of a simple spatial database and querying of spatial and attribute data.
10. Preparation of interactive web maps and visualization of geospatial information.
11. Site suitability analysis using multiple spatial criteria.
12. Integrated GIS case study involving transportation, urban planning, environmental management, utility planning or disaster management applications, including preparation and presentation of analytical maps and reports.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18

Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
PROJECT SEMINAR

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0:0:2	SEE Marks: ----	Course Code: U23PW719CE
Credits: 1	CIE Marks: 30	Duration of SEE: --

Course outcomes:

1. Analyse civil engineering problems in a multi disciplinary domain.
2. Acquire the ability to make effective presentation.
3. Explore the use of research based knowledge.
4. Apply engineering knowledge in the context of society
5. Present the details obtained after mutual discussions with the team members

Instructions to students:

Objective of the project seminar is to actively involve the students in preparation of the final year project with regard to following components:

1. Problem definition and specification.
2. Literature survey, familiarity with research journals.
3. Broad knowledge of available techniques to solve a particular problem.
4. Planning of the work, preparation of bar (activity) charts.
5. Presentation – oral and written.

The department can initiate the project allotment procedure at the end of VI semester and finalise it in the first two weeks of VII semester.

First 4 weeks of VII semester will be spent on special lectures by faculty members, research scholars, post graduate students of the department and invited lectures by engineers from industries and R & D institutions. The objective of these preliminary talks will be to expose the students to real life practical problems and methodology to solve the technical problems.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)
BE (CIVIL ENGINEERING) VIII-SEMESTER ACADEMIC YEAR 2026-2027
(Students Admitted in 2023-24)

Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U23PE8XXCE	Professional Elective – III	3	-	-	3	60	40	3
U23PE8XXCE	Professional Elective - IV	3	-	-	3	60	40	3
PRACTICALS								
U23PW819CE	Project / Internship	-	-	12	Viva-Voce	50	50	6
Note: The left over hours are to be allotted to Sports / Library / Mentor Interaction / CC / RC / TC / PDC based on the requirement.								
Total		**6**	**-**	**12**		**170**	**130**	**12**
Grand Total		**18**				**300**		

PROFESSIONAL ELECTIVE – III		
1	U23PE851CE	Advanced Structural Analysis
2	U23PE852CE	Intelligent Transportation Systems
3	U23PE853CE	Ground Water Hydrology
4	U23PE854CE	Ground Improvement Techniques
PROFESSIONAL ELECTIVE – IV		
1	U23PE861CE	Pre-Stressed Concrete
2	U23PE862CE	Railway and Airport Engineering
3	U23PE863CE	Hydraulic Structures
4	U23PE864CE	Soft Computing in Civil Engineering

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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DEPARTMENTOFCIVILENGINEERING

ADVANCED STRUCTURAL ANALYSIS

SYLLABUSFORB.E.VIII-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:U23PE851CE
Credits:3	CIE Marks:40	Duration of SEE:3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	At the end of the course, students will be able to:
1. Explain about direct stiffness method to perform analysis of bars, trusses, beams and rigid frames. 2. Describe the procedure to perform seismic analysis of framed structures. 3. Explain the fundamental principles and challenges in analysis of tall structures.	1. Perform analysis of bars using direct stiffness method. 2. Perform analysis of trusses using direct stiffness method. 3. Perform analysis of beams and rigid frames using direct stiffness method. 4. Perform seismic analysis of framed structures. 5. Understand the fundamental principles and challenges in analysis of tall structures.

Unit–I: Direct Stiffness Method-Analysis of Axial Force Members–I: Introduction to force & displacement methods, force-displacement relationships, principle of superposition, local and global coordinates, development of member stiffness matrices for bar, assembly of global stiffness matrices, analysis of bar members.

Unit–II: Direct Stiffness Method – Analysis of Axial Force Members–II: Development of element stiffness matrix for truss elements, transformation matrices, assembly of global stiffness matrices and load matrices, finding displacements and member end actions.

Unit – III: Direct Stiffness Method – Analysis of Flexural Members: Development of element stiffness matrices for beams and rigid frames, transformation matrices, assembly of global stiffness matrices and load matrices, finding displacements and member end actions.

Unit – IV: Earthquake Engineering: Earthquakes: occurrences, measurement, learning from past events, requirements of good seismic design, design seismic load calculation – equivalent linear static method – vertical and member-wise distribution of design seismic loads – seismic analysis.

Unit – V: Tall Structures: Introduction to high-rise building systems, importance of structural modeling in design and performance evaluation, basic assumptions and simplifications in modeling, overview of structural systems: frames, shear walls, core-outriggers, tubular systems – case studies of notable tall structures.

Learning Resources:

1. Weaver and Gere, "Matrix Analysis of Framed Structures", CBS Publishers, Reprint 2025.
2. Hibbeler R.C., "Structural Analysis", 10/E, Prentice Hall, Higher Education, 2022.
3. Pankaj Agarwal & Manish Shrikhande, "Earthquake Resistant Design of Structures", PHI, Reprint 2024.
4. Michael R. Lindeburg & Kurt M. McMullin, "Seismic Design of Building Structures", Professional Publications Inc., Reprint 2023.
5. Damodar Maity, "Computer Analysis of Framed Structures", IK International Publishing House Pvt. Ltd., Reprint 2022.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	: 2	Max. Marks for each Internal Tests	: 30
2	No. of Assignments	: 3	Max. Marks for each Assignment	: 5
3	No. of Quizzes	: 3	Max. Marks for each Quiz Test	: 5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

INTELLIGENT TRANSPORTATION SYSTEMS

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code: U23PC852CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

Course objectives	Course Outcome (CO)
1. To introduce the fundamental concepts, components, and technologies of Intelligent Transportation Systems (ITS), including data collection, communication, and information management tools. 2. To familiarize students with the functional areas, architecture, and planning strategies involved in ITS deployment, emphasizing traffic management, public transportation, and safety applications. 3. To enable students to critically analyze and evaluate real-world ITS applications and emerging technologies for enhancing mobility, sustainability, and operational efficiency in transportation systems.	1. Explain the objectives, benefits, and historical evolution of ITS, and describe data collection technologies such as detectors, AVL, AVI, GIS, and video-based systems. 2. Analyze the role of telecommunications and evaluate sensor technologies, communication systems, and data fusion techniques used in Traffic Management Centres (TMCs). 3. Differentiate between functional areas of ITS and interpret the user needs and services across transportation domains. 4. Interpret ITS architecture at regional and project levels, and apply models, evaluation methods, and human factor considerations to ITS planning and design. 5. Assess various ITS applications in areas such as traffic and incident management, tolling, public transit, and automated highway systems, and evaluate their role in achieving sustainable mobility.

UNIT–I: Introduction to Intelligent Transportation Systems (ITS): Definition, Objectives, Historical Background, Benefits of ITS, ITS Data collection techniques – Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Geographic Information Systems (GIS), video data collection.

UNIT–II: Telecommunications in ITS: Information Management, Traffic Management Centres (TMC). Application of sensors to Traffic management; Traffic flow sensor technologies; Transponders and Communication systems; Data fusion at traffic management centres; Sensor plan and specification requirements; Elements of Vehicle Location and Route Navigation and Guidance concepts.

UNIT–III: Functional Areas of ITS: Advanced Traffic Management Systems (ATMS), Advanced Traveller Information Systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control systems (AVCS), Advanced Public Transportation System (APTS), Advanced Rural Transportation Systems (ARTS). ITS User Needs and Services – Travel and Traffic Management, Public Transportation management, Electronic Payment, Commercial Vehicle Operations, Emergency management, Advances 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, and ITS Security ITS as a technology deployment program, research, development and business models/modules, 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, Automated Highway Systems- Vehicles in Platoons – Integration of Automated Highway Systems.

Learning Resources:

1. USDT. (2025), "National ITS Architecture Documentation", U.S. Department of Transportation, USA
2. Joseph, S.S. (2017). "Perspectives on Intelligent Transportation Systems", Springer publishers, USA.
3. Kan Paul and Chen Jhon Miles (2007). "Intelligent Transportation Systems", Hand Book 2000: Recommendations for World Road Association (PIARC).
4. Chowdhury, M. A., Sadek, A. and Boston, M.A. (2003). "Fundamentals of Intelligent Transportation Systems Planning", Artech House, -USA.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENTOFCIVILENGINEERING

GROUNDWATER HYDROLOGY

SYLLABUS FOR B.E. VIII-SEMESTER

L:T:P(Hrs./week):3:0:0	SEEMarks:60	Course Code: U23PE853CE
Credits:3	CIEMarks:40	DurationofSEE:3Hrs

COURSEOBJECTIVES	**COURSEOUTCOMES**
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Understand the properties of Groundwater and solve for problems on steady flows. 2. Explain the various methods used to calculate parameters of unsteady flow. 3. Describe various geophysical exploration methods and selection of sites 4. Interpret the various artificial methods of ground water recharge, sea water intrusion and its control. 5. Explain conjunctive use of groundwater, different ground water analog models.	1. Assess the ground water parameters and flow characteristics, equations 2. Interpret various equations for unsteady radial flow to a well. 3. Understand different 4. Evaluate the methods of artificial recharge of groundwater. 5. Analyze various groundwater analog models and hydrologic balance equations

UNIT-I: Introduction: Groundwater in the hydrologic cycle, vertical distribution of groundwater. Types of aquifers – unconfined, confined and leaky aquifers, porosity, void ratio, storage coefficient, permeability, transmissivity, specific yield, safe yield. General equation of groundwater flow, steady uni-directional flow, steady radial flow to a well in unconfined and confined aquifers. Steady flow with uniform recharge.

UNIT-II: Unsteady Radial Flow to a well: Non-equilibrium equation for pumping tests, Theis method of solution, Cooper Jacob method, Chow's methods of solution, law of times, well flow near aquifer boundaries. Image wells, multiple well systems, partially penetrating wells, steady radial flow in leaky artesian aquifer. Well completion and well development.

UNIT-III: Geophysical Exploration: Surface investigations of groundwater –Electrical Resistivity method, seismic refraction method, gravity and magnetic methods, geologic methods, Dowsing. Subsurface Investigations – Test Drilling, resistivity logging, potential logging, Interpretation of logs and selection of site as a well.

UNIT-IV: Artificial Recharge of Groundwater: Methods of recharge, water spreading, sewage discharge,Recharge through pits andshafts,Recharge through well,Inducedrecharge. Sea water intrusion in coastal aquifers; occurrence, Ghyben-Herzberg relation, space of fresh – salt water interface, length of the intruded sea water wedge, prevention and control of sea water intrusion.

UNIT-V: Groundwater Basin Management: Conjunctive use of surface and groundwaters, Contaminant Transports processes – Dispersion, diffusion, advection, Fick's Law, Hydrologic balance equation. Groundwater analogue models-sand models, electrical Analogue models, viscous flow models, case studies.

Learning Resources:

1. ToddD.K.,Ground water Hydrology,John Wiley & Sons,Inc., 3rd Edition, 2011.
2. RagunathH.M.,Groundwater,New Age International Publishers, Fourth Edition,2021.
3. Karnath K.P., Groundwater Assessment, Development and Management, Tata McGraw HillPublishing Company, 2017.
4. MIT Open Course Ware: *Groundwater Hydrology*, https://ocw.mit.edu/courses/1-72-groundwater-hydrology-fall-2005/
5. Manual on Artificail Recharge on Groundwater, Ministry of Water Resources, Central Ground Water Board https://www.cgwb.gov.in/old_website/documents/Manual%20on%20Artificial%20Recharge%20of%20Ground%20Water.pdf

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of each Internal Test : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
GROUND IMPROVEMENT TECHNIQUES

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U23PE854CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to introduce	Upon the completion of this course students will be expected to
1. Mechanical modification, hydraulic modification, usage of admixtures and geosynthetics in ground modification. 2. Stabilization techniques for cohesionless and cohesive soils 3. Miscellaneous techniques of ground improvement	1. Analyse different methods of Mechanical stabilization 2. Analyse different methods of Hydraulic stabilization 3. Analyse different methods of stabilization using admixtures 4. Analyse different methods of grouting 5. Examine application of geosynthetics in ground modification and analyze external and internal stability conditions of MSE wall

UNIT-I :**Introduction to ground improvement**- Need for ground improvement. Classification of techniques

Mechanical stabilization: Shallow and deep compaction requirements, principles and methods of soil compaction, shallow compaction and methods, properties of compacted soil and compaction control, deep compaction techniques.

UNIT-II: **Hydraulic modification:** Ground Improvement by drainage, Dewatering methods. Introduction to dewatering systems, Preloading, application of geosynthetics in hydraulic modification (PVDs, geonets), vacuum consolidation, Electro-kinetic dewatering.

UNIT-III: Modification by admixtures : Cement stabilization and cement columns, Lime stabilization and lime columns, Stabilization using bio-cementation approaches-MICP, stabilization using wastes- flyash-shredded tyres-demolition waste.

UNIT-IV :Grouting and Insitu soil treatment methods: Permeation grouting, compaction grouting, jet grouting. Introduction to Soil nailing, rock anchoring, micro-piles.

UNIT-V Modification by inclusion: Classification of geosynthetics-Applications-Properties of geosynthetics-Physical, Mechanical, hydraulic, endurance properties. Introduction to design of mechanically stabilized earth walls using geotextiles, geogrids and geostrips- External and Internal stability conditions.

Learning Resources:

1. Hausmann R., "Engineering principles of Ground Modification", McGraw Hill Publishing Co
2. Koerner, R. M., Designing with geosynthetics, Prentice Hall Inc.
3. Purushothama Raj P. , Ground Improvement Techniques, Laxmi Publications, 3rd edition 2023
4. Moseley, M.P., "Ground Improvement", Blackie, Academic & professional, 2004
5. Fang-Hsai – Yang, "Foundation Engineering Hand Book", Springer,2012
6. M C. R. Davies, F.Schlosser Ground improvement geosystems.

The break-up of CIE: Internal Tests + Assignments + Quizzes

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2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

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DEPARTMENT OF CIVIL ENGINEERING
PRE-STRESSED CONCRETE

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U23PE861CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Appreciate the importance & use of pre stressed concrete. Which possesses additional advantages compared to conventional RCC. 2. Acquire the knowledge on prestress operations and materials of Prestress 3. Acquire the knowledge on the design of prestressed concrete components.	1. Understand the process of production of Prestressed concrete and the principle involved. 2. Examine the advantage of prestressing in reducing tension in concrete and making the beam more safer 3. Describe how the deflections in beams are reduced in Prestressed compared to RCC 4. Examine the shear distribution in Prestressed concrete sections & the design procedure. 5. Explain how the end blocks of Prestressed concrete beams are strengthened against bursting tension.

UNIT-I: Introduction: Basic Concepts, materials, permissible stresses – systems of prestressing. Losses of prestress in pre-tensioned and post-tensioned members.

UNIT-II: Design: Analysis of PSC beams for flexure using elastic analysis of simple and composite sections with various cable profiles.

UNIT-III: Design of sections for flexure: Design of PSC sections by elastic and limit state methods for flexure.
Design for Shear: Shear and principle stresses, Design of R.C. section for shear, cracked and uncracked sections.

UNIT-IV: Deflections: Importance of deflections, factors influencing deflections, codal provisions, short terms and long-term deflections – computation. Cable profiles

UNIT-V: End Blocks: Nature of stresses, stress distribution – Magnel and Guyon's Methods – IS code provisions – Design by Guyon's method.
Precast Construction: Introduction: Detailed description of Precast Concrete Construction. Difference between Precast and other forms of Concrete construction. Advantages of Precast Construction.

Learning Resources:

1. Krishna Raju N., Prestressed Concrete, Tata McGraw Hill, 2024.
2. Pandit G.S. and Gupta S.P., Prestressed Concrete, CBS Publications, 2018.
3. Dayaratnam, Prestressed Concrete, Oxford & IBH Publications, 2019
4. Lin TY. And Bushy, Design of Pre stressed concrete Structures, Wiley India, Pvt, Ltd, 2020
5. IS 1343-2012, Code of Practice for Prestressed concrete, B.I.S Publications.
6. Marzuki , Nor, Ashikin "Pre-Cast and Pre-Stress Technology: Process, Method and Future Technology" Create space Independent Publication ISBN 10:1499353391 ISBN 13: 978-1499353396

The break-up of CIE: Internal Tests + Assignments + Quizzes

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DEPARTMENT OF CIVIL ENGINEERING
RAILWAY AND AIRPORT ENGINEERING

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U23PE862CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Impart knowledge on the basics of railway with respect to alignment, components, geometric design, construction and maintenance of track. 2. Introduce principles of airport engineering with respect to planning and geometric design	1. Describe the requirements of alignment and its surveys and explain the permanent way components with its functions 2. Design the elements of railway track 3. Present the techniques for construction and maintenance of railway track 4. Elucidate the requirements of airport layout and explain aircraft characteristics 5. Draw wind rose diagrams and determine the corrected runway length

Unit I: Introduction to Railway Engineering: Significance of Road, Rail, Air and Water transports - Coordination of all modes to achieve sustainability , Introduction to Hyperloop, Classification of railway lines in India, Different gauges on Indian Railways, Railway alignment – Requirements of an Ideal alignment, surveys for railway alignment - Traffic, Reconnaissance, Preliminary and Final location surveys.
Permanent way: Permanent way component parts and its functions. Rails – various types, functions, creep in rails, creep measurement, coning of wheels, Track fittings and fastenings, Sleepers- various types, merits and demerits, ballast- various types .

Unit II: Geometric Design: Details of geometric design, Gradients, grade compensation, Circular curves, Super elevation, safe speed on curves, Transition curves, widening of gauge on curves, Vertical curves, Check rails
Points, Crossing, Level Crossing: Important terms, switches, Tongue rails, Crossing, Turnouts, Layout of turnout, Classification of level crossings.

UNIT-III: Track construction – Stages in construction of railway track – earthwork, plate laying and laying of ballast
Maintenance of track: Necessity of maintenance, Maintenance of railway track – Maintenance of surface rails, Maintenance of track alignment, Maintenance of gauge, Maintenance of proper drainage and Maintenance of track components

Unit IV: Airport Planning: Introduction to air transportation, air craft types and its characteristics. Components of an airport, Terminal area and airport lay-out- building functions and planning considerations, vehicular circulation and parking area, apron and hangar, typical airport layouts.

Unit V: **Runway design:** Site selection of an airport as per ICAO, orientation of runway by wind rose diagrams, basic runway length determination including corrections, geometric design, runway configurations, Taxiway design.

Learning Resources:

1. Saxena S. C. and Arora S. P., "A Text Book of Railway Engineering", Dhanpat Rai and Sons, 2024.
2. Satish Chandra and Agarwal M. M., "Railway Engineering", Oxford Publishers, 2023.
3. Khanna. S.K., Arora, M.G. and Jain. S.S., "Airport Planning and Design" Nem Chand & Bros, Roorkee, India, 2023.
4. Mundrey J. S., "Railway Track Engineering", Tata McGraw Hill, 2017.
5. Rangwala, "Railway Engineering" Charotar Publishers, 2022.
6. http://rdso.indianrailways.gov.in
7. https://www.iricen.gov.in
8. https://www.icao.int
9. https://www.faa.gov/

The break-up of CIE: Internal Tests + Assignments + Quizzes

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2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

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DEPARTMENT OF CIVIL ENGINEERING
HYDRAULICS STRUCTURES

SYLLABUSFORB.E.VIII-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks :60	Course Code:U23PE863CE
Credits:3	CIE Marks: 40	Duration of SEE:3Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
Objectives of the course are to introduce	Upon the completion of this course students will be expected to
1. To describe the various aspects of reservoirs, types and functions of spillway and energy dissipators. 2. Study construction and design aspects of gravity dams 3. Study construction and design aspects of earth dams. 4. Learn Cross drainage work and its design 5. Estimate hydro power potential	1. Explain the components, causes of failure and theories behind it. 2. Express canal regulation works, canal falls, cross drainage works and outlets. 3. Describe the types and function of spill way and energy dissipators 4. Explain cross drainage works 5. Evaluate the factors leading to the assessment of water power potential land layout of a hydel plant.

UNIT-I: Spill Ways & Energy Dissipation: Types of spill ways, ogee spill way, design of ogee profile, description of way & chute spill way. Energy dissipators, hydraulic jump & bucket type dissipators, tail water rating curve & jump height curve.

UNIT-II: Gravity dam -advantages & disadvantages, selection criteria, economical height of the dam, forces acting on dam, stability analysis, elementary profile and practical profile, low and high gravity dams.

UNIT-III: Earth dams: Types, Methods of construction, Seepage analysis for homogenous and zoned embankment dams, Drainage in embankment dams, various types of filters, Failure of Earth dams & Design criteria. Design

to suit available materials and foundation conditions, seepage control measures.

UNIT-IV: Cross Drainage Works: Types- selection of suitable type of CD works- aqueduct and Syphon Aqueduct- determination of maximum flood discharge and waterway for drain, fluming of canal- uplift pressure on underside of barrel roof and at the floor of the culvert.

UNIT-V: Hydro Power Engineering: Demand and generation, different heads, load factor, capacity factor and utilization factor, Assessment of water power potential, primary and secondary power, components and types of Hydel plants, Pen stocks & Surge Tanks, Power house layout, components and their functions.

Learning Resources:

1. Modi, Irrigation & Water Resources and Water Power, Standard Publishers, New Delhi, 11th Edition, 2020.
2. S.K.Garg, Irrigation Engineering &Hydraulic Structures,KhannaPublishers, Revised Edition 2019
3. B.C.Punmiya&B.B.Lal,Irrigation&WaterPowerEngineering,LaxmiPublishers, 2020.
4. Ralph W.Warbs and W.P.James, Water Resources Engineering, Prentice Hall, New Delhi, First edition, Reprint 2020.

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Duration of each Internal Test : 90 Minutes

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DEPARTMENT OF CIVIL ENGINEERING
SOFT COMPUTING IN CIVIL ENGINEERING
SYLLABUSFORB.E.VIII-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks :60	Course Code:U23PE864CE
Credits:3	CIE Marks: 40	Duration of SEE:3Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
Objectives of the course are to introduce	Upon the completion of this course students will be expected to
1. Learn various concepts of soft computing 2. Apply to techniques of soft computing to Civil Engineering	1. Learn about soft computing techniques and their applications. 2. Analyze various neural network architectures. 3. Define the fuzzy systems. 4. Understand fuzzy rules and propositions 5. Understand the genetic algorithm concepts and their applications.

UNIT-I: Introduction to Soft Computing - Artificial neural networks - biological neurons, Basic modelsof artificial neural networks – Connections, Learning,Activation Functions, McCulloch and Pitts Neuron, Hebbnetwork

UNIT-II: Perceptron networks – Learning rule – Training and testingalgorithm, Adaptive Linear Neuron, Back propagationNetwork – Architecture, Training algorithm. Applications of ANN in Civil Engineering.

UNIT-III: Fuzzy logic - fuzzy sets - properties - operations on fuzzysets, fuzzy relations - operations on fuzzy relations.Fuzzy membership functions, fuzzification, Methods of membership value assignments – intuition – inference –rank ordering, Defuzzificationmethods. Lambda –cuts for fuzzy sets,

UNIT-IV: Truth values and Tables in Fuzzy Logic, Fuzzy propositions,Formation of fuzzy rules - Decomposition of rules –Aggregation of rules, Fuzzy Inference Systems – Mamdaniand Sugeno types, Neuro-fuzzy hybrid systems –characteristics – classification. Applications of Fuzzy Logic in Civil Engineering.

UNIT-V: Introduction to genetic algorithm, operators in geneticalgorithm - coding - selection - cross over – mutation,stopping condition for genetic algorithm flow, Genetic neuro-hybrid systems, GeneticFuzzy rule-based system. Applications of Genetic Algorithms in Civil Engineering.

Learning Resources:

1. S.N.Sivanandam and S.N.Deepa, Principles of soft computing-Wiley ,Third Edition, 2011
2. Timothy J. Ross, Fuzzy Logic with engineering applications-4th edition, Wiley India, 2021.

The break-up of CIE: Internal Tests + Assignments + Quizzes

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2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of each Internal Test : 90 Minutes

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
PROJECT / INTERNSHIP

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):0 : 0 : 12	SEE Marks:50	Course Code: U23PW819CE
Credits : 6	CIE Marks:50	Duration of SEE: - -

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Solve a real life societal problem through research based approaches	1. Formulate an analytical model for a civil engineering problem and obtain its solution with necessary tools. 2. Design a civil engineering structure with due consideration for public health and safety. 3. Perform and manage as an individual or as a member of a team with ethical values. 4. Examine the concepts of environment and sustainability 5. Write effective reports and communicate effectively on civil engineering problems. 6. Present the conclusions in a way to benefit the society.

Instructions to Students: Solving a real life problem should be the focus of under graduate projects. Faculty members should prepare project briefs (giving scope and references) well in advance which should be made available to the students at the departmental library. The project may be classified as hardware / software / modeling / simulation. It may comprise any elements such as analysis, design, synthesis.

The department will appoint a project coordinator who will coordinate the following.

1. Grouping of students (a maximum of 3 in a group)

2. Allotment of projects and project guides
3. Project monitoring at regular intervals.

All projects allotments are to be completed by the 4th week of VII semester, so that students get sufficient time for completion of the project. All projects will be monitored at least twice in a semester through students' presentation. Sessional marks should be based on the grades / marks, awarded by a monitoring committee of faculty members and also marks given by the supervisor.

Efforts be made that some of the projects are carried out in industries with the help of industry coordinators. Problems can also be invited from the industries to be worked out through undergraduate projects.