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 2023–2024
(For the students admitted in 2020-21)

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-20)
BE (CIVIL ENGINEERING) VII-SEMESTER ACADEMIC YEAR 2023 - 2024
(Students Admitted in 2020-21)

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								
U20HS040EH	Economics & Finance for Engineers	2	-	-	3	60	40	2
U20PC710CE	Finite Element Method	2	-	-	3	60	40	2
U20PC720CE	Estimation & Specifications	2	-	-	3	60	40	2
U20PC730CE	Water Resources Engineering	2	-	-	3	60	40	2
U20PE7XXCE	Professional Elective – II	3	-	-	3	60	40	3
U20PE7XXCE	Professional Elective – III	3	-	-	3	60	40	3
U20PE7XXCE	Professional Elective – IV	3	-	-	3	60	40	3
PRACTICALS								
U20PC711CE	Geographical Information Systems lab	-	-	2	3	50	30	1
U20PC712CE	Finite Element Method Lab	-	-	2	3	50	30	1
U20PW719CE	Project Seminar	-	-	2	-	-	30	1
	Online Certificate Course	-	-	-	-	-	-	2
Total		**17**	**-**	**6**		**520**	**370**	**22**
Grand Total		**23**				**890**		

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

PROFESSIONAL ELECTIVE – II		
1	U20PE721CE	Elements of Earthquake Engineering
2	U20PE722CE	Foundation Engineering
3	U20PE723CE	Solid & Hazardous Waste Management
4	U20PE724CE	Sustainable Materials & Construction
PROFESSIONAL ELECTIVE – III		
1	U20PE731CE	Advanced Design of Steel Structures
2	U20PE732CE	Transportation Infrastructure Planning & Management
3	U20PE733CE	Environmental Impact Assessment
4	U20PE734CE	Geoinformatics
PROFESSIONAL ELECTIVE – IV		
1	U20PE741CE	Pre-Stressed Concrete and Pre-Building Structures
2	U20PE742CE	Railway & Airport Engineering
3	U20PE743CE	Advanced Environmental Engineering
4	U20PE744CE	Applications of Artificial Intelligence and Machine Learning in Civil Engineering

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

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ECONOMICS AND FINANCE FOR ENGINEERS

SYLLABUSFORB.E.VII-SEMESTER

L:T:P(Hrs./week):2:0:0	SEEMarks:60	Course Code: U20HS040EH
Credits:2	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. The course will enable the learners to: Understand the concepts and tools of economics, cost and finance that will equip them for decision making.	1. Gain a conceptual understanding economics as a discipline. 2. Construct a cost sheet and classify costs and make use of break-even analysis in decision making. 3. Evaluate the accounting cycle and explain its importance in recording business transactions 4. Interpret the ratios and dissect comparative and common size statements 5. Compare the sources of finance and evaluate them

UNIT-I: Concepts in Economics: Scarcity of Resources-Relevance of Economics for Engineers- Scope of Managerial Economics Law of Demand-assumptions and exceptions -Price elasticity of demand(Application-oriented approach)

UNIT-II: **Cost Analysis and Profit Planning:** Concept of Cost -Costing – Classification of Costs –Preparation of Cost Sheet (Simple Problems)-Breakeven Analysis(Application-oriented approach)

UNIT-III: **Conceptual Understanding of Accounting:** Accounting Cycle-Journal-Subsidiary Books- Ledger-Trial Balance-Final Accounts (Manufacturing/Trading, Profit and Loss Account, Balance Sheet (Theory Only)

UNIT-IV: **Financial Statement Analysis:** Financial Statements- Meaning - Types –Purpose-Comparative and Common Size Statements
Ratio Analysis-Liquidity,Solvency, Activity & Profitability Ratios(including simple problems on Ratio Analysis)

UNIT-V:**Long Term Sources and Uses of Finance:** Long term sources of finance-Debt, Equity, Hybrid, Start- Up finances, Crowd Funding, Peer to Peer lending platforms.
Capital Budgeting –Traditional and DCF Techniques (including simple problems)

Learning Resources:

1. S.P.Jain and K.L Narang., "Financial Accounting", Kalyani Publishers – Latest edition.
2. S.P.Jain and K.LNarang., "Cost Accounting", Kalyani Publishers, Latest edition.
3. M.Y.Khan and P.K. Jain., "Financial Management – Text, Problems and Cases", Mc Graw Hill Education Private Limited, New Delhi.Latest edition
4. M. Kasi Reddy &Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, Latest edition.
5. Mehta P.L.,"Managerial Economics: Analysis,Problems and Cases", Sultan Chand and Sons. Latest edition.
6. Narayana swamy, "Financial Accounting: A Managerial Perspective", Prentice Hall India
7. M. L. Seth., "Micro Economics", Lakshmi Narain Agarwal. Latest edition
8. Dr. R.P. Rustagi., "Fundamentals of Financial Management"Taxmann Publications Latest edition

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

FINITE ELEMENT METHOD

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):2 : 0 : 0	SEE Marks:60	Course Code: U20PE710CE
Credits: 2	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. Zienkiewicz O.C., Taylor R.L. and Zhu J.Z., The Finite Element Method, (Its Basics and fundamentals) Vol. I, McGraw Hill, 2013.
2. Krishna Moorthy C.S., Finite Element Analysis, McGraw Hill, 2017.
3. Desai C.S. and Abel J.F., Introduction to the Finite Method, Van Nostrand, 2002
4. 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
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3	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

ESTIMATION AND SPECIFICATIONS

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):2 : 0 : 0	SEE Marks:60	Course Code: U20PC720CE
Credits : 2	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.

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Duration of Internal Tests : 90 Minutes

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DEPARTMENT OF CIVIL ENGINEERING
WATER RESOURCE ENGINEERING

SYLLABUSFORB.E.VII-SEMESTER

L:T:P(Hrs./week):2:0:0	SEEMarks:60	CourseCode:U20PC730CE
Credits:2	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. Compute rainfall, runoff and estimate floods in a catchmentarea 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 and variations.

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, types of outlets, flexibility, sensitivity and proportionality of 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. http://nptel.ac.in/courses/105104103/

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

ELEMENTS OF EARTHQUAKE ENGINEERING

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week) 3 : 0 : 0	SEE Marks:60	Course Code: U20PE721CE
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. Obtain the concepts of engineering seismology, related terms. 2. Study of different, dynamic system like single degree & multiple degrees of freedom. 3. Evaluate the Earthquake forces necessary for seismic resistant design. 4. Describe the various case studies of major earthquakes, damage patterns, principles of earthquake resistant design; Retrofitting strategies.	1. Understand the basics of Engineering seismology 2. Gain the knowledge on the concepts of theory of vibrations and response spectrum analysis 3. Follow the seismic design philosophy for the Earthquake forces on various buildings. 4. Estimate the seismic performance of building with respect to damage patterns 5. Understand the concepts of earthquake resistant design as per codal provisions and retrofitting strategies.

UNIT-I: Engineering Seismology: Causes of earthquakes – Seismic waves – Magnitudes, intensity and energy release – characteristics of strong earthquakes, ground motions, soils effects and liquefaction.

UNIT-II: Theory of Vibrations: Introduction, long and short period structure; single, two and multi-degree of freedom systems, damped and undamped variations, concepts of damped and undamped vibrations, response spectrum – Response spectrum analysis.

UNIT-III: Seismic Design Philosophy: Concept of Seismic resistant design, reduction factors – Over strength, Ductility and Redundancy – Determination of earthquake forces on structures. Seismic Design and detailing of Masonry, Reinforced Concrete, and Steel Buildings.

UNIT-IV: Seismic Performance of Buildings: Case Studies of few serious earthquakes in the country in the past, damages to buildings – Damage Patterns – Performance of Non-Engineered Buildings, Rural houses during the Earthquakes.

UNIT-V: Seismic Resistant Design: Basic Principles of Earthquake resistance. Concepts of earthquake resistant construction in rural areas.Base isolation and energy dissipation devices.Seismic retrofitting – Repair, rehabilitation and retrofitting, retrofitting strategies – Importance of reanalysis. Case studies

Learning Resources:

1. Chopra A.K., Dynamics of Structures, Theory and Applications to Earthquake Engineering, Pearson Education, 2007.
2. Pankaj Agarwal and Manish Shrikhande, Earthquake Resistant Design of Structures, Prentice Hall of India, 2006.
3. Kramer S.L., Geotechnical Earthquake Engineering, Pearson Education, 2004.
4. Mario Paz, International Handbook of Earthquake Engineering: Codes, Programs and Examples, Springer Verlag, 1995.
5. Prakash Rao D.S., Design Principles and Detailing of Concrete Structures, Tata McGraw-Hill Publishing Company, 1998.

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Duration of Internal Tests : 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: U20PE722CE
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", Wiley Eastern Limited, third edition, 2016.
2. Principles of Foundation Engineering by Braja M. Das -2017 edition
3. J. E. Bowels, "Foundation Analysis and Design", McGraw-Hill
4. Design of Foundation Systems: Principles and Practices by Nainan P. Kurian
5. Murthy V.N.S.,"A Text book of Soil Mechanics &Foundation Engineering",CBSPublishers, 2018.
6. Venkat ramaiahC.,"Geo-technical Engineering",New Age Publishers, fourth edition, 2017.
7. Foundation Engineering- P. C. Varghese– PHI Learning Pvt. Ltd.

8. Soil Mechanics in Engineering Practice By Karl Terzaghi, Ralph B. Peck, GholamrezaMesri
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
11. ShenbagaKaniraj,"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

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

Duration of Internal Tests : 90 Minutes

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

SOLID & HAZARDOUS WASTE MANAGEMENT

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20PE723CE
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. To make the students to understand solid waste, its collection, process and disposal	1. At the end of the course, the student will be able to understand solid waste, its collection, process disposal

UNIT-I: Solid Waste and their Handling: Definition of solid wastes – types of solid wastes – Sources - Industrial, mining, agricultural and domestic – Characteristics. Solid waste Characteristics – Proximate and Ultimate analysis. - Impact on environmental health- Elements of Solid Waste Management.

UNIT-II: Collection, Segregation and Transport Management of Municipal Solid Wastes: Handling and segregation, Collection and storage of municipal solid wastes; Analysis of Collection systems. Transfer stations – labeling and handling of hazardous wastes. Stationary container system, hanked container system-routing for collection of solid waste, Transfer stations.

UNIT-III: Solid waste processing technologies. Mechanical and thermal volume reduction. Biological and chemical techniques for energy and other resource recovery: composting - types, vermicomposting, termigradation, fermentation. Incineration of solid wastes. Design
principles.

UNIT-IV: Disposal in landfills: site selection, design, and operation of sanitary landfills; Leachate and landfill gas management; landfill closure and post-closure environmental monitoring; landfill remediation. Regulatory aspects of municipal solid waste management, Leachate management.

UNIT-V: Hazardous Waste and Management: Hazardous waste definition. Physical and biological routes of transport of hazardous substances – sources and characterization. Sampling and analysis of hazardous wastes –proximate analysis – survey analysis – directed analysis handling, collection, storage and transport. Hazardous waste treatment technologies TSDF concept - Physical, chemical and thermal treatment of hazardous waste: solidification, chemical fixation, encapsulation, pyrolysis and incineration. Hazardous waste landfills – Site selections, design and operation. HW reduction, recycling and reuse, Regulatory aspects of HWM/HWM rules- Bio Medical Waste Management. E Waste Management

Learning Resources:

1. Hazardous waste management Charles A. Wentz. Second edition 1995. McGraw Hill
   International.
2. Integrated solid waste management George Tchobanoglous, Hilary Theisen & Samuel A. Vigil.
3. Solid waste Engineering by William A. Worrel, and P. Aarne Vesilind Cengage Learning 2012.
4. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
5. Management of Solid waste in developing countries by Frank Flintoff, WHO regional
6. publications 1976.

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

SUSTAINABLE MATERIALS & CONSTRUCTION

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20PE724CE
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. expose to the concepts of sustainability in the context of building and conventional engineered building materials, such as Concrete, Bricks, and achieving the same through lower Carbon cements, Superior brick kilns and Recycled aggregate minimizing consumption of natural resources including water. VOC and indoor air quality 2. know the concepts of embodied, Operational and Life Cycle Energy, Minimizing Energy consumption by optimal design, use of BIPV	1. Know the background and understand the reasons for a more sustainable development of the built environment 2. identify alternative materials for civil engineering construction, recognizing their qualities and limits in lowering environmental impact 3. Understand a building life cycle and the environmental challenges related to materials' decay and required maintenance 4. Apply concepts of energy efficiency in optimizing the building performance 5. extend their conventional knowledge of construction with sustainable practices

UNIT-I: Embodied energy, Operational energy in Building and Life cycle energy. Ecological footprint, Bio-capacity and calculation of planet equivalent
Role of Material: Carbon from Cement, alternative cements and cementitious material, Alternative fuel for cements for reduction in carbon emission. Sustainability issues for concrete. Role of quality, minimization of natural resource utilization, High volume fly ash concrete, geo-polymer concrete.Concrete with alternative material for sustainability

UNIT-II: Reduction in water consumption in concrete, Recycled aggregate, Energy for grinding crushing of cement aggregate and reduction
Clay Bricks, Types kilns, Comparative energy performance emission performance andfinancial performance, Indoor air quality Paints,Adhesive and sealants for use in building,Volatile organic content (VOC) emissionissues and indoor air quality for Sustainability and Health hazard

UNIT-III: Operational energy reduction and net zero building, Optimization for design of building for energy efficiency
Use of Building Integrated Photo Voltaic (BIPV) and other renewable energy in buildings, basic concepts and efficiency
Energy codes ECBC requirement, Concepts of OTTV

UNIT-IV: Radiation budget, Surface water balance, Effects of trees and microclimatic modification through greening, Green Performance rating, requirements of LEED, GRIHA, IGBC

UNIT-V: Sustainable construction techniques, Design issues relating to sustainable development including site and ecology, community and culture, health, materials, energy, and water- Domestic and Community buildings using self-help techniques of construction; adaptation, repair and management-portable architecture. Types of foundations and construction methods; Basics of Formwork and Staging; Modular construction methods for repetitive works; Precast concrete construction methods

Learning Resources:

1. Sustainable Construction - Green Building Design and Delivery by Charles J. Kibert, John Wiley & Sons, 5th edition, 2021.
2. Sustainable Construction and Design by Regina Leffers, Prentice Hall, 2009.
3. Materials for Sustainable Sites: A Complete Guide to the Evaluation, Selection and Use of Sustainable Construction Materials by Meg Calkins 1 st Edition, 2009, John Wiley & Sons, Inc. Hoboken, NJ
4. NPTEL course on Sustainable materials and green buildings by B. Bhattacharjee, Professor, IIT Delhi - https://nptel.ac.in/courses/105/102/105102195/#

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

ADVANCED DESIGN OF STEEL STRUCTURES

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20PE731CE
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. Learn the design of plate girder for heavy loads and long spans. 2. Design gantry girder for industrial workshops 3. Design beam columns forindustrial buildings 4. Understand the use of Indian standard railway loadings and types of steel bridges for railways 5. Learn the design of deck type plate girder railway bridges for broad gauge railway loadings and end bearings	1. Design a welded plate girder by limit state method. 2. Design a gantry girder by limit state method. 3. Design a beam - column by limit statemethod. 4. Use the Indian standardrailway loadings and different types of steel bridges forrailways. 5. Design deck type riveted plate girder and bearings for steel Railway Bridges

UNIT-I: Design of Plate girders: (Limit state design**)** Design of welded plate girder for static loads as per IS:800-2007 – Economical Depth, Design of Cross Section, Flange curtailment, intermediate and bearing stiffeners, Design of connections. Sketch showing the details of longitudinal section and cross section.

UNIT-II: Design of Gantry girders: **(**Limit state design**)** Basic principles, Loads, Codal provisions, Design of Cross section and design of welded connection as per IS: 800-2007. Sketch showing general layout and cross section of gantry girder.

Design of Beam – Column: Introduction – general behavior of beam – column. Codal provision for local capacity check and overall buckling check – Design of beam -column.

UNIT-III: Design of Steel Railway Plate Girder Bridge: Types of steel bridges, Economical span. Indian standard railway broad gauge train loading – permissible stresses. Design of Deck type riveted plate girder railway bridges for broad gauge main line loading – Design of cross section, riveted connections, Intermediate and bearing stiffeners – Design of cross frame, Sketch showing the longitudinal section & cross section. Types of bearings for steel railway bridges.Design of rocker and roller bearings for steel railway bridges.

Learning Resources:

1. Duggal S.K "Limit State Design of Steel Structures" 3rd Edition McGraw Hill Education (India), 2019
2. Purnima B.C Ashok Kumar Join and Arun Kumar Join, "Comprehensive Design of Steel Structures" Laxmi publication Pvt. Ltd, 2015.
3. Ramchandra and Virendra Gehlot "Design of Steel Structures - II",Standard publishers distributors , 2010.
4. Bhavikatti S.S. "Limit State Design of Steel Structures", 5th Edition Dream Tech. Press 2019.
5. Arya A.S, Awadhesh Kumar and Ajmani J.L. " Design of Steel Structures" Nem Chand & Bros, 2014.
6. SubramanianN, "Designof SteelStructures (Limit State methods)", 2nd Edition OxfordUniversityPress,2018.
7. Gambhir M.L. "Fundamentals of structural Steel Design" Tata Mc.Graw Hill Education Pvt.Ltd., 2013
8. Shah V.L. And Veena Gore " Limit State Design of Steel Structures" Structures Publications, 2013
9. Suken Chaterjee, "The design of Modern Steel Bridges" , Wiley Black welll, 2003
10. IS: 800 – 2007: Code of Practice for General Construction in Steel, Bureau of Indian Standards, New Delhi.
11. IS: 875-1987: Code of Practice for Design loads for buildings and structures, Bureau of Indian Standards, New Delhi.
12. Bridge Rules – 1982, specifications for Indian Railway Loadings
13. ISI Handbook No. 1 Bureau of Indian Standards, New Delhi
14. IS: 1915 – 1961 – The Indian Standard Code of Practice for design of steel bridges Bureau of Indian Standards, New Delhi

15. Bhavikatti S.S. & Prasad K.V. “Steel Tables with Plastic Modules of I.S.Section” I.K International Publishing House Pvt. Ltd, 2016
16. http://nptel.ac.in/courses/105103094/
17. www.steel-insdag.org

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

TRANSPORTATION INFRASTRUCTURE PLANNING AND MANAGEMENT

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20PE732CE
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. Introduce students to the fundamentals of transportation planning and the types of skills and knowledge that transportation planners need 2. Familiarize students with contemporary transportation planning issues and methods of analysis	1. Identify urban transportation problems. 2. Estimate urban travel demand. 3. Plan urban transport networks. 4. Identify urban transport corridors. 5. Prepare urban transportation plans

UNIT– I: Introduction: Role of transportation in the economic development of nations, overview of transport modes, growth trends, National Transport Policy of India – Case studies, transportation planning in the developing world; and comparative international transportation policies; Fundamentals of transportation , Principles of planning, evaluation, selection, adoption, financing, and implementation of alternative urban transportation systems; formulation of community goals and Objectives, inventory of existing conditions; transportation modeling trip generation, distribution, modal choice, assignment

UNIT–II: Data Collection And Inventories: Collection of data – Organization of surveys and Analysis, Study Area, Zoning, Types and Sources of Data, Road Side Interviews, Home Interview Surveys, Commercial Vehicle Surveys, Sampling Techniques, Expansion Factors, Accuracy Checks, Use of Secondary Sources, Economic data – Income – Population – Employment – Vehicle Owner Ship.

UNIT–III: Travel Demand issues: Trends, Overall Planning process, Long term Vs Short term planning, Demand Function, Independent Variables, Travel Attributes, Assumptions in Demand Estimation, Detailed approach on 4 step travel demand estimation; Sequential, and Simultaneous Approaches, Aggregate and Disaggregate Techniques.

UNIT–IV:Demand and supply planning: Planning for sustainable urban mobility, positive and negative externalities in urban transport, congestion pricing, parking policy, demand management , Urban travel and transportation system characteristics – a systems perspective, Data management and use in decision making , Demand analysis , Urban activity analysis, Supply analysis; Plan Preparation And Evaluation: Travel Forecasts to Evaluate Alternative Improvements, Impacts of New Development on Transportation Facilities. Master plans, Selection of Corridor, Corridor Identification, Corridor deficiency Analysis.

UNIT–V: Metropolitan cities: Design issues in urban mobility, integrating land use and transport planning; , Overview of urbanization process, city structure and urban activity and infrastructure systems, Economic and social significance of urban infrastructure systems; Transport's Role in tackling Social Inclusion, Economic Impacts of Transport Policy

Learning Resources:

1. Bruton M.J, Introduction to Transportation Planning , Hutchinson of London Ltd,1992.
2. Hutchinson B.G, Introduction to Urban System Planning, McGraw Hill,1974.
3. Kadiyali L.R., Traffic Engineering and Transport Planning –Khanna Publishers,2011
4. John W. Dickey, Metropolitan transportation planning , Tata McGraw Hill, New Delhi, 1980

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

ENVIRONMENTAL IMPACT ASSESSMENT

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20PE733CE
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. Define and Classify Environmental Impacts and the terminology 2. Understands the environmental Impact assessment procedure 3. Explain the EIA methodology 4. List and describe environmental audits	1. Identify the environmental attributes to be considered for the EIA study 2. Formulate objectives of the EIA studies 3. Identify the methodology to prepare rapid EIA 4. Prepare EIA reports and environmental management plans

UNIT-I:Introduction: The Need for EIA, Indian Policies Requiring EIA, The EIA Cycle and Procedures, Screening, Scoping, Baseline Data, Impact Prediction, Assessment of Alternatives, Delineation of Mitigation Measure and EIA Report, Public Hearing, Decision Making, Monitoring the Clearance Conditions, Components of EIA, Roles in the EIA Process. Government of India Ministry of Environment and Forest Notification (2000), List of projects requiring Environmental clearance, Application form, Composition of Expert Committee, Ecological sensitive places, International agreements.

UNIT-II:EIA Methodologies: Environmental attributes-Criteria for the selection of EIA methodology, impact identification, impact measurement, impact interpretation & Evaluation, impact communication, Methods-Adhoc methods, Checklists methods, Matrices methods, Networks methods, Overlays methods. EIA review- Baseline Conditions -Construction Stage Impacts, post project impacts.

UNIT-III: Environmental Management Plan: EMP preparation, Monitoring Environmental Management Plan, Identification of Significant or Unacceptable Impacts Requiring Mitigation, Mitigation Plans and Relief & Rehabilitation, Stipulating the Conditions, Monitoring Methods, Pre-Appraisal and Appraisal.

UNIT-IV: Environmental Legislation and Life cycle Assessment: Environmental laws and protection acts, Constitutional provisions-powers and functions of Central and State government, The Environment (Protection) Act 1986, The Water Act 1974, The Air act 1981, Wild Life act 1972, Guidelines for control of noise, loss of biodiversity, solid and Hazardous waste management rules. Life cycle assessment: Life cycle analysis, Methodology, Management, Flow of materials-cost criteria case studies.

UNIT- V: Case Studies: Preparation of EIA for developmental projects-Factors to be considered in making assessment decisions, Water Resources Project, Pharmaceutical industry, thermal plant, Nuclear fuel complex, Highway project, Sewage treatment plant, Municipal Solid waste processing plant, Air ports.

Learning Resources:

1. Anjaneyulu. Y and Manickam. V., Environmental Impact Assessment Methodologies, B.S. Publications, Hyderabad, 2007
2. Barthwal, R. R., Environmental Impact Assessment, New Age International Publishers, 2002
3. Jain, R.K., Urban, L.V., Stracy, G.S., Environmental Impact Analysis, Van Nostrand Reinhold Co., New York, 1991.
4. Rau, J.G. and Wooten, D.C., Environmental Impact Assessment, McGraw Hill Pub. Co., New York, 1996.

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: U20PE734CE
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, 2017.
2. Anji Reddy M., Remote Sensing and Geographic Information System, 2012
3. John R Jensen, Ryan R Jensen, Introduction to Geographic Information System, 2013
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

PRE-STRESSED CONCRETE AND PRE-ENGINEERING BUILDING (PSC and PEB)

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20PE741CE
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. Principles of PSC design including the actual design of PSC members as per the codal provisions. 2. To know the behavior of PSC members in shear, and flexure. 3. Deflections on the PSC and Importance of the end block for PSC members. 4. Applications of PEB and Design Loads on Pre-Engineered Buildings 5. To impart knowledge about pre-engineered structures their analysis and design for different conditions	1. Knowledge about the deflection and shear behavior of PSC members is gained. 2. The students will be able to design of section for flexure and shear for PSC. 3. Knowledge about the pre-stressing deflections on the longer span and design of end block 4. Significance of PEB and manufacturing techniques 5. The learner will be able to understand and design various com

Unit-I: Introduction: Basic Concepts, materials, permissible stresses – systems of pre stressing, merits and demerits of PSC, Losses of prestress in pre-tensioned and post-tensioned members.

Unit-II: Analysis for the PSC sections: stress distribution across the depth of the PSC beam subjected to concentric and eccentric pre-stressing.

Design for flexure: Analysis and Design of PSC beams for flexure using elastic analysis of simple sections.

Unit-III: Deflections: Importance of deflections, factors influencing deflections, codal provisions, short terms and long-term deflections -Kern points, limiting points – load balancing method.

End Blocks: Nature of stresses, stress distribution– codal provisions

UNIT-IV: Pre-Engineered Buildings: Advantages of PEB - Applications of PEB – Materials used for manufacturing of PEB.

UNIT-V:

Design Loads on Pre-Engineered Buildings: Design of PEB frame under the influence of Dead, Live, Collateral, Wind, Seismic and Other applicable Loads. Serviceability Limits as per code.

Learning Resources:

1. Pillai and menon, Reinforced Concrete Design,Narosha publications,4th edition,2021
2. Krishna Raju N., Prestressed Concrete, Tata McGraw Hill, 2001.
3. Pandit G.S. and Gupta S.P., Prestressed Concrete, CBS Publications, 2008.
4. Dayaratnam, Prestressed Concrete, Oxford & IBH Publications, 2017
5. Lin TY. And Bushy, Design of Pre stressed concrete Structures, Wiley India, Pvt, Ltd, 2010
6. IS 1343-2012, Code of Practice for Prestressed concrete, B.I.S Publications.
7. Pre-Engineered Steel Building, K.S. Vivek and P.Vyshnavi, LAP Lamdert Academic Publishing.
8. Metal building systems: Design and Specifications, Third edition, Alexander Newman, McGraw- Hill Education.

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: U20PE742CE
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, adzing of sleepers, 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, Cant, safe speed on curves, Transition curves, widening of gauge on curves, Vertical curves, Check rails
Points, Crossings, Signaling and Inter locking: Important terms, switches, Tongue rails, Crossing, Turnouts, Layout of turnout, Introduction to signaling and inter locking.

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, Railway safety issues and remedies.

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 Orientation and Geometric design:** Site selection of an airport as per ICAO, orientation of runway by wind rose diagrams I and II, 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

ADVANCED ENVIRONMENTAL ENGINEERING

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20PE743CE
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 characteristics and effects of industrial wastes on land and human health. 2. Describe the waste water characteristics and treatment from various industries 3. Explain various effects of air pollution and perform quantitative analysis on various samples for air pollution. 4. Interpret the working and control of equipments pertaining to air pollution 5. State the objectives of EIA, legal provisions and preparation of EIA documents	1. Classify various types of industrial wastes 2. Assess the treatment procedure for waste water from different industries. 3. Analyse air quality parameters, effects of air pollution. 4. Design the control equipments of air pollution. 5. Understand the management of solid waste.

UNIT-I: Industrial Waste Management: Types of industries, characteristics of industrial wastes, effects of industrial effluents on streams, land and human health. Environmental legislation related to industrial effluents and hazardous wastes. Streeter phelps equation.

UNIT-II: Industrial Waste Water Treatment: Manufacturing process, waste water characteristics and effluent of the following industries – Leather tanning, dairy, pulp and paper, pharmaceutical, textiles, steel plants, thermal power plants, fertilizer, cement, sugar and distilleries.

UNIT-III: Air Pollution: Sources, classification and effects of air pollutants, Meteorology of air pollution, wind rose diagrams, lapse rates, atmospheric stability and dispersion of air pollutants, stack height calculation, ambient air quality monitoring, stack sampling, analysis of air pollutants.

UNIT-IV: Air Pollution Control: Air quality standards, methods of air pollution control-zoning, source correction, control of suspended parciulate matter by equipment (gravitation, centrifugation, filtration, scrubbing, electrostatic precipitation), selection of proper equipment, gaseous pollutant control by absorption, condensation, combustion.

UNIT-V: SolidWaste Management: Sources of Solid waste, Types of solid waste, Physical and Chemical composition of municipal solid waste. Generation rate, Numerical Problems.
Collection: Collection of solid waste- services and systems, equipments,Transportation: Need of transfer operation, transfer station, transport means and methods, route optimization. Solid waste management 2000 rules with, 2016 amendments.

Learning Resources:

1. Rao M.N. and Dutt, Waste Water Treatment, Oxford and IBM Publications Ltd, 2008.
2. B C Punmia, “Environmental Engineering vol-II”, Laxmi Publications 2nd, 2016
3. Karia G.L., and Christian R.A, “Wastewater Treatment Concepts and Design Approach”, Prentice Hall of India Pvt. Ltd., New Delhi. 3rd, Edition, 2017
4. S.K.Garg, “Environmental Engineering vol-II, Water supply Engineering”, Khanna Publishers, – New Delhi, 28th edition and 2017
5. Eckenfelder, Industrial Water Pollution Control, McGraw Hill Book Co, 1999.
6. Rao C.S., Environmental Pollution Control Engineering, WileyEastern Ltd., 2006.
7. Rao M.N., Rao H.V.N., Air Pollution Control, Tata McGraw Hill, 2001.
8. Peavy and Rowe, Environmental Engineering, McGraw Hill Publications, 2013.
9. Keiley, Environmental Engineering, McGraw Hill Publishers, 2003.

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 AND MACHINE LEARNING IN CIVIL ENGINEERING

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U20PE744CE
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, Neural Networks, Classification – Generative classifiers, Formulation, Neural Networks, Regression versus Classification.

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

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

GEOGRAPHICAL INFORMATION SYSTEM LAB

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0 : 0 : 2	SEE Marks:50	Course Code: U20PC711CE
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

FINITE ELEMENT METHOD LAB

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0:0 : 2	SEE Marks:50	Course Code: U20PC712CE
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
PROJECT SEMINAR

SYLLABUS FOR B.E. VII-SEMESTER

L : T : P (Hrs./week):0:0:2	SEE Marks: ----	Course Code: U20PW719CE
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.

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-20)
BE (CIVIL ENGINEERING) VIII-SEMESTER ACADEMIC YEAR 2023 - 2024
(Students Admitted in 2020-21)

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								
U20PE8XXCE	Professional Elective – V	3	-	-	3	60	40	3
U20PE8XXCE	Professional Elective - VI	3	-	-	3	60	40	3
PRACTICALS								
U20PW819CE	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 – V		
1	U20PE851CE	Advanced Reinforced Concrete Design
2	U20PE852CE	Advanced Transportation Engineering
3	U20PE853CE	Climate Change And Its Impact
4	U20PE854CE	Disaster mitigation and management
PROFESSIONAL ELECTIVE – VI		
1	U20PE861CE	Health Monitoring & Retrofitting of Structures
2	U20PE862CE	Ground Improvement Techniques
3	U20PE863CE	Hydraulic Structures
4	U20PE864CE	Soft Computing in Civil Engineering

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

DEPARTMENT OF CIVIL ENGINEERING

ADVANCED REINFORCED CONCRETE DESIGN

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20PE851CE
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. Design the ring girder of a circular overhead water tank and Understand the design of deep beams for multi storied structures. 2. Design portal frames and multi-story frames by substitute frame method for vertical loads. 3. Understand the design of Flat slabs and Gain knowledge on the advanced type of foundation design like pile foundation and raft foundation	1. Design the beams curved in plan and deep beams. 2. Design the portal frame and building frames by substitute frame method 3. Design Flat slabs to get more head room and Design the piles foundations for weak soils and raft or mat foundations to control the uneven settlements.

UNIT-I: Beams curved in plan: Introduction - design principles - structural design of beams curvedin plan of circular and semicircular types.
Deep beams: Introduction – flexural and shear stresses in deep beams. I.S. Code provisions – Design of deep beams.

UNIT-II: Building frames: Design of rectangular portal frames for vertical loading including hinges at the base – Detailing of Reinforcement.
Multi storied Frames: Analysis by substitute frame methods for different loading cases.

UNIT-III: Flat slabs: Introduction, Components – I.S. Code provisions – Design methods, Design for flexure and shear.
Foundations: Structural design of piles and pile caps. Raft foundations – Different types – analysis and design

Learning Resources:

1. Pillai and menon, Reinforced Concrete Design,Narosha publications,4th edition,2021
1. Krishna Raju N., Advanced Reinforced Concrete Design, 3rd edition, CBS Publishers,2016
2. Shah H.J., Reinforced Concrete, Volume II, 7th edition, Charotar Publishers, 2014
3. Varghese P.C., Advanced Reinforced Concrete Design, 2nd edition, PHI, 2011.
4. Gambhir M.L, Design of Reinforced concrete structures, PHI, 2010
5. Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain, R.C.C. Designs (Reinforced Concrete Designs), Laxmi Publications, 2015.
6. IS:456-2000, Indian standard code of practice for plain and reinforced concrete, Bureau of Indian standards
7. SP.16 -1980 Design Aids for reinforced concrete, Bureau of Indian standards
8. SP.34 -1987 Hand book on concrete reinforcement and detailing , Bureau of Indian standards

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

ADVANCED TRANSPORTATION ENGINEERING

SYLLABUS FOR B.E. VIII SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U20PE852CE
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, 2023
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. Srinivasa Kumar, Publishing, 2022, Universities Press
6. Pavement Evaluation by (Maintenance and Management System) by 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

CLIMATE CHANGE AND ITS IMPACT

SYLLABUSFORB.E.VIII-SEMESTER

L:T:P(Hrs./week):3:0:0	SEEMarks:60	CourseCode:U20PE853CE
Credits:3	CIEMarks:40	DurationofSEE:3Hrs

COURSEOBJECTIVES	**COURSEOUTCOMES**
Objectives of this course are	Upon the completion of this course the students will be expected to:
1. To understand the basics of weather and climate 2. To have an insight on Atmospheric dynamics and transport of heat 3. To develop simple climate models and evaluate climate changes using models	1. The concepts of weather and climate 2. The principles of Atmospheric dynamics and transport of heat and air mass 3. The global climate change and phenomenon involved 4. The climatic system and processes 5. The develop simple climate models and to predict climate change

UNIT- I: BASICS OF WEATHER AND CLIMATE: Shallow film of Air– stratified & disturbed atmosphere – law – atmosphere Engine. Observation of parameters: Temperature – Humidity – Wind - Pressure – precipitation-surface – networks. Constitution of atmosphere: well stirred atmosphere – process around turbopause – in dry air – ozone – carbon Dioxide – Sulphur Dioxide– Aerosol - water. Evolution of Atmosphere. State of atmosphere: Air temperature – pressure – hydrostatic – Chemistry – Distribution – circulation.

UNIT-II: ATMOSPHERIC DYNAMICS: Atmosphere dynamics: law – isobaric heating and cooling – adiabatic lapse rates – equation of motion - solving and forecasting. Forces – Relative and absolute acceleration – Earth's rotation coriolis on sphere – full equation of motion – Geostrophy;- Thermal winds –departures – smallscale motion. Radiation, convection and advections: sun & solar radiation – energy balance – terrestrial radiation and the atmosphere – Green house effect- Global warming - Global budget – radiative fluxes - heat transport. Atmosphere and ocean systems convecting&advecting heat. Surface and boundary layer – smaller scale weather system – larger scale weather system.

UNIT-III: GLOBAL CLIMATE: Components and phenomena in the climate system: Time and space scales – interaction and parameterization problem. Gradients of Radiative forcing and energy transports by atmosphere and ocean – atmospheric circulation – latitude structure of the circulation - latitude – longitude dependence of climate features. Ocean circulation: latitude – longitude dependence of climate features – ocean vertical structure – ocean thermohaline circulation – land surface processes – carbon cycle.

UNIT-IV: CLIMATE SYSTEM PROCESSES : Conservation of motion: Force – coriolis - pressure gradient- velocity equations – Application – geotropic wind – pressure co-ordinates. Equation of State – atmosphere – ocean. Application: thermal circulation – sea level rise. Temperature equation: Ocean – air – Application – decay of sea surface temperature. Continuity equation: ocean – atmosphere. Application: coastal upwelling – equatorial upwelling – conservation of warm water mass. Moisture and salinity equation: conservation of mass – moisture. Source & sinks – latent heat. Moist processes – saturation – convection – Wave processes in atmosphere and ocean.

UNIT- V: CLIMATE CHANGE MODELS : Constructing a climate model – climate system modeling – climate simulation and drift – Evaluation of climate model simulation – regional (RCM) – global (GCM) – Global average response to warming – climate change observed to date. COURSE OUTCOMES: At the end of the course the student will be able to understand ☐The concepts of weather and climate ☐The principles of Atmospheric dynamics and transport of heat and air mass ☐The develop simple climate models and to predict climate change.

Learning Resources:

1. Fundamentals of weather and climate (2nd Edition) Robin Moilveen (2010), Oxford University Press.
2. Climate change and climate modeling, J. David Neelin (2011) Cambridge 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

DISASTER MITIGATION AND MANAGEMENT

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	CourseCode:U20PE854CE
Credits :	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. Know about the state of art of disaster management in world and explore the history of the disasters and comprehend how past events have helped shape the future. 2. Study the various natural and manmade disasters and apply the mitigation measures 3. Expose students to various technologies used for disaster mitigation and management.	1. Attain knowledge on various types, stages, phases in disaster with international & national policies & programmes with reference to the disaster reduction. 2. Understand various types of natural disaster, their occurrence, Effects, Mitigation and Management Systems in India 3. Understand different types of manmade disasters, their occurrence, Effects, Mitigation and Management Systems in India. 4. Explain the utility of geographic information systems (GIS), Remote sensing technology in all phases of disaster mitigation and management. 5. Develop understanding on the concepts of risk, vulnerability, warning and forecasting methods in disaster management.

UNIT-I: Introduction: Hazard, vulnerability and risk, Types of disasters , Disaster management cycle, role of civil engineers in disaster management, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India

UNIT-II: Natural Disasters: Hydro - meteorological based disasters – Tropical cyclones, floods, drought and desertification zones, Geographical based disasters – Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures, coastal zone management

UNIT-III: Human induced hazards: chemical industrial hazards, major power breakdowns, traffic accidents, etc. Case studies

UNIT-IV: Remote sensing and GIS for Disaster Management: Introduction to remote sensing and GIS, its applications in disaster mitigation and management, case studies

UNIT-V: Disaster Management: Risk assessment and hazard mapping – mitigation and management options – warning and forecasting.

Learning Resources:

1. Rajib, S and Krishna Murthy, R.R. "Disaster Management Global Challenges and Local Solutions", Universities Press,2012.
2. Navele, P & Raja, C.K. Earth and Atmospheric Disasters Management, Natural and Manmade, B.S. Publications, 2009.
3. Fearn-Banks, K Crises Computations Approach: A case book approach, Route ledge Publishers, 2011.
4. Battacharya, T. Disaster Science and Management, Tata McGraw Hill Company, 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

HEALTH MONITORING & RETROFITTING OF STRCTURES

SYLLABUS FOR B.E. VIII-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20PE861CE
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. Identify the importance of structural health monitoring, which gives the knowledge about the safety & stability of structures 2. Assess the present condition and strength of an existing structure by adopting Non destructive testing methods. 3. Conduct condition survey concrete structures by Non destructive evaluation.	1. Explain the importance of structures health monitoring (SHM) and the basic components of SHM. 2. Describe the application of SHM in civil engineering with respect to various types of structures. 3. Describe the various methods of Non – destructive testing of concrete structures to know their health condition. 4. Examine the various Non – destructive testing methods which are suitable for determining the condition of the existing concrete structures. 5. Examine the condition of the existing structures by conducting condition survey to know various defects and to make use NDT methods for evaluation to suggest the methods of rehabilitation.

UNIT–I: Introduction to Structural Health Monitoring (SHM) : Definition & motivation for SHM, SHM – a way for smart materials and structures, SHM and bio mimetic - analogy between the nervous system of a man and a structure with SHM, SHM as a part of system management, Passive and Active SHM, NDE, SHM and NDECS, Basic components of SHM, materials for Sensor design

UNIT–II: Application of SHM in Civil Engineering: Introduction to capacitive methods, capacitive probe for cover concrete, SHM of a bridge, applications for external post tensioned cables, monitoring historical buildings

UNIT–III: Non Destructive Testing of Concrete Structures : Introduction to NDT - Situations and contexts, where NDT is needed, classification of NDT procedures, Visual Inspection, Half- Cell Electrical Potential Methods, Schmidt Rebound Hammer Test, Resistivity Measurement, Electro Magnetic Methods, Radiographic Testing, Ultrasonic Testing, Infra Red Thermography, Ground penetrating Radar, Radio Isotope gauges, Other methods.

UNIT-IV: Condition Survey & NDE of Concrete Structure: Definition and objective of Condition Survey, Stages of Condition Survey (Preliminary, Planning, Inspection and Testing stages), possible defects in concrete structures, Quality control of concrete structures- Definition and need, Quality control applications in concrete structures, NDT as an option for Non-Destructive Evaluation (NDE) of Concrete structures, Case studies of a few NDT procedures on concrete structures

UNIT–V: Rehabilitation and Retrofitting of Concrete Structures: Repair, rehabilitation & retrofitting of structures, damage assessment of concrete structures, materials and methods for repairs and rehabilitation, modelling of repaired composite structure, structural analysis and design – importance of re-analysis, execution of rehabilitation strategy, case studies

Learning Resources: 2

1. Daniel Balageas, Claus-Peter FritzenamI Alfredo Guemes, “Structural Health Monitoring” published by ISTE Ltd, U.K. 2006.
2. “Guide book on Non-destructive Testing of Concrete Structures, Training Course series no. 17”, International Atomic Energy Agency, Vienna, 2002
3. Hand book on “Repair and Rehabilitation of RCC Buildings”, published by Director General, CPWD, Govt. of India, 2002.
4. Handbook on Seismic Retrofitting of Buildings, published by CPWD & Indian Building Congress in Association with IIT, Madras, Narosa Publishing House, 2008.

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: U20PE862CE
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
HYDRAULICS STRUCTURES

SYLLABUSFORB.E.VIII-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks :60	Course Code:U20PE863CE
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, the design of solid gravity dam.

UNIT-III: Earth dams: Types, Methods of construction, Seepage analysis for homogenous and zoned embankment dams, Drainage in embankment dams,varioustypesoffilters,FailureofEarthdams&Designcriteria.Designto 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- design of bank connections

UNIT-V: Water Power Engineering: Demand and generation, different heads,loadfactor,capacityfactorandutilizationfactor,Assessmentof water powerpotential, 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.

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: U20PE864CE
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)
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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: U20PW819CE
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.