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 2024–2025
(For the students admitted in 2021-22)

DEPARTMENT OF CIVIL ENGINEERING
+91-40-23146010, 23146011
Fax: +91-40-23146090
Website: www.vce.ac.in

DEPARTMENT MISSION

"To strive for excellence in order to make the students better citizens with technical knowledge and social 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-21)
BE (CIVIL ENGINEERING) VII-SEMESTER ACADEMIC YEAR 2024 - 2025
(Students Admitted in 2021-22

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								
U21PC710CE	Finite Element Method	3	-	-	3	60	40	3
U21PC720CE	Estimation & Specifications	2	1	-	3	60	40	3
U21PC730CE	Water Resources Engineering	3	-	-	3	60	40	3
U21PC740CE	Foundation Engineering	3	-	-	3	60	40	3
U21PE7XXCE	Professional Elective – I	3	-	-	3	60	40	3
U21PE7XXCE	Professional Elective – II	3	-	-	3	60	40	3
PRACTICALS								
U21PC711CE	Finite Element Method Lab	-	-	2	3	50	30	1
U21PE71XCE	Professional Elective-I Lab	-	-	2	-	50	30	1
U21PE71XCE	Professional Elective-II Lab	-	-	2	-	50	30	1
U21PW712CE	Project Seminar	-	-	2	-	-	30	1
Total		**17**	**1**	**8**		**510**	**360**	**22**
Grand Total		**26**				**870**		
Note: The left over hours are to be allotted to Sports / Library / Mentor Interaction based on the requirement.								

PROFESSIONAL ELECTIVE – I		
1	U21PE710CE	Applications of Artificial Intelligence and Machine Learning in Civil Engineering
2	U21PE720CE	Geoinformatics
PROFESSIONAL ELECTIVE – II		
1	U21PE730CE	Traffic Engineering
2	U21PE740CE	Design of Concrete Structures

PROFESSIONAL ELECTIVE – I Lab		
1	U21PE711CE	Applications of Artificial Intelligence and Machine Learning in Civil Engineering Lab
2	U21PE721CE	Geographical Information Systems Lab
PROFESSIONAL ELECTIVE – II Lab		
1	U21PE731CE	Traffic Engineering Lab
2	U21PE741CE	Design of Concrete Structures 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: U21PC710CE
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 to the finite element method: 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: Stiffness matrix for 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. Plane stress and plane strain problems.

UNIT-III: Formulation of finite element method using principle of virtual displacement. 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.

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

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):3 : 0 : 0	SEE Marks:60	Course Code: U21PC720CE
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.

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

UNIT – III: 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 and all items of work for bituminous and concrete road works. Introduction to SSR, CPWD, MES.

UNIT – IV: Specifications: Necessity, Types of Specifications -General and detailed specification of works, Measurement Book and muster roll. Introduction to B_EST software.
Valuation – Purpose, Concept of time – value of money, Sinking fund, Capitalized value, Depreciation.

UNIT – V: 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), UBS Publishers' Distributors Pvt Ltd., 2020.
2. Chakra borty M. Estimating, Costing, Specification & Valuation In Civil Engineering , (Published by Author), 2006.
3. Upadhyay A.K. Civil Estimating & Costing: Including Quality Surveying, Tendering and Valuation, S K Kataria and Sons, 2013.
4. Patil, B.S. Civil Engineering Contracts and Estimation, Orient Black Swan, 2015.
5. Leonard Holm, John E. Schaufelberger, Dennis Griffin, Thomas Cole Construction Cost Estimating: Process and Practices, Pearson Education, 2017.

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

WATER RESOURCE ENGINEERING

SYLLABUS FOR B.E.VII-SEMESTER

L:T:P(Hrs./week):2:0:0	SEE Marks:60	Course Code: U21PC730CE
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. Compute rainfall, runoff and estimate floods in a catchment area 2. Understand different terms related to Irrigation and theories on canal design. 3. To explain the different components of Diversion head works, theories explaining the causes of failures. 4. To describe the various aspects of reservoirs, types and functions of spillway and energy dissipators. 5. Study construction and design aspects of gravity dams and earth dams.	1. Estimate floods, rain fall and runoff using different methods for peak flow estimation and plotting hydrograph 2. Understand the concepts of irrigation engineering 3. Explain Bligh's theory and Khosla's theory for diversion head work. 4. Estimate the capacity of reservoir incorporating sedimentation for computing life of reservoir and describe the types and functions of spill way and energy dissipators. 5. Understand the criteria for design and construction of gravity dams and earth dams.

UNIT-I:Precipitation: Hydrologic cycle, measurement of rain fall, estimation of mean rain fall over a catchment, infiltration, evaporation, runoff, factors affecting runoff, peak flow estimation, Unit Hydrograph, S- Hydrograph.

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 lacy's theories, design of lined and unlined canals.

UNIT-III: Diversion head works: Components, causes of failures, difference between weir and barrage, Bligh's creep theory, Khosla's theory.

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: 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 dam, 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” McGraw Hill Education, 2017
2. V T Chow, “Applied Hydrology”, McGraw Hill Education, 2017
3. Garg S.K., “Water Resources Engineering Irrigation Engineering & Hydralic Structures Vol II”, Khanna Publishers, 2019.
4. Dandekar & Sarma, Water Power Engineering, Vikas Publishers, 2009
5. H.M. Raghunath, “Irrigation Engineering” Wiley India, 2011
6. 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 Internal Tests		:	90 Minutes			

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

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: U21PC740CE
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 lateral earth pressure and stability of slopes. 2. Design of a sheet pile 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. Evaluate lateral earth pressure using Rankine's theory and assess stability slopes in soils under given field conditions. 2. Design sheet piles under cantilevered and anchored actions using analytical approach. 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: 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 Gravity retaining walls- checking for safety against external stability conditions.

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 and Taylor's stability number.

UNIT-II: **Sheet Piles**: Sheet pile structures, cantilever sheet pile in cohesive and cohesionless soils, types of anchors, Anchored sheet pile-Depth of embedment in cohesive and cohesionless soils -free earth support.
Braced excavation: Fundamental pressure distribution diagrams.

UNIT-III: Site investigation: Need for investigation. Designing an investigation. Advances in Drilling technologies, samplers and sampling techniques. In-situ testing-Penetration tests- Ground water observations, PMT, introduction to Geophysical exploration. Presenting results of site investigation. Introduction to resilient modulus.

UNIT-IV:Bearing Capacity of soils: Terzaghi's equation for bearing capacity in soils–it's modification for continuous, square, rectangular and circular footings, general and local shear failure conditions-Allowable bearing pressure-IS code method of calculating bearing capacity, Plate load test. Introduction to combined and mat footings

UNIT-V: Pile Foundations:. Classification of piles. Pile capacity–static formulae, dynamic formulae, pile load test, determination of point resistance and skin friction as per IS code. Bearing capacity of pile groups, negative skin friction.Introduction to the design of piers. Introduction to well foundations - types of well foundations

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 ramaiah C.,"Geo-technical Engineering",New Age Publishers, 6th Edition, 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. Shenbaga Kaniraj,"Design Aids 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

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING APPLICATIONS IN CIVIL ENGINEERING

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U21PE710CE
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 & ML: Overview of Artificial Intelligence(AI), History of AI, State of the Art, Benefits of AI, Introduction to Machine Learning, Introduction to Neural Networks, Neural Net Architectures, Uses of Neural Networks, Evaluation of Networks.

UNIT-II: Supervised Learning: Liner Regression – Mathematical formulation, Overfitting and Cross-Validation, Classification – Generative classifiers, Formulation, Regression versus Classification.

UNIT-III: Unsupervised Learning: Clustering, K-Means, hierarchical, partition based clustering, overlapping clustering.

UNIT-IV: Reinforcement Learning: Learning from rewards, Passive reinforcement learning, active reinforcement learning, and generalization in reinforcement learning.

UNIT-V: Applications to Civil Engineering Problems: Classification of soil, Hot extrusion of steel, Design of trusses, Design of three link bar mechanism, Design of journal bearing, Prediction of Compressive strength of concrete cubes, Classification of pavement surface distress, Optimal calibration of water distribution system.

Learning Resources:

1. Kishan Mehrotra, C.K. Mohan & R. Sanjay "Artificial Neural Networks", Penram International Pub (India) Pvt. Ltd, 2010.
2. S.N.Sivanandam & S.N.Deepa "Principles of Soft Computing" wiley India edition, 2008.
3. Kevin P Murphy "Machine Learning – A Probabilistic Perspective" MIT Press, 2012.
4. Stephen Marsland "Machine Learning", CRC Press, 2015.
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

GEOINFORMATICS

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U21PE720CE
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 provide fundamental knowledge on geo spatial technologies such as GIS, remote sensing, photogrammetry, and GPS	1. Define common coordinate systems and projections in a map and types of data in GIS 2. Explain the theoretical and practical considerations required for preparing a GIS-database 3. prepare, manipulate, display and analyse spatial data, synthesise and present high quality GIS-based outputs in a report format 4. Apply the principles and techniques of remote sensing and photogrammetry in preparation of map 5. Describe the fundamental theory and concepts of the Global Positioning System

UNIT-I: Introduction and scope of Geoinformatics, Branches of Geoinformatics, Geoinformatics technologies and Applications
Cartography: Map, definitions, representations-Point, line, polygon, Geographic coordinate system, Map projections, Map Analysis.
Geographic Information System (GIS) Data: Data types – spatial, non-spatial (attribute data)

UNIT-II: GIS: Data structure, data format – point, line, Polygon, vector – Raster, Advantages and Disadvantages

Data Input: Keyboard entry, Manual Digitizing, Scanner, Remotely sensed data, Existing Digital data Cartographic database, Digital elevation data
Data Base Management Systems: Functions & components, storage of GIS data
Data Editing: Detection and correction of errors, data reduction, edge matching

UNIT-III: Data Analysis and Modelling: Spatial analysis, Vector data analysis, Raster data analysis – Modelling in GIS – Digital elevation model Modelling networks
Presentation of Geo-data and Analysis: Types of output data – Types of errors elimination and accuracies – sampling – Components of data quality
Applications of Geographic Information System (GIS): Soil and water resources, Agriculture, Land use planning, geology and Municipal applications.

UNIT-IV: Remote Sensing: Overview, sensors and Platforms, interpretation elements; Geometric and radiometric distortions, Geo-referencing, re-sampling methods; Atmospheric errors and removal; Lidar - principles and properties, different Lidar systems, applications.
Photogrammetry: metric and non-metric cameras; Geometry of near vertical and tilted photographs, heights and tilt distortions; Rectification and ortho-photographs; Stereoscopy; Orientation interior, exterior, relative, and absolute.

UNIT V: Global Positioning System (GPS): Overview-signal structure and code modulation Pseudo-range measurements; Accuracy of navigation position: UERE and DOP. Intentional degradation of GPS signals: Selective availability (SA) and Anti-spoofing (AS), Point positioning, Differential Positioning and Relative positioning; Space based augmentation systems and Ground based augmentation systems

Learning Resources:

1. Kang-Tsung Chang, Introduction to GIS, Tata McGraw Hill Edition, 2019.
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, 2017
4. John A. Richards, Remote sensing Digital Image Analysis, 2013
5. T. Schenk, Introduction to photogrammetry, 2005
6. Leick, A., GPS Satellite Survey, John Wiley: NJ, 2015
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 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

TRAFFIC ENGINEERING

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U21PE730CE
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, 2013, Fifth Edition.
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, 2015, 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, 1997

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. VI-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U21PE740CE
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 retaining walls 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

FINITE ELEMENT METHOD LAB

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0:0 : 2	SEE Marks:50	Course Code: U21PC711CE
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 following problems are solved using any Finite Element software:

1. Stepped bars
2. Plane trusses
3. Beams with 2 degrees of freedom at each node
4. Plane frames
5. 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. 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. Problems of axisymmetric domain using
    a) 3-node triangular axisymmetric elements
    b) 6-node triangular axisymmetric elements
    c) 8-node quadrilateral axisymmetric elements
8. Solid beam using 8-node hexahedral (brick) elements

Learning Resources:

1. ABAQUS Learning Edition (2022),Dassault Systèmes

   https://edu.3ds.com/en/software/abaqus-learning-edition

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 & MACHINE LEARNING APPLICATIONS IN CIVIL ENGINEERING LAB

SYLLABUS FOR B.E. VII- SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks: 50	Course Code: U21PE711CE
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 Experiments:

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. Using curve fitting App.
7. Using Regression App.
8. Using Classifier App
9. Using Clustering App.
10. Predicting Compressive Strength of concrete.

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

GEOGRAPHICAL INFORMATION SYSTEM LAB

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0 : 0 : 2	SEE Marks:50	Course Code: U21PE721CE
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. To introduce the platforms of GIS related softwares inorder to apply the knowledge in GIS based projects	1. Generate a GIS base map with data obtained from surveys, scanned map, satellite images, CAD 2. Create thematic maps for various applications in civil engineering 3. Perform spatial analysis with GIS tools List of experiments:

List of experiments:

1. Introduction to ARCGIS – ARCMAP Data view, Table of contents, toolbars, Adding data, Creation of feature classes, importing data from CAD
2. Rectification of satellite images/scanned map
3. Database creation and digitization of spatial datasets and projections.
4. Attribute data integration to the vector data – Creation of tables, fields.
5. Map layout generation with legend, scale, north arrow and grids.
6. Use of spatial analysis tools, querying, joining data.
7. Use of editing tools, buffer and overlay analysis
8. Creation of thematic maps
9. Introduction to QGIS
10. Practice exercises through case studies.

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

TRAFFIC ENGINEERING LAB

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0:0 : 2	SEE Marks:50	Course Code: U21PE731CE
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. Analyzing 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. Analyze 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 behavior in conducting the experiments and presenting the results effectively

List of Experiments:

1. Traffic signal Design at Intersections
2. Intersection-Delay studies
3. Parking demand studies
4. Gap Acceptance studies
5. Headway-studies
6. Pedestrian Survey
7. Road safety audit
8. Creation of basic Data and traffic Network for simulation
9. Connecting Links, assigning routes with relative ratio for the given Data.
10. Simulation and Analysis of output

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: U21PE741CE
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 combinted 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 canteliver 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. Understanging RCC deck slab design and T beam brige (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. Foudnation 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 flexble 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 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: U21PW712CE
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.
6.

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.

Seminar schedule will be prepared by the co-ordinator for all the students from 5th week to the last week of the semester which should be strictly adhered to.

Each student will be required to:

1. Submit a one-page synopsis before the seminar for display on notice board.
2. Give a 20 minutes presentation followed by 10 minutes discussion.
3. Submit a technical write-up on the talk.

At least two teachers will be associated with the Project Seminar to evaluate students for the award of sessional marks which will be on the basis of performance in all the 3 items stated above

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATION (R-21)
BE (CIVIL ENGINEERING) VIII-SEMESTER ACADEMIC YEAR 2024 - 2025
(Students Admitted in 2021-22)

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								
U21PE8XXCE	Professional Elective – III	3	-	-	3	60	40	3
U21PE8XXCE	Professional Elective - IV	3	-	-	3	60	40	3
PRACTICALS								
U21PW819CE	Project / Internship	-	-	12	Viva-Voce	50	50	6
Total		**6**		**12**		**170**	**130**	**12**
Grand Total		**18**				**300**		

Note: The left over hours are to be allotted to Sports / Library / Mentor Interaction based on the requirement.

PROFESSIONAL ELECTIVE – III		
1	U21PE851CE	Advanced Structural Analysis
2	U21PE852CE	Advanced Transportation Engineering
3	U21PE853CE	Ground Water Hydrology
4	U21PE854CE	Ground Improvement Techniques
PROFESSIONAL ELECTIVE – IV		
1	U21PE861CE	Pre-Stressed Concrete
2	U21PE862CE	Railway and Airport Engineering
3	U21PE863CE	Hydraulic Structures
4	U21PE864CE	Soft Computing in Civil Engineering

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

DEPARTMENT OF CIVIL ENGINEERING

ADVANCED STRUCTURAL ANALYSIS

SYLLABUS FOR B.E. VIII SEMESTER

L : T : P (Hrs./week):3:0 : 0	SEE Marks:60	Course Code: U21PE851CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Explain the use of influence line diagrams in the analysis of simply supported beams and trusses subjected to moving loads. 2. Analyze beams and frames using flexibility method and stiffness method, and to develop element stiffness matrices and assembly of global stiffness matrices.	1. Perform analysis of simply supported beam subjected to moving loads using influence line diagrams 2. Compute forces in the members of the trusses subjected dead load & live load using influence line diagrams 3. Apply flexibility method for analysis of beams and frames with degree of indeterminacy not exceeding three 4. Explain the principles of analysis of structures subjected to external forces using stiffness method. 5. Analyse the structures subjected to external loads by developing element stiffness matrices, assembly of global stiffness matrices and load matrices.

UNIT-I: Moving loads and influence line diagrams: Influence lines for reaction, bending moment and shear force. Determination of maximum bending moment and shear force for moving load systems on simply supported girders, Curves of maximum bending moment and shear force for simply supported girders traversed, by (i) single point load, (ii) two point loads, (iii) uniformly distributed load longer than span, and (iv) uniformly distributed load shorter than span, enveloping parabola and EUDLL.

UNIT-II: Moving loads on trusses and arches: Influence lines for forces in members of statically determinate trusses under moving loads (warren truss and Pratt truss). Influence line diagrams for three hinged parabolic arches.

UNIT-III: Flexibility & Stiffness Methods of Analysis: Analysis of continuous beams, pin jointed plane trusses, rigid jointed plane frames with static indeterminacy not exceeding three with flexibility method. Introduction to stiffness method

UNIT-IV: Direct Stiffness Method - I: Development of element stiffness matrices for bar and truss elements Transformation matrices, assembly of global stiffness matrices and load matrices. Finding displacements and member end action matrices. Initial stresses and strains.

UNIT-V: Direct Stiffness Method-II: Development of element stiffness matrices for beam and plane frame elements. Transformation matrices, assembly of global stiffness matrices and load matrices. Finding displacements and member end action matrices.

Learning Resources:

1. Vazirani V.N., Ratwani M. M, Duggal S.K.,"Analysis of Structures-Vol.IITheory,Design and Details of Structures",Khanna Publishers,16th Edition, 2015.
2. Thandava moorthy T.S.,"Structural Analysis",Oxford Higher Education, Second Edition,2012.
3. Weaverand Gere,"Matrix Analysis of Framed Structures", CBS Publisher,2nd edition, 2004
4. Ramamrutham S.,Narayan R.,"Theory of Structures",Dhan path Rai publications, 9th edition,2017
5. DevdasMenon,"StructuralAnalysis",2st Edition,Naros a Book Distributors Pvt Ltd,2018.
6. ReddyC.S.,"Basic Structural Analysis",3rd Edition, Mc Graw Hill, 2010.
7. Junarkar S.B.,Shah,"Mechanics of Structures",Volume II,CharotarPub. House, 24th edition, 2015.
8. Chu-Kia Wang,"Intermediate Structural Analysis (English) 1st Edition", Mc Graw Hill Education, 2010.
9. HibbelerR.C., "Structural Analysis",10/E,PrenticeHall,HigherEducation, 2018.
10. Louis F.Geschwindner,Harry H.West,"Fundamentals of Structural Analysis", 2ndEdition,WileyIndia Pvt.Ltd.,2011.

11. Stephen P. Timoshenko and Donovan H. Young “Theory of Structures” McGraw Hill International Edition, 1968
12. http://nptel.ac.in/courses/105101086/

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

ADVANCED TRANSPORTATION ENGINEERING

SYLLABUS FOR B.E. VIII SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U21PE852CE
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. Impart knowledge on advanced transportation concepts in the field of urban transportation planning, ITS, pavement management, economic analysis and transportation system management.	1. Propose right TSM strategy for solving traffic problems. 2. Know the concepts of ITS. 3. Estimate urban travel demand. 4. Evaluate the pavement with respect to structure, function and safety. 5. Perform economic analysis using highway economic evaluation methods and check the feasibility of highway projects.

UNIT-I: Transportation System Management: TSM actions – Objectives and Philosophy; Relevance of TSM actions to Indian Urban Context, TSM actions – Measures to improve vehicular flow, preferential treatment of High occupancy vehicles, Reduced Peak period travel, Promotion of High occupancy and Non vehicular travel modes, Parking management, Transit and para transit service improvements, Transit management efficiency measures.

UNIT-II: Introduction to Intelligent Transportation Systems (ITS): Definition of ITS and Identification of ITS 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. ITS functional areas – Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control Systems (AVCS), Advanced Public Transportation Systems (APTS), Advanced Rural Transportation Systems (ARTS)

UNIT-III: Urban Transportation Planning: Introduction to travel demand estimation , Study area delineation, zoning, Planning surveys, OD matrix generation, Four stage travel demand modelling – Trip generation, trip distribution, modal split, trip assignment and their methods.

UNIT-IV: Pavement Management Systems: Introduction to PMS, Components of PMS, Introduction to project level and network level management systems, Importance of pavement evaluation in PMS, Functional condition evaluation techniques, Structural condition evaluation techniques – BBD and FWD, Safety evaluation

UNIT-V: Highway Economic Evaluation: Economic Analysis; Basic Concepts of Economic Analysis, Principles of Economic Analysis; Cash flow diagrams; Time value of Money; Development of cash flow Diagrams; Methods of Economic Evaluation - Equivalent Uniform Annual Cost Method; Present worth of cost method; Equivalent uniform annual net return method; Net present value method; Benefit cost ratio method. Applications of these methods to highway projects.

Learning Resources:

1. Traffic Engineering and Transport Planning - Kadiyali L.R., Khanna Publishers, 2024
2. Hass, R. and Hudson, W. R., Pavement Asset Management, McGraw Hill Company, Inc, 2015
3. ITS Hand Book 2000: Recommendations for World Road Association (PIARC) by Kan Paul Chen, John Miles.
4. Transportation System management Notes: S.R.Chari, REC Warangal.
5. ITS by Dr. R. Srinivasa Kumar, Publishing, 2022, Universities Press
6. Pavement Evaluation by (Maintenance and Management System) by Dr. R. Srinivas Kumar 2022, University Press

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

GROUNDWATER HYDROLOGY

SYLLABUS FOR B.E. VI-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U21PE853CE
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 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 groundwater 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 and shafts, Recharge through well, Induced recharge. 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, Contaminatnt Transports processes – Disperson, diffusion, advection, Fick's Law, Hydrologic balance equation. Groundwater analog models-sand models, electric analog models, viscous flow models.

Learning Resources:

1. Todd D.K., Groundwater Hydrology, John Wiley & Sons, Inc., 2011.
2. Ragunath H.M., Groundwater, Wiley Eastern Limited, 2006.
3. Karnath K.P., Groundwater Ananment, Development and Management, Tata McGraw Hill Publishing Company, 2017.
4. Bouwer, Groundwater Hydrology, McGraw Hill, 1979.
5. MIT Open Course Ware: *Groundwater Hydrology*, https://ocw.mit.edu/courses/1-72-groundwater-hydrology-fall-2005/
6. 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 Internal Tests	:	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: U21PE854CE
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- External and Internal stability conditions.

Learning Resources:

1. Hausmann R., “Engineering principles of Ground Modification”, McGraw Hill Publishing Co, 1990.
2. Purushothama Raj P. , Ground Improvement Techniques, Laxmi Publications, 2016
3. Moseley, M.P., “Ground Improvement”, Blackie, Academic & professional, 2004
4. Fang-Hsai – Yang, “Foundation Engineering Hand Book”, CBS Publication, New Delhi, 1990.
5. M C. R. Davies, F.Schlosser Ground improvement geosystems.
6. Koerner, R. M., Designing with geosynthetics, Prentice Hall Inc. 2012.

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

PRE-STRESSED CONCRETE

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U21PE861CE
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.
Continuous Beams: Advantages of continuous members – codal provisions – analysis of two span continuous beams – concordant cable profiles.

Learning Resources:

1. Krishna Raju N., Prestressed Concrete, Tata McGraw Hill, 2001.
2. Pandit G.S. and Gupta S.P., Prestressed Concrete, CBS Publications, 2008.
3. Dayaratnam, Prestressed Concrete, Oxford & IBH Publications, 2017
4. Lin TY. And Bushy, Design of Pre stressed concrete Structures, Wiley India, Pvt, Ltd, 2010
5. IS 1343-2012, Code of Practice for Prestressed concrete, B.I.S Publications.

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

RAILWAY AND AIRPORT ENGINEERING

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U21PE862CE
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, 2015.
2. Satish Chandra and Agarwal M. M., "Railway Engineering", Oxford Publishers, 2013.
3. Khanna. S.K., Arora, M.G. and Jain. S.S., "Airport Planning and Design" Nem Chand & Bros, Roorkee, India, 2012.
4. Mundrey J. S., "Railway Track Engineering", Tata McGraw Hill, 2009.
5. Rangwala, "Railway Engineering" Charotar Publishers, 2017.
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

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

HYDRAULICS STRUCTURES

SYLLABUSFORB.E.VIII-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks :60	Course Code: U21PE863CE
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: Water 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.
2. S.K.Garg, Irrigation Engineering & Hydralic Structures,KhannaPublishers
3. B.C.Punmiya&B.B.Lal,Irrigation&WaterPowerEngineering,LaxmiPublishers.
4. Ralph W.Warbs and W.P.James, Water Resources Engineering, Prentice Hall, New Delhi.
5. K.R. Arora, "Irrigaton, Water Power and Water Resources Engineering", 3rd Edition, Standard Publishers distribtutors, 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			

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

DEPARTMENT OF CIVIL ENGINEERING

SOFT COMPUTING IN CIVIL ENGINEERING

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):4:0 : 0	SEE Marks:60	Course Code: U21PE864CE
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. 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, Lambda –cuts for fuzzy sets, Defuzzificationmethods.

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, Genetic-Fuzzy 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-Wiley India.

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

Project / Internship

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):0 : 0 : 12	SEE Marks:50	Course Code: U21PW819CE
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.