

**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) V and VI SEMESTER
UNDER CBCS WITH EFFECT FROM 2026–2027
(For the students admitted in 2024-25)**



**DEPARTMENT OF CIVIL ENGINEERING
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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-24)
BE (CIVIL ENGINEERING) V-SEMESTER ACADEMIC YEAR 2026-2027
(Students Admitted in 2024-25)

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								
U24HS510EH	Skill Development Course-V:(Communication Skills-II)	1	-	-	2	40	30	1
U24HS540EH	Design Thinking	1	-	-	2	40	30	1
U24PC510CE	Structural Analysis	3	-	-	3	60	40	3
U24PC520CE	Hydraulics and Hydraulic Machinery	3	-	-	3	60	40	3
U24PC530CE	Environmental Engineering	3	-	-	3	60	40	3
U24PC540CE	Reinforced Concrete Design	3	-	-	3	60	40	3
U24PE510CE	Skill Development Course-VI:(Technical Skills-II)	1	-	-	2	40	30	1
U24OEXXXX	Open Elective-III	3	-	-	3	60	40	3
PRACTICALS								
U24PC511CE	Hydraulics and Hydraulic Machinery Lab	-	-	2	3	50	30	1
U24PC521CE	Environmental Engineering Lab	-	-	2	3	50	30	1
U24PC531CE	Concrete Lab	-	-	2	3	50	30	1
U24PC541CE	Surveying Camp	-	-	-	-	-	50	1
Note:The left over hours are to be allotted to ECA-II/Sports/Library/Mentor Interaction / CC / RC / TC / PDC based on the requirement.								
Student should complete one NPTEL (8 weeks) certificate course equivalent to 2 credits by the end of VI semester								
Total		18	-	6		570	430	22
Grand Total		24				1000		
Note: Surveying Camp will be conducted for one week before the commencement of V-Semester.								

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS),
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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
SKILL DEVELOPMENT COURSE-V COMMUNICATION SKILLS-II
(Common to all branches)

SYLLABUS FOR V- SEMESTER

L: T: P (Hrs/Week):2:0:0	SEE Marks: 40	Course Code:U24HS510EH
Credits:1	CIE Marks: 30	Duration of SEE: 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	At the end of the course, students will be able to:
1. Get students proficient in both receptive and productive skills 2. Enable students to build strategies for effective group interaction and help them in developing decisive awareness and personality while maintaining emotional balance. 3. To introduce students to an ideal structure for a presentation 4. To develop and improve writing and study skills needed for college work.	1. Participate in group and forum discussions by providing factual information, possible solutions, and examples 2. Present a topic by picking up the key points from the arguments placed. 3. Read between the lines and write informed opinions. 4. Prepare, present, and analyze reports

UNIT-I: Delightful Discussions: Equips participants with group discussion strategies using Six Thinking Hats, point generation, and summarization techniques, along with case study-based discussions to enhance analytical thinking.

- 1.1 Six Thinking Hats
- 1.2 Group Discussion Techniques (Initiation Techniques, Generating Points, Summarization techniques)
- 1.3 Case Study Based Group Discussions

UNIT-II:Power ful Presentations: Develops the ability to deliver clear, persuasive, and structured presentations using the Toulmin model, with practical exposure to JAM (Just A Minute) and extempore speaking exercises.

- 2.1 Concise Cogent Presentation
- 2.2 Persuasion skills

- 2.3 Toulmin Model
- 2.4 Biker B - JAM and Extempore

UNIT-III: Fact, Observation and Inference: Builds critical reading and thinking skills to differentiate facts from opinions, make accurate inferences, identify main ideas, and draw logical conclusions from various texts.

- 3.1 Discernment of fact and opinion
- 3.2 Note making and Inference
- 3.3 Main idea identification
- 3.4 Logical Conclusions

UNIT-IV: Effective Technical Writing: Trains learners in crafting technical reports, descriptive image-based writing, and composing insightful book and movie reviews with clarity and coherence.

- 1.1 Report writing
- 1.2 Image Writing
- 1.3 Book Reviews
- 1.4 Movie Reviews

Learning Resources:

1. How to Win Friends and Influence People by Dale Carnegie. ...
2. Crucial Conversations: Tools for Talking When Stakes Are High by Kerry Patterson, Joseph Grenny, Ron McMillan, and Al Switzler. ...
3. Difficult Conversations: How to Have Conversations that Matter the Most by Douglas Stone, Bruce Patton, Sheila Heen, and Roger Fisher.

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			

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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

DESIGN THINKING

(Common to all branches)

SYLLABUS FOR V- SEMESTER

L: T: P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code:U24HS530EH
Credits:1	CIE Marks: 30	Duration of SEE: 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	At the end of the course, students will be able to:
1. Understand the stages of design thinking and the role of empathy in design. 2. Learn techniques to brainstorm and frame problem statements effectively. 3. Develop prototyping and feedback techniques for iterative improvements. 4. Apply design thinking to solve community challenges and real-world problems.	1. Students will articulate the stages of design thinking and create empathy maps for user-centered solutions. 2. Students will use ideation tools and define clear, actionable problem statements. 3. Students will create low-fidelity prototypes and refine solutions based on feedback. 4. Students will demonstrate design thinking by creating innovative prototypes for specific challenges.

OVERVIEW: In a fast-changing world driven by innovation, AI, and user-centric solutions, Design Thinking equips engineering students with the mindset and tools to solve real-world problems creatively and collaboratively. This course introduces a structured, human-centered approach to innovation through empathy, ideation, prototyping, and iteration. Students will engage in hands-on activities that enhance creativity, adaptability, and practical problem-solving.

UNIT-I: Introduction to Design Thinking: Help build a strong foundation in user-centric innovation by understanding the design thinking process and developing empathy to uncover real user needs.

- 1.1 Stages of Design Thinking
- 1.2 Case Studies of Innovative Solutions
- 1.3 Empathy in Design

Learning Outcomes:

- Understand the five stages of the design thinking process
- Analyze real-world innovations using the design thinking lens
- Create empathy maps by observing and interpreting user needs

UNIT-II: Ideation and Problem Definition: Train to convert user insights into well-defined engineering problems and generate multiple solution ideas using structured creativity techniques.

2.1 Brainstorming Techniques

2.2 Framing the Right Problem Statement

2.3 Ideation Tools (Affinity Mapping)

Learning Outcomes:

- Generate multiple ideas using structured creativity techniques
- Frame user-centered problem statements from gathered insights
- Organize and cluster ideas using ideation tools

UNIT-III: Prototyping and Feedback: Develop practical skills to rapidly prototype engineering solutions and iteratively improve them based on user testing and feedback.

3.1 Creating Low-Fidelity Prototypes

3.2 Gathering and Implementing Feedback

3.3 Iterative Improvements

Learning Outcomes:

- Design simple prototypes that communicate core ideas
- Collect meaningful feedback through observation and interaction
- Refine prototypes through successive iterations for better user fit

UNIT-IV: Real-World Applications: Learn to apply the full design thinking process to real-life engineering, business, or social challenges, enhancing teamwork and innovation readiness.

4.1 Design Thinking in Business and Technology

4.2 Creating Solutions for Community Challenges

4.3 Group Project: Prototype a Solution

Learning Outcomes:

- Apply the complete design thinking cycle to real-world problems
- Collaborate in teams to design and test user-centered solutions
- Present working prototypes and justify design decisions with user insights

Learning Resources:

1. [Learn.talentsprint.com](https://www.talentsprint.com)

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

1	No. of Internal Tests	: 1	Max. Marks for each Internal Test	: 20
2	No. of Assignments	: 1	Max. Marks for each Assignment	: 5
3	No. of Quizzes	: 1	Max. Marks for each Quiz Test	: 5
	Duration of Internal Tests	: 90 Minutes		

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DEPARTMENT OF CIVIL ENGINEERING
STRUCTURAL ANALYSIS

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U24PC510CE
Credit: 3	CIE Marks:40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Explain methods of analysis for indeterminate beams, portal frames, arches and trusses. 2. Describe analysis of beams and pin jointed frames using strain energy methods. 3. Explain approximate methods of analysis for the frames subjected to lateral loads. 4. Describe analysis of beams using influence line diagrams	1. Find degree of indeterminacy of various structures subjected to external forces. 2. Perform analysis of beams and rigid jointed frames subjected to external loads using moment distribution method & slope deflection method and draw bending moment diagrams. 3. Analyse three hinged, two hinged parabolic arches carrying vertical loads and frames subjected to lateral loads and draw bending moment diagrams. 4. Apply strain energy methods in the analysis of pin jointed frames subjected to external forces. 5. Explain analysis of beams using influence line diagrams.

UNIT-I: Static and Kinematic indeterminacy: Determination of static and kinematic indeterminacy of beams, pin jointed and rigid jointed frames. Introduction to analysis by force method and displacement method, Continuum, Internal hinges for Axial force, Bending movement, Shear force and Torque.

Moment distribution method: Slope deflection equations, Analysis of continuous beams with and without sinking of supports, single bay single storey portal frames with and without side sway-loading on beam/portal frames subjected to point load(s) and uniformly distributed load-shear force and bending moment diagrams.

UNIT-II: Slope deflection method: Analysis of continuous beams with and without sinking of supports, single bay single storey portal frames with and without side sway – loading on beam/portal frame shall be point load(s) and uniformly distributed load-shear force and bending moment diagrams.

UNIT-III: Approximate methods : Portal method and cantilever method.

Analysis of arches: Three hinged and two hinged parabolic arches, circular arches, determination of horizontal thrust, bending moment, normal thrust and radial shear for static loading.

UNIT-IV: Strain energy methods: Determination of displacements using unit load method for frames and statically determinate pin-jointed trusses.

Redundant pin jointed trusses: Analysis of plane trusses with one degree of redundancy (internal / external), lack of fit and temperature effects.

Strain energy methods: Determination of displacements using unit load method for statically determinate pin-jointed trusses.

Redundant pin jointed trusses: Analysis of plane trusses with one degree of redundancy (internal / external), lack of fit and temperature effects.

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

Learning Resources:

1. Vazirani V.N., Ratwani M.M, Duggal S.K., "Analysis of Structures-Vol.II Theory, Design and Details of Structures", Khanna Publishers, 18th Edition, 2023.
2. Thandavamoorthy T.S., "Structural Analysis", Oxford Higher Education, Reprint 2021.
3. Ramamrutham S., Narayan R., "Theory of Structures", Dhanpath Rai publications, 11th edition, Reprint 2025.
4. Devdas Menon, "Structural Analysis", 3rd Edition, Narosa Book Distributors Pvt Ltd, 2023.
5. Reddy C.S., "Basic Structural Analysis", 3rd Edition, Mc GrawHill, 2017.
6. Junarkar S. B., Shah, "Mechanics of Structures", Volume-II, Charotar Pub.

House, 24th edition, Reprint 2024.

7. Chu-Kia Wang, "Intermediate Structural Analysis (English) 1st Edition", McGrawHill Education, 2017.
8. Hibbeler R.C., "Structural Analysis", 10/E, Prentice Hall, Higher Education, 2022.
9. Louis F. Geschwindner, Harry H. West, "Fundamentals of Structural Analysis", 2nd Edition, Wiley India Pvt. Ltd., 2011.
10. Stephen P. Timoshenko and Donovan H. Young "Theory of Structures" McGraw Hill International Edition, 1968
11. <http://nptel.ac.in/downloads/105101085/>

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

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

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DEPARTMENT OF CIVIL ENGINEERING
HYDRAULICS AND HYDRAULIC MACHINERY

SYLLABUS FOR B.E. V SEMESTER

L:T:P(Hrs./week):3:1:0	SEE Marks: 60	Course Code: U24PC520CE
Credits:4	CIE Marks: 40	Duration of SEE: 3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Study various aspects of open channel flow. 2. Analysis the impact on water jets on stationary and moving flat and curved plates 3. Discuss the performance and design of hydraulic turbines and centrifugal pump.	1. Compute velocity, specific energy, and critical depth in steady uniform flow through open channels 2. Understanding concepts of gradually varied flow, classifying flow profiles, and applying the dynamic equation of gradually varied flow. 3. Understanding the fundamentals of the impact of jets and computing the force exerted by jets. 4. Evaluate the performance characteristics and perform the design of turbines for various conditions of head, discharge, and power 5. Evaluate the performance characteristics and perform the design of a centrifugal pump for various conditions of head, discharge, and power

UNIT-I: Steady uniform flow through open channels: Descriptions and definitions, difference between pipe flow and channel flow, velocity and pressure distribution in channel cross-section, energy and momentum correction coefficients, friction to flow in open channel, uniform flow, Manning's and Chezy's formulae, most efficient channel cross-section, specific energy, Critical depth, Computation of critical depth.

UNIT-II: Gradually varied flow: Significance of Froude Number, dynamic equation of gradually varied flow, classification of gradually varied flow profiles, computation of flow profiles, and characteristics of flow profiles. Hydraulic Jump- Momentum equation for a jump in a horizontal rectangular channel, energy dissipation in hydraulic jumps.

UNIT-III: Impact of Jets: Force exerted by a jet on a stationary and moving plate; Force exerted on a curved plate, Force exerted by a jet of water on a series of straight plates and curved plates.

UNIT-IV: Hydraulic Turbines: Classification, specific speed, unit quantities, velocity triangles, energy equation for hydraulic machine, principles of design of Pelton wheel turbine, Francis turbine, and Kaplan turbine, characteristic curves, cavitation in turbines

UNIT-V: Centrifugal Pump: Components, work done, heads and efficiencies, minimum starting speed, specific speed, and characteristic curves of centrifugal pump.

Learning Resources:

1. P.N. Modi and S.M. Seth, Hydraulics and Fluid Mechanics Including Hydraulic Machines, Standard Book House, 23rd Edition, 2022.
2. K SrinivasaRaju and D Nagesh Kumar, "Fluid Mechanics problem solving using MATLAB" Prentice Hall of India, 2020
3. K. Subrmanya, "Flow in Open Channel", Tata McGraw Hill Publishers, 5th Edition, 2019
4. D. Rama Durgaiah, Fluid Mechanics and Machinery, New Age International Publishers, Reprint Edition, 2019.
5. R.K. Bansal, A Textbook of Fluid Mechanics and Hydraulic Machines, Laxmi Publications, Revised Edition, 2018.
6. Ojha C.S.P., Brendts son R., Chandramouli P.N., "Fluid Mechanics and Machinery", Oxford University Press, 2010.
7. VenTeChow "Open-Channel Hydraulics" International Student Edition, McGraw-Hill, 2009.
8. <http://nptel.ac.in/courses/105103096/3>, Hydraulics
9. <http://nptel.ac.in/courses/105107059/>, FluidMechanics

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

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

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
ENVIRONMENTAL ENGINEERING

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U24PC530CE
Credits : 3	CIE Marks:40	1. Duration of SEE:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Analyze water and waste water system and understand the concepts of demand, supply and distribution system and identify various public health elements 2. State the stages involved in water and sewage design treatment, mechanism and disposal 3. Describe the concept of sludge and solid waste management and air pollution.	1. Assess the water demand and understand the concept of water and wastewater conveyance. 2. Apprehend water quality, unit operations and processes involved in water treatment. 3. Understand the characteristics of domestic sewage and stages of sewage treatment. 4. Understand the biological methods of sewage treatment and natural sewage disposal methods. 5. Understand the concepts of sludge, solid waste management and air pollution.

UNIT-I: Water Demand and Forecasting Methods: Water demand and per capita consumption, population forecasting approaches.

Water distribution: Water distribution systems and solution of a simple network using Hardy Cross method.

Sewage conveyance: Dry and wet weather flow, types of sewerage networks, sewer appurtenances, Velocity in sewers, Rational method for storm water estimation.

UNIT-II: Water Quality: Standards of potable water, Drinking water quality parameters.

Treatment of Water: Introduction to unit operation and unit processes, Design of rectangular and circular sedimentation tanks, coagulation and flocculation, design of a flocculator. Filtration – types of filters and filter media. Design principles of slow and rapid sand filters, Disinfection – necessity and methods, chlorination of water supplied, advanced water treatment methods.

UNIT-III: Wastewater Characteristics: Waste water sampling-significance and techniques; significance of sample preservation, physical, chemical and biological characteristics of wastewater; Population equivalent; Relative Stability.

Waste Water Treatment: Stages of wastewater treatment, Preliminary and primary treatment: Screens: types, disposal. Grit chamber, oil and grease removal, primary settling tanks, Equalization.

Biological Treatment Process: Suspended growth system - conventional activated sludge process and its modifications, Principle of stabilization ponds, oxidation ditch.

UNIT-IV: Biological Treatment Process: Attached growth system – trickling filter, bio-towers and rotating biological contactors, secondary settling tank. Introduction to Sequential Batch Reactor (SBR) and Up flow Anaerobic Sludge Blanket (UASB) treatment methods, Bioremediation.

Natural Methods of sewage disposal: Self-purification of streams, Oxygen sag Analysis, Dilution into sea, disposal by land treatment.

UNIT-V: Sludge management: Introduction to sludge management-characteristics, treatment and disposal methods. Working principal and design of septic tanks for small community.

Learning Resources:

1. S.K.Garg, "Environmental Engineering vol-II, Water supply Engineering", Khanna Publishers, – New Delhi, 35th edition and 2022
2. S.K.Garg, "Environmental Engineering vol-I, Water supply Engineering Sewage Disposal and Air pollution engineering", Khanna Publishers, – New Delhi, 40th edition and 2022
3. B C Punmia, "Environmental Engineering vol-I& II", Laxmi Publications, 1st edition, 2021 (E-book).
4. Karia G.L., and Christian R.A, "Wastewater Treatment Concepts and Design Approach", Prentice Hall of India Pvt. Ltd., New Delhi. 3rd, Edition, 2017
5. Peavy H.S., Rowe D.R., Tchobanoglous G., "Environmental Engineering", Tata McGraw Hills, New Delhi, 2017

6. <http://nptel.ac.in/courses/105106119/>

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

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

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
REINFORCED CONCRETE DESIGN

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U24PC540CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Design philosophies of working stress method and limit state method.	1. Understand design philosophies of concrete and design beams for flexure with working stress method according to IS: 456:2000.
2. Indian standard codes of practice for Reinforced Concrete	2. Design beams for flexure with limit state method according to IS: 456:2000.
3. Design of concrete structural elements using limit state method as per Indian code of practice.	3. Design beams for shear, torsion and compute deflections with limit state design philosophy according to IS: 456-2000.
	4. Design slabs with limit state method according to IS: 456-2000.
	5. Design columns and footings with limit state method according to IS: 456:2000.

UNIT-I: Introduction to Reinforced Cement Concrete: Need for Reinforcement in Concrete – Basic requirements of an RC Structure-stability, Strength, Service ability and durability.

Design Philosophies: Design Philosophies-Working stress method (WSM) and Limit State Method (LSM) relative merits and demerits, Ultimate collapse load.

Working Stress Method: Theory of flexure in RC beams, Balanced, under-reinforced and over reinforced sections; Analysis and design of singly and doubly reinforced rectangular sections.

UNIT-II: Basic Concepts and Terminology of LSM: Basic concepts and terminology of LSM – limit state, characteristic loads and strengths, Partial safety factors. Stress strain relationship for concrete and reinforcing steel; stress blocks.

Limit State of collapse in flexure: Assumptions, Analysis for flexure, failure in tension and compression, singly reinforced, doubly reinforced rectangular and flanged beams. Anchorage and development length, Curtailment of reinforcement in beams.

UNIT-III: Limit State of Collapse in shear and torsion: Analysis and design for shear and torsion.

Limit State of Service ability: Check for deflection and cracking.

UNIT-IV: Analysis and Design of Slabs: Types of slabs-one way, two way simply supported and continuous rectangular slabs, subjected to uniformly distributed load. Design of solid rectangular slabs.

UNIT-V: Analysis and Design of Columns: Assumptions, axially loaded circular, square and rectangular columns, Uniaxial and biaxial bending-interaction diagrams.

Design of Footings: Design of isolated square and rectangular footings as per IS code.

Learning Resources:

1. Pillai and menon, Reinforced Concrete Design, Mc Graw, 4th edition, 2021
2. Varghese P.C., "Limit State Design of Reinforced Concrete", Prentice Hall of India, 2nd Edition 2017.
3. Subramanian N., "Design of Reinforced Concrete Structures", Oxford University Press, 2013.
4. Shah H.J., "Reinforced Concrete", Vol.1, Charotar Publishing House, 13th Edition 2025.
5. Punmia B.C., Ashok K. Jain, Arun K. Jain, "Limit State Design of Reinforced Concrete", Laxmi Publications (P) Ltd. 2016.
6. Ramamrutham, "Design of Reinforced Concrete Structures", Dhanpat Rai Publishing Co, 2020.
7. Nptel.ac.in /courses/105105105, Design of Reinforced Concrete Structures.
8. IS:456-2021, Code of Practice for Plain and Reinforced Concrete, Bureau of Indian Standards, New Delhi, India.
9. SP16: Design Aids for Reinforced Concrete

10. SP24:Explanatory Hand book on Indian Standard Code of Practice for Plain and Reinforced Concrete to IS456:1978, Bureau of Indian Standards, New Delhi, India
11. SP34:Hand bookon Concrete Reinforcement and Detailing (With Amendment1), Bureau of Indian Standards, NewDelhi, India
12. IS:875-1987 Code of Practice For Design Loads (Other Than Earth quake) For Buildings And Structures Parts (1,2,3,4&5), 2015 Bureau of Indian Standards, New Delhi, India

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

1 No. of Internal Tests	: 2	Max. Marks for each Internal Tests	: 30
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DEPARTMENT OF CIVIL ENGINEERING
SKILL DEVELOPMENT COURSE-VI (TECHNICAL SKILL-II)

SYLLABUS FOR B.E.V SEMESTER

L : T : P (Hrs./week):1:0:0	SEE Marks:40	Course Code: U24PE510CE
Credits : 1	CIE Marks:30	Duration of SEE: 3 Hrs

BIM concepts / Industry standard coding practices through C or other programming languages / Applications of spread sheets in engineering

Advanced BIM Concepts

1. Introduction
2. Draw and modify walls & Complex Walls
3. Add and modify wall profiles
4. Place Doors, windows & Components
5. Dimensions and Constraints
6. Create Floor, roofs and Ceilings
7. Curtain walls, grids and mullions
8. Railing, Stairs & Ramps
9. Conceptual models
10. Annotations, legends and Schedules
11. Sheets and Title Blocks
12. Materials and lighting
13. Views, camera, Walk – through, Render & Solar study
14. In place families and families creations
15. Massing and Site Design
16. Link projects & collaboration
17. Realistic presentations
18. Import & Export

The content of technical skills may be altered based on the industry requirements and third party technical expertise available.

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

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

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

DEPARTMENT OF CIVIL ENGINEERING
HYDRAULICS & HYDRAULIC MACHINERY LAB

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0:2	SEE Marks:50	Course Code: U24PC521CE
Credits: 1	CIE Marks:30	Duration of SEE:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to	Upon the completion of the course, students are expected to
1. Manning's rugosity coefficient and super elevation in open channels.	1. Determine Manning's rugosity coefficient and measure super elevation in an open channel and estimate loss of energy in hydraulic jump.
2. Impact coefficient on different types of vanes and drag and lift force in wind tunnel	2. Evaluate impact coefficient for different types of vanes.
3. Pre and post jump depths and calculate loss of energy in hydraulic jump.	3. Evaluate the overall efficiency of various pumps and turbines and draw performance characteristic curves.
4. Familiarize with the procedures of calculating overall efficiency of different types of pumps and turbines.	4. Practice working as a team member and lead a team.
	5. Demonstrate professional behavior in conducting the experiments and presenting the results effectively.

LIST OF EXPERIMENTS

- | | | |
|---|-------------------|---|
| 1 | Open Channel Flow | Determination of Manning's and Chezy's coefficient |
| 2 | Open Channel Bend | Determination of super elevation |
| 3 | Hydraulic Jump | Determination of pre and post jump depth in |
| 4 | Impact of Jets | Determination of vane coefficient on different types of vanes (Virtual Mode)
https://eerc03-iith.vlabs.ac.in/exp/jets/ |
| 5 | Centrifugal pump | Determination of efficiency and performance |

6	Centrifugal pump test rig	Determination of efficiency and performance Characteristics under varying loads
7	Pelton Wheel Turbine	Determination of efficiency and Performance
8	Francis Turbine	Determination of efficiency and Performance
9	Kaplan Turbine	Determination of efficiency and Performance
10	Self priming pump	Determination of efficiency and performance

Learning Resources:

<http://eerc03-iiith.virtual-labs.ac.in>

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
ENVIRONMENTAL ENGINEERING LAB

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0: 2	SEE Marks:50	Course Code:U24PC531CE
Credits: 1	CIE Marks:30	Duration of SEE: 3 hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Familiarize with the procedures of water quality analysis. 2. Estimate the Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) for sewage samples. 3. Calculate the coagulant dosage for the reduction of turbidity and disinfection dosage. 4. Practice working with a flame photometer.	1. Analyze water samples for alkalinity, hardness, chlorides, calcium, pH, sodium and potassium content, total dissolved solids, and turbidity using a flame photometer. 2. Estimate the BOD and COD in sewage samples. 3. Calculate the coagulant dosage for reducing the turbidity and disinfection dosage. 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

LIST OF EXPERIMENTS

1. Determination of Variation of pH and Hardness
2. Determination of Chlorides
3. Determination of Acidity and Alkalinity.
4. Determination of Dissolved Oxygen (DO) and Biochemical Oxygen Demand (B.O.D.)
5. Determination of Total Solids and Sludge Volume Index (SVI)
6. Determination of Residual Chlorine.
7. Determination of turbidity
8. Determination of coagulant dose –Jar test.
9. Determination of Chemical Oxygen Demand
10. Determination of Nitrates and Sulphates using UV Spectrophotometer

11. Determination of Sodium & Potassium present in water using flame photometer (Demonstration).
12. Determination of Calorific Value of Solid Waste using Bomb Calorimeter (Demonstration)
13. Determination of Air Quality Index using Indoor Air quality monitor
14. Determination of total Iron in water (Virtual)

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
CONCRETE LAB

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0 : 2	SEE Marks:50	Course Code:U24PC541CE
Credits:1	CIE Marks:30	Duration of SEE:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Determine the physical properties of cement fine aggregate and coarse aggregate. 2. Determine workability of concrete 3. Determine the strength of concrete using destructive and non-destructive methods.	1. Determine the physical properties of cement, fine aggregate and coarse aggregate. 2. Determine the work ability of concrete. 3. Determine the compressive strength using destructive and non-destructive methods and flexural strength by destructive method. 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:

I TESTS ON CEMENT

- 1 (a). Specific gravity of cement
(b). Unit weight or bulk density of cement
- 2 Normal Consistency of cement
- 3 (a) Initial setting time of cement
(b) Final setting time of cement
(c) Fineness of cement by sieving

4 Compressive strength of cement

II TEST ON AGGREGATE:

- 5 (a) Specific gravity of fine aggregate.
- (b) Bulk density of fine aggregate
- 6 (a) Specific gravity of coarse aggregate
- (b) Bulk density of coarse aggregate
- 7 Bulking of sand by laboratory method.
- 8 Bulking of sand by field method.
- 9 Fineness modulus of fine aggregate
- 10 Fineness modulus of coarse aggregate.

III TEST ON CONCRETE

- 11 Workability of concrete by slump test
- 12 Workability of concrete by compacting factor test
- 13 Compressive strength of concrete
- 14 Flexural strength of concrete
- 15 A Concrete Mix Design using IS Code 10262

IV EXPERIMENTS FOR DEMONSTRATION ONLY

- 16 Non – Destructive Testing of Concrete Structures. Using Rebound Hammer and UPV
- 17 Workability of concrete by Flow test
- 18 Workability of concrete by Vee-Bee test.
- 19 Durability Test on concrete

Learning Resources:

- 1. IS: 269-2013, Indian Standard Code of Practice for Ordinary Port land Cement, 33 Grade-Specifications (Fourth Revision), Bureau of Indian Standards, New Delhi.
- 2. IS: 8112-2013, Indian Standard Code of Practice for 43 Grade Ordinary Portland Cement-Specifications (First Revision), Bureau of Indian Standards, New Delhi.
- 3. IS: 12269-2013, Indian Standard Code of Practice for ordinary Port land Cement, 53 Specifications, Bureau of Indian Standards, New Delhi.
- 4. IS: 650-2008, Indian Standard Code of Practice for Standards and for Testing Cement-Specifications (Second Revision), Bureau of Indian Standard, New Delhi.
- 5. IS: 2386 (Part-III) – 2002, Indian Standard Methods of Test for Aggregates

for Concrete, Bureau of Indian Standards, New Delhi.

6. IS:1199-2002, Indian Standard Methods of Sampling and Analysis of Concrete, bureau of Indian Standards, New Delhi.
7. IS: 516-2004, Indian Standard Methods of Tests for Strength of Concrete, Bureau of Indian Standards, New Delhi.
8. IS: 13311 (Part-1)-1992 (Reaffirmed-2004), Indian Standard Non-Destructive Testing of Concrete-Methods of Test, Part-1 Ultrasonic Pulse Velocity, Bureau of Indian Standards, New Delhi.
9. IS: 13311 (Part-2)-1992 (Reaffirmed-2004), Indian Standard Non-Destructive Testing of Concrete-Methods of Test, Part-2 Rebound Hammer, Bureau of Indian Standards, New Delhi.
10. IS:4031 (Part-2)-1999 (Reaffirmed-2004), Indian Standard Methods of Physical Tests for Hydraulic Cement, Determination of Fineness by Blaine Air Permeability Method, Bureau of Indian Standards, New Delhi.
11. IS10262-2019-Indian Standard Concrete Mix Proportioning – Guide lines

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
SURVEYING CAMP

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0:0	SEE Marks: - - -	Course Code: U24PC541CE
Credits: 1	CIE Marks: 50	Duration of SEE: ---

COURSEOBJECTIVES	COURSEOUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Field exercise with modern surveying equipment including GPS and Total Station. 2. All aspects of executing and plotting of field surveys. 3. Capturing top of graphical features.	1. Measure the topographical features using advanced surveying instruments such as total station and GPS 2. Plot the data obtained in the field through mapping software like QGIS / ArcGIS 3. Interpret the need for accurate and thorough note taking process in the field work to serve as a team member.

Course Content:

A one week (6 days, 36 hours) surveying camp shall be organized in the intervening period between the completion of the IV-Semester and the commencement of V-Semester.

The work has to be graded for 30 sessional marks by a committee consisting of the Head of the Department and 2-3 senior faculty members.

The surveying camp shall expose the students to all the aspects of planning, organizing and conducting a field survey, and plotting of the same.

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. V-SEMESTER

Dept	Course Code	Name of the Course	Stream Type	Stream Name	credits
Civil	U24OE510CE	Geo Spatial Information Technology	General	-	3
CSE	U24OE510CS	Introduction to Operating Systems	General	-	3
CSE	U24OE520CS	Fundamentals of Artificial Intelligence	Stream	AI&ML	3
ECE	U24OE510EC	Introduction to Biomedical Electronics	General	-	3
EEE	U243OE510EE	Modelling and Simulation of Basic Photovoltaic Systems	General	-	3
IT	U24OE510IT	Introduction to Database Management System	General	-	3
IT	U24OE520IT	Introduction to Artificial Intelligence	Stream	AI&ML	3
Mech.	U24OE520ME	Additive Manufacturing And Its Applications	General	-	3
Mech.	U24OE510ME	Drives and Control Systems for Robotics	Stream	Robotics	3
H&SS	U24OE540EH	Basics of Entrepreneurship	General	-	3

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

DEPARTMENT OF CIVIL ENGINEERING
GEO SPATIAL INFORMATION TECHNOLOGY
(Open Elective-III)

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code:U24OE510CE
Credits : 3	CIE Marks:40	Duration of SEE:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to	Upon the completion of the course, students are expected to
1. To provide fundamental knowledge on geo spatial technology such as Remote sensing GPS and GIS.	1. Explain the fundamental principles of remote sensing, including EMR spectrum, radiation interactions, and spectral reflectance characteristics, and identify their applications in observing and analyzing earth surface features. 2. Identify and differentiate various remote sensing systems, satellite characteristics, image types, and digital data formats used in visual interpretation, and understand their applications in fields such as agriculture, water resources, urban planning, and disaster management. 3. Describe the structure and operational principles of GPS and other GNSS systems, and recognize their practical applications . 4. Analyze sources of GPS errors, evaluate position accuracy using DOP/UERE, apply differential and carrier phase positioning methods. 5. Explain the core concepts of GIS, spatial and non-spatial data types, map projections, and demonstrate methods of data input and editing, along with their applications in spatial analysis, infrastructure planning, and environmental monitoring.

UNIT-I: Introduction and Basic Concepts of Remote Sensing

:Introduction, Basic concepts of remote sensing, Airborne and space born sensors, Passive and active remote sensing, EMR Spectrum, Energy sources and radiation principles, Energy interactions in the atmosphere, Energy interactions with earth surface features, Atmospheric windows, Spectral reflectance curves

UNIT-II: Remote Sensing Systems: Satellites and orbits, Polar orbiting satellites, Image characteristics and different resolutions in Remote Sensing, Multispectral, thermal and hyperspectral remote sensing. Some remote sensing satellites and their features, Map and Image, color composites, introduction to digital data, elements of visual interpretation techniques. Applications of Remote sensing in various fields.

UNIT-III: Global positioning Systems (GPS) :Overview of GNSS and Introduction to GPS, GLONASS, GALILEO, COMPASS, IRNSS systems , Applications of GPS.

GPS: Basic concepts, Functional system of GPS – Space segment, control segment and user segment, Working principle of GPS, Signal structure and code modulation, Pseudo-range measurements and navigation message

UNIT-IV: Errors and Positioning methods of GPS: Errors and biases in GPS measurements, Accuracy of navigation position: UERE and DOP, Intentional degradation of GPS signals: Selective availability (SA) and Anti-spoofing (AS) Differential GPS: Space based augmentation systems (e.g., SBAS, GAGAN) and Ground based augmentation systems (e.g., WASS, EGNOS). GPS Carrier Phase measurements: Single Differencing, Double Differencing and Triple Differencing in GPS measurements.

UNIT-V:Basic Concepts of GIS: Introduction to GIS, Areas of GIS application, Components of GIS, Overview of GIS Software packages, Current issues and Trends in GIS. Variables-Point, line, polygon, Map projections, Map Analysis.

GIS Data: Data types – spatial, non-spatial (attribute data) – data structure, data format – point line vector – Raster – Polygon

Data Input : Keyboard entry, Manual Digitizing, Scanner, Remotely sensed data, Existing Digital data Cartographic database, Digital elevation data

Data Editing: Detection and correction of errors, data reduction, edge matching

Learning Resources:

1. James B. Campbell & Randolph H. Wynne., Introduction to Remote Sensing, The Guilford Press, 2011

2. Lillesand, Kiefer, Chipman., Remote Sensing and Image Interpretation, Seventh Edition, 2022
3. Leick, A., GPS Satellite Survey, John Wiley: NJ, 2015
4. Hofmann, B., Lichtenegger H. and Collins J., Global Positioning System: Theory and Practice, Springer: Berlin, 2011.
5. Basudeb Bhatta, Remote Sensing and GIS, Oxford University Press, 2011.
6. Hofmann-Wellenh of, Bernhard, Lichtenegger, Herbert, Wasle, Elmar, GNSS – GPS, GLONASS, Galileo and more, 2013
7. Thanappan Subash., Geographical Information System, Lambert Academic Publishing, 2011.
8. Paul Longley., Geographic Information systems and Science, John Wiley & Sons, 2015
9. John E. Harmon & Steven J. Anderson., The design and implementation of Geographic Information Systems, John Wiley & Sons, 2003
10. Kang Tsung Chang., Introduction to Geographic Information Systems, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2021.
11. Burrough, P.A., Mc. Donnel and Christopher, D. Lloyd, Principles of GIS, Oxford Publications, 2015.
12. C.P.Lo & Albert K. W.Yeung, Concepts and Techniques of Geographic Information Systems, Prentice Hall India Pvt.Ltd, 2016.

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

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

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

INTRODUCTION TO OPERATING SYSTEMS

(OPEN ELECTIVE-III)

SYLLABUS FOR B.E. V-SEMESTER
(COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U24OE510CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
1 Understand different Operating system Structures and Services.	1 Explain Operating system structures and internal structure of a process 2 Compare CPU scheduling algorithms. Analyze Disk scheduling algorithms 3 Apply different techniques for Main memory management. 4 Describe file management techniques. 5 Describe deadlock handling methods.

UNIT-I: Introduction to operating systems: Definition, User view and System view of the Operating system, Operating system structure, Operating system services.

Process: Process concept, Process Control block, Context switching.

UNIT-II: CPU Scheduling: Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Round Robin

Device Management: Disk Scheduling algorithms: FCFS, SSTF, SCAN.

UNIT–III:Memory Management: Swapping, Contiguous memory allocation: Fixed Partitioning, Variable Partitioning. Non-Contiguous memory allocation: Paging.

Virtual memory: Demand paging, Page replacement Algorithms: FIFO, Optimal, LRU.

UNIT–IV:File System Interface: File Concept, Access Methods: Sequential, Indexed, and Direct

File System Implementation: File-System Structure, Allocation Methods: Contiguous, Linked and Indexed.

UNIT-V:Deadlocks: System model, deadlock characterization: Mutual Exclusion, Hold and Wait, Non pre-emption, Circular wait. Deadlock Prevention, Deadlock Avoidance: Banker's algorithm.

Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 9th Edition (2016), Wiley India.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition (2001), Pearson Education, Asia.
3. Dhananjay, Dhamdhere.M, *Operating System-concept based approach*, 3rd edition (2009), Tata McGraw Hill, Asia
4. Robert Love: *Linux Kernel Development*, (2004)Pearson Education
5. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
6. <http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php>
7. <https://nptel.ac.in/courses/106106144/>

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

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

Duration of Internal Tests: 90 Minutes

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE
Stream- Artificial Intelligence & Machine Learning
(OPEN ELECTIVE-III)
(COMMON for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E V SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:U24OE520CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES	
	<i>On completion of the course, students will be able to</i>	
Understand issues and techniques involved in the creation of intelligent systems.	1	Solve searching problems using A*.
	2	Develop an algorithm for playing games.
	3	Represent the knowledge using propositional logic and predicate logic
	4	Understand the Expert Systems
	5	Construct Neural Network to solve problems

UNIT-I:Introduction: Intelligent Systems, Foundation of AI, Sub areas of AI, Applications.

Problem Solving – State – Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of problem, Exhaustive Searches, Heuristic Search Techniques, Iterative – Deepening A*.

UNIT-II: Problem Reduction & Game Playing: Game Playing, Bounded Look – Ahead Strategy and use of Evaluation Function, MINIMAX procedure, Alpha-Beta Pruning.

UNIT-III: Logic Concepts: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, resolution Refutation in Propositional Logic, Predicate Logic.

UNIT-IV: Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert System versus Traditional Systems, Truth Maintenance Systems, Application of Expert Systems.

UNIT-V: Artificial Neural Networks: Introduction Artificial Neural Networks, Single – Layer Feed Forward Networks, Multi – Layer Feed Forward Networks.

Learning Resources:

1. Saroj Kaushik, "Artificial Intelligence", Cengage Learning, 2011.
2. Russell, Norvig, "Artificial Intelligence, A Modern Approach ", Pearson Education, Second Edition, 2004.
3. Elaine Rich, Kevin Knight, Shivshankar B. Nair, "Artificial Intelligence", Tata McGraw Hill, Third Edition 2009. Stuart Russell, Peter Norvig, Artificial Intelligence – A Modern Approach, Third Edition (2019), Pearson
4. Nils J. Nilsson, Artificial Intelligence: A New Synthesis, (1998), Elsevier

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 ELECTRONICS AND COMMUNICATION ENGINEERING

INTRODUCTION TO BIOMEDICAL ELECTRONICS

(Open Elective - III)

(Civil, CSE, CSE (AI&ML), EEE, IT & Mechanical)

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U24OE510EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To provide foundational knowledge of physiological systems and the origin of biomedical signals relevant to medical instrumentation. 2. To introduce the basic components and performance requirements of medical instrumentation systems, including intelligent and non-invasive systems. 3. To familiarize students with various electrodes and transducers used in biomedical applications, including their working principles and characteristics. 4. To develop understanding of therapeutic and prosthetic devices such as pacemakers, defibrillators, and ventilators, and their role in patient care. 5. To explore modern medical imaging technologies such as X-ray, CT, MRI, and thermography, and their applications in diagnostic medicine.	On completion of the course, students will be able to 1. Recognize the fundamental need for biomedical signal acquisition and describe the structure and function of basic biomedical instrumentation systems. 2. Explain the principles and applications of bioelectric signals, and evaluate the use of electrodes and transducers in biomedical measurements. 3. Demonstrate the working principles and clinical relevance of therapeutic, prosthetic, and non-invasive biomedical instruments used in diagnosis and treatment. 4. Apply mathematical, physical, and computational principles to interpret and analyze data from modern medical imaging systems such as X-ray, CT, and MRI. 5. Integrate knowledge of biomedical instrumentation systems to analyze constraints and design considerations for safe, reliable, and intelligent healthcare solutions.

UNIT-I: Basics of Biomedical Electronics: Physiological systems of the body, sources of biomedical signals, basic medical instrumentation system, performance requirements of medical instrumentation systems, Intelligent medical instrumentation systems, General constraints in design of medical instrumentation systems.

UNIT - II: Bioelectric Signals, Electrodes, Transducers: Origin of bioelectrical signals, recording electrodes, electrodes for ECG, EEG, EMG, micro-electrodes. Transducer: Introduction, classification of transducers, performance characteristics of transducers, displacement position and motion transducers, pressure transducers, photoelectric transducer.

UNIT - III:Therapeutic and Prosthetic Devices: Cardiac pacemaker, defibrillators, hemodynamic & haemodialysis, ventilators, infant incubators, surgical instruments, therapeutic applications of laser.

UNIT - IV: Non-invasive Instrumentation: Temperature measurements, principles of ultrasonic measurements and its applications in medicine, medical thermography, physics of thermography infrared detectors and thermographic detectors.

UNIT - V: Modern Medical Imaging System: Radiography: Production of X-rays, units of X-radiation, block diagram of X-ray machine, MRI, computed tomography: Block diagram and working.

Learning Resources:

L. Cromwell, Biomedical Instrumentation and Measurements, Prentice Hall.

Handbook of Biomedical Instrumentation by R.S. Khandpur.

S.K. Venkata Ram, Bio-medical Electronics and Instrumentation, Galgotia Publications, Pvt. Ltd.

https://onlinecourses.nptel.ac.in/e-learning/preview/noc22_md01

https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_bt78

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 ELECTRICAL AND ELECTRONICS ENGINEERING
MODELLING AND SIMULATION OF BASIC PHOTOVOLTAIC SYSTEMS
(Open Elective-III)

SYLLABUS FOR B.E. V SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U24OE510EE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
1. Understand photovoltaic systems concepts, design criteria and conclusions, 2. Verify model of photovoltaic systems using 3. PSpice.	1. Understand basics of solar radiation and PSpice software. 2. Use a simplified analytical model of solar cell which can be implemented in PSpice. 3. Examine basic equations of a solar cell and develop PSpice models 4. Describe the association of solar cells to form PV arrays and PV modules. 5. Interface PV systems to supply either DC or AC loads.

UNIT-I: Introduction to Photovoltaic Systems and PSpice: Photovoltaic system: Introduction, Important definitions: irradiance and solar radiation, Learning some of PSpice basics, Using PSpice subcircuits to simplify portability, PSpice piecewise linear (PWL) sources and controlled voltage sources, Energy input to the PV system: solar radiation availability, Problems

UNIT-II: Spectral Response and Short-Circuit Current: Introduction: Absorption coefficient and Reflectance, Analytical solar cell model, PSpice model for the short-circuit spectral current density, Short-circuit current, Effects of solar cell material, DC sweep plots and I(V) solar cell characteristics, Ideal circuit model: series and shunt resistances and recombination terms, Problems

UNIT-III: Electrical Characteristics of the Solar Cell: Ideal equivalent circuit, PSpice model of the ideal solar cell, Open circuit voltage, Maximum power point, Fill factor (FF) and power conversion efficiency, Generalized model of a solar cell, Effects of the series resistance on the short-circuit current and the open-circuit voltage, Effects of the shunt resistance, Effects of the recombination diode, Temperature effects, Problems

UNIT-IV: Solar Cell Arrays, PV Modules and PV Generators: Introduction, Series connection of solar cells, Identical solar cells in series, Bypass diode in series strings of solar cells, Shunt connection of solar cells, Shadow effects, The terrestrial PV module, Photovoltaic arrays, Photovoltaic generators and PV plants, Problems

UNIT-V: Interfacing PV Modules to Loads and Battery Modelling: DC loads directly connected to PV modules, Photovoltaic pump systems, DC series motor PSpice circuit, Centrifugal pump PSpice model, PSpice simulation of a PV array-series DC motor-centrifugal pump system, PV modules connected to a battery and load, Lead–Acid battery PSpice model, PSpice model to commercial batteries, Simplified PSpice battery model, Problems

Learning Resources:

1. Luis Castaner and Santiago Silvestre, Modelling Photovoltaic Systems using PSpice, John Wiley & Sons Ltd, 2002
2. Paul Tobin, PSpice for Circuit Theory and Electronic Devices, Morgan & Claypool Publishers, 2007.
3. Muhammad H. Rashid, Introduction to Pspice Using Orcad for Circuits and Electronics, Prentice-Hall of India Pvt.Ltd, 2004.
4. Orcad Capture User's Guide, Cadence Design Systems, Second edition 2000.

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 INFORMATION TECHNOLOGY
INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

(General Pool Stream: Open Elective-III)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. V-SEMESTER

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code :U24OE510IT
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
1. Apply the concepts of database management systems and design relational databases.	1. Understand functional components of the DBMS and develop ER model for a given problem and map ER it to Relational model 2. Understand Relational model and basic relational algebra operations. 3. Devise queries using SQL. 4. Design a normalized database schema using different normal forms. 5. Understand transaction processing and concurrency control techniques.

UNIT–I: Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Architecture, Database Users and Administrators.

Database Design and the E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams

UNIT–II: Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Fundamental Relational-Algebra Operations.

UNIT–III: Structured Query Language: Introduction, Data Definition, Basic Structure of SQL Queries, Modification of the Database, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Join Expressions, Views.

UNIT–IV: Relational Database Design: Features of Good Relational Design, Normalization-Decomposition Using Functional Dependencies, Functional-Dependency Theory.

UNIT–V:Transactions: Transaction Concepts, Transaction State, Concurrent Executions, Serializability

Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, Database System Concepts, 6th Edition, McGraw-Hill International Edition, 2011.
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, Third Edition, McGraw-Hill International Edition, 2003.
3. Elmasri, Navathe, Somayajulu and Gupta, Fundamentals of Database System, 6th Edition, Pearson Education, 2011.
4. Patric O'Neil, Elizabeth O'Neil, Database-principles, programming, and performance, Morgan Kaufmann Publishers, 2001.
5. Peter Rob, Carlos coronel, Database Systems, (2007), Thomson.
6. <https://nptel.ac.in/courses/106105175/>

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

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

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

DEPARTMENT OF INFORMATION TECHNOLOGY
INTRODUCTION TO ARTIFICIAL INTELLIGENCE
(AI&ML TRACK : OPEN ELECTIVE-III)
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS OF B.E V- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: U24OE520IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
1. The objective of this course is to provide the necessary fundamentals, approaches in Artificial intelligence for problem solving for a goal-based single or multi agents with or without constraints and formalise soft computing techniques for better optimization for intelligent systems.	1. Investigate applications of AI techniques in intelligent agents. 2. Apply various search algorithms for demonstrating agents, searching and inferencing 3. Analyse searching beyond classical search and adversarial Techniques. 4. Identify problem types which might have constraints and evolutionary computation. 5. Define the fuzzy systems, ethics and risks of AI.

UNIT-I: Introduction to AI: What is AI, Foundations of AI, History of AI, State of the Art, Applications of AI.

Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

UNIT-II: Solving Problems by Search: Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies: Breadth first search, Depth-first search, Depth limited search, Iterative deepening depth first search

Informed (Heuristic) Search Strategies: Greedy best first search, A* Search, Optimality of A*, Heuristic Functions.

UNIT-III: Beyond Classical Search: Local search and optimization problems, Local search in continuous spaces, Searching with non-deterministic actions and partial observations.

Adversarial Search: Games, Optimal decisions in games, Alpha-Beta Pruning, Imperfect real time decisions.

UNIT-IV: Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.

Introduction to Evolutionary Computation: Representation – The Chromosome, Initial Population, Fitness Function, Selection, Reproduction Operators, Stopping Conditions, Evolutionary Computation versus Classical Optimization.

UNIT-V: FUZZY Systems, Logic and Reasoning: Fuzzy Sets-Formal Definitions, Membership Functions, Fuzzy Operators, Fuzzy Set Characteristics, Fuzziness and Probability, Fuzzy Inferencing.

Philosophical foundations: Weak AI, Strong AI, Ethics of AI and Risks of AI.

Learning Resources:

1. Artificial Intelligence A Modern Approach Third Edition – Russell & Norvig
2. Computational Intelligence: An Introduction, 2nd Edition - [Andries P. Engelbrecht](#)
3. <https://online.stanford.edu/courses/cs221-artificial-intelligence-principles-and-techniques>
4. <https://nptel.ac.in/courses/106105077>
5. <https://ocw.mit.edu/courses/6-034-artificial-intelligence-spring-2005/>

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

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

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

DEPARTMENT OF MECHANICAL ENGINEERING
ADDITIVE MANUFACTURING AND ITS APPLICATIONS

(General Pool)
(Open Elective-IV)

SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U24OE620ME
Credits: 03	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: 1. Understand the fundamentals of various additive manufacturing technologies and their applications in Engineering Industry.	On completion of the course the student will be able to: 1. Understand the fundamentals of prototyping and the various data formats used in Additive Manufacturing. 2. Study the principle, process, advantages, limitations and case studies of liquid based AM systems. 3. Study the principle, process, advantages, limitations and case studies of solid based AM systems. 4. Study the principle, process, advantages, limitations and case studies of powder based AM systems. 5. Study the applications of AM in various engineering industries as well as the medical field.

UNIT-I: Introduction: Prototyping fundamentals, Historical development, Advantages of AMT, Commonly used terms, Fundamental Automated Processes, process chain, 3D modeling, Data Conversion, and transmission, Checking and preparing, Building, Post processing, RP data formats, Newly Proposed formats, Classification of AMT process.

UNIT-II: Liquid based systems: Stereo lithography apparatus (SLA): Models and specifications, process, working principle, photopolymers, photo polymerization, layering technology, laser and laser scanning, applications, advantages and disadvantages, case studies.

Solid ground curing (SGC): Models and specifications, process, working, principle, applications, advantages and disadvantages, case studies.

UNIT-III: Solid based systems: Laminated object manufacturing (LOM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.

Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.

UNIT-IV: Powder Based Systems: Selective laser sintering (SLS): Models and specifications, process, materials, working principle, applications, advantages and disadvantages, case studies.

Three dimensional printing (3DP): Models and specification, process, working principle, applications, advantages and disadvantages, case studies.

UNIT-V: Applications of AM systems: Applications in Design, aerospace industry, automotive industry, jewellery industry, coin industry, GIS Application, arts and architecture.

RP medical and bio engineering Application: planning and simulation of complex surgery, customized implant and prosthesis, design and production of medical devices, forensic science and anthropology, visualization of bio-molecules.

Learning Resources:

1. Chua C.K., Leong K.F. and LIM C.S Rapid prototyping: Principles and Applications, World Scientific publications, 3rdEd., 2010
2. D.T. Pham and S.S. Dimov, "Rapid Manufacturing", Springer, 2001
3. Terry Wohlers, "Wohlers Report 2000", Wohlers Associates, 2000
5. Paul F. Jacobs, "Rapid Prototyping and Manufacturing", ASME Press, 1996
6. Ian Gibson, Davin Rosen, Brent Stucker "Additive Manufacturing Technologies, Springer, 2nd Ed, 2014.

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
Duration of Internal Test: 90 Minutes				

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

DEPARTMENT OF MECHANICAL ENGINEERING
DRIVES AND CONTROL SYSTEMS FOR ROBOTICS
(Stream: Robotics)

(Open Elective-III)

SYLLABUS FOR B.E. V-SEMESTER

Instruction : 3Hours	SEE Marks : 60	Course Code : U24OE510ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: 1. To provide students with a fundamental understanding of control systems and their applications in robotics.	On completion of the course, the student will be able to: 1. Understand basic control system types and analyze block diagrams using transfer functions. 2. Interpret transient and steady-state responses and understand system stability concepts. 3. Represent control systems using state-space models and convert between state-space and transfer functions. 4. Understand control techniques to achieve precise and stable joint control in robotic systems. 5. Implement advanced control strategies to enhance the performance and interaction of robotic systems.

UNIT-I: Introduction to Control Systems: Examples of control systems, Transfer function of spring-mass-damper system, Transfer function of simple RLC circuit. Block diagrams, Block diagram reduction.

UNIT-II: Steady-State and Transient Response: Transient Response of first order and second order system to step input. Concept of steady-state error. Stability: Introduction to the concept of stability using Routh-Hurwitz criterion.

UNIT-III: State-space representation of linear control systems: Basic concepts. State-space representation of spring-mass-damper system, State-space representation of simple RLC circuit. Conversion of Transfer function into State Space, Conversion of State-Space in to Transfer Function.

UNIT-IV: Independent Joint Control: Transfer function of Armature Controlled DC Motor, Proportional (P) Control, Proportional-Integral (PI) Control, Proportional-Derivative (PD) Control, Proportional-Integral-Derivative (PID) Control.

UNIT-V: Computed Torque Feed-forward Control, Force Control: Compliance Control, Impedance Control, Hybrid Force/Motion Control.

Learning Resources:

1. Norman S. Nise, "Control Systems Engineering", John Wiley & Sons, Inc., 2001.
2. Ogata, K. "Modern Control Engineering", Prentice Hall, 2004
3. Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Robotics: Modelling, Planning and Control, Springer Science & Business Media, 2008
4. Spong, Mark W., and M. Vidyasagar, Robot dynamics and control. John Wiley & Sons, 2008.

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
Duration of Internal Test: 90 Minutes				

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
BASICS OF ENTREPRENEURSHIP
(Open Elective-III)

SYLLABUS FOR B.E V Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U24OE540EH
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: 1. Take entrepreneurship as a career choice 2. Understand the method of preparing a business model 3. Develop costing and pricing strategy 4. Understand team building and its importance. 5. Create marketing and sales strategies for business and understand business regulations.	On completion of the course the student will be able to: 1. Explain the role of entrepreneurship and assess its potential as a career path. 2. Develop and validate a business model using structured tools. 3. Apply basic costing and pricing strategies for a startup. 4. Demonstrate effective team building and leadership in startups. 5. Design marketing strategies and understand key business regulations.

UNIT-I:Introduction to Entrepreneurship:Definition of Entrepreneurship, Entrepreneurship as a career choice, Benefits and Myths of Entrepreneurship. Characteristics, Qualities and Skills of an Entrepreneur. Impact of entrepreneurship on the Economy and Society.

Opportunity and Customer Analysis: Identify your Entrepreneurial Style, Identify Business Opportunities, Methods of finding and understanding Customer Problems, Process of Design Thinking, Identify Potential Problems, Customer Segmentation and Targeting, Crafting your Value Propositions, Customer-Driven Innovation.

UNIT-II: Business Model and its Validation: Types of Business Models, Lean Approach, the Problem-Solution Fit Test, Solution Interview Method, Difference between Start-up Venture and small Business, Identify Minimum

Viable Product (MVP), Build-Measure-Learn Feedback Loop, Product-market fit test.

UNIT-III: Economics and Financial Analysis: Revenue streams and pricing, Income analysis and Cost Analysis. Product Cost and Operation Cost, Basics of Unit Costing, Profit Analysis, Customer Value Analysis, Different Pricing Strategies, Investors' Expectations, Pitching to Investors and Corporate.

UNIT-IV: Team Building and Project Management: Leadership Styles, Team Building in Venture, Role of good team in Venture, Roles and Responsibilities, Explore Collaboration Tools and Techniques. Brainstorming, Mind Mapping. Importance of Project Management, Time Management, Work Flow.

UNIT-V: Marketing & Business Regulations :Positioning, Positioning Strategies,Building Digital Presence and Leveraging Social Media, Measuring effectiveness of Channels, Customer Decision-making Process, Sales plans and Targets, Unique Sales Proposition (USP), Follow-up and Close Sales. Business Regulations of starting and operating a Business, Start-up Ecosystem.

Learning Resources:

1. Robert D. Hisrich, Michael P Peters, "Entrepreneurship", Sixth edition, McGraw-Hill Education.
2. Thomas W. Zimmerer, Norman M. Scarborough, "Essentials of Entrepreneurship and small businessManagement", Fourth edition, Pearson, New Delhi, 2006.
3. Alfred E. Osborne, "Entrepreneurs Toolkit", Harvard Business Essentials, HBS Press, USA, 2005
4. MadhurimaLall and ShikhaSahai, "Entrepreneurship", Excel Books, First Edition, New Delhi,2006

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
	Duration of Internal Test:	90 Minutes		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-24)
BE (CIVIL ENGINEERING) VI-SEMESTER ACADEMIC YEAR 2026-2027
(Students Admitted in 2024-25)

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								
U24HS040EH	Economics & Finance for Engineers	2	-	-	3	60	40	2
U24BS610MA	Skill Development Course-VII (Aptitude-III)	1	-	-	2	40	30	1
U24PC610CE	Design of Steel Structures	3	1	-	3	60	40	4
U24PC620CE	Soil Mechanics	3	1	-	3	60	40	4
U24PC630CE	Highway Engineering	3	-	-	3	60	40	3
U24PC640CE	Construction Management and Administration	3	-	-	3	60	40	3
U24PE610CE	Skill Development Course-VIII (Technical Skills-III)	1	-	-	2	40	30	1
U24OEXXX	Open Elective-IV	3	-	-	3	60	40	3
PRACTICALS								
U24PC611CE	Soil Mechanics Lab	-	-	2	3	50	30	1
U24PC621CE	Computer Aided Structural Engineering Lab	-	-	2	3	50	30	1
U24PC631CE	Highway Engineering Lab	-	-	2	3	50	30	1
U24PW619CE	Theme Based Project	-	-	2	-	50	30	1
Note: The left over hours are to be allotted to CCA-II / Sports / Library / Mentor Interaction / CC / RC / TC / PDC based on the requirement.								
Total		19	2	8		640	420	25
Grand Total		29				1060		
Student should complete one NPTEL (8 weeks) certificate course equivalent to 2 credits by the end of VI semester								

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

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
ECONOMICS AND FINANCE FOR ENGINEERS

SYLLABUS FOR B.E VI Semester

Instruction: 2Hrs/week	SEE Marks: 60	Course Code: U24HS040EH
Credits: 2	CIE Marks:40	SEE: 3 hrs.

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. Understand the concepts and tools of economics, accounting and finance that will equip them for decision making.	At the end of the course the learner will be able to : 1. Gain a conceptual understanding of economics as a discipline. 2. Construct a cost sheet and classify costs and make use of Marginal cost analysis in decision making. 3. Understand the accounting process and analysis of financial statements. 4. Conceptual understanding of Financial Management and evaluate Long term investment decisions in business.

UNIT-I: Concepts in Economics: Definition of Managerial Economics-Scope of Managerial Economics-Relevance of Economics for Engineers - Concept of Demand - Determinants of Demand - Law of Demand- assumptions and exceptions of Law of Demand -Price Elasticity of demand - Numerical problems on price elasticity of demand - Application-oriented approach of price Elasticity -Types of market structures.

UNIT-II: Cost Analysis and Profit Planning : Concept of Cost - Classification of Costs-Cost sheet (simple problems) - Marginal Costing Analysis (simple numerical problems on Break Even Analysis only) - Application oriented approach (Make or buy, continue or shutdown decisions - Theory)

UNIT-III: Conceptual Understanding of Accounting: Preparation of Income statement and Balance Sheet (with adjustment of closing stock only) - Ratio Analysis - Liquidity Ratios (Current ratio, Liquid Ratio), Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Cost Ratio, Operating Profit Ratio), Activity ratios (Stock Turnover Ratio, Debtors Turnover Ratio, Creditors Turnover Ratio, Fixed assets Turnover Ratio) Solvency Ratios (Debt-Equity Ratio, Long Term Debt to Shareholders Net worth Ratio).

UNIT- IV: Financial Management Decisions: Investment decisions - Long term - Capital budgeting - Traditional and DCF Techniques (Numerical on capital budgeting techniques namely PBP, ARR, NPV, and PI) - Short term - Introduction to working capital (gross and net working capital)

Learning Resources for students:

1. Mehta P.L., "Managerial Economics: Analysis, Numericals and Cases", Sultan Chand and Sons. Latest edition.
2. S.P. Jain and K.L. Narang., "Financial Accounting", Kalyani Publishers – Latest edition.
3. S.P. Jain and K.L. Narang., "Cost Accounting", Kalyani Publishers, Latest edition.
4. M.Y. Khan and P.K. Jain., "Financial Management – Text, Numericals and Cases", McGraw Hill Education Private Limited, New Delhi. Latest edition
5. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, Latest edition.
6. Narayanaswamy, "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:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05
	Duration of Internal Test:	90 Minutes		

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
SKILL DEVELOPMENT COURSE- VII (VERBAL ABILITY)

SYLLABUS FOR B.E VI Semester

Instruction: 2Hrs/week	SEE Marks:40	Course Code: U24HS630EH
Credits: 1	CIE Marks:30	SEE: 3 hrs.

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. Introduce students to higher order thinking and problem solving via vocabulary and its various components 2. Train students to understand context & theme and use it to complete sentences. 3. Train students to identify the structure of sentences & paragraphs 4. Train students to analyze text, e.g., simple outlining and note taking, summarize, draw conclusions, and apply information to personal experiences 5. Train students to improve the quality of sentences by fixing errors	At the end of the course the learners will be able to: - 1. Use vocabulary as a tool to solve questions in verbal ability 2. Identify meanings of words using theme and context 3. Solve questions based on jumbles-sentences and paragraphs 4. Develop skills to critically analyze texts and then the ability to identify its theme 5. Improve the quality of their writing by being aware of the common errors

Unit 1: Vocabulary- Reading for Content and Context

Overview:

This course is designed for students to not just understand the importance of vocabulary but also to build on it by using the appropriate tools and methods. After which they will be able to solve vocabulary based questions and also use vocabulary as a tool to solve problems.

1.1 Concepts & Context Rules: Collocations & Phrasal Verbs

1.2 Prefixes/ Suffixes & Root Words

- 1.3 Phrases & Idioms; Questions based on it
- 1.4 One Word Substitution; Questions based on it
- 1.5 Antonyms, Synonyms & Incorrect Word Usage

Unit 2: Fill in the Blanks- Applying Content and Context

Overview:

This course is designed for students to identify the clue/ theme words in sentences, then understand the context in which the words are used and finally apply concepts like collocation, antonyms, and synonyms to solve questions.

- 2.1 Concepts & Rules: Single Fill in the Blanks
- 2.2 Double/ Triple Fill in the Blanks
- 2.3 Cloze Test

Unit 3: Jumbles

Overview:

This course is designed to develop and improve reading and study skills needed for college work. Topics include identifying main idea and supporting details, determining author's purpose and tone, distinguishing between fact and opinion, identifying patterns of organization in a sentence or passage and the transition words associated with each pattern, recognizing the relationships between words and sentences, identifying and using context clues to determine the meanings of words, identifying logical inferences and conclusions.

- 3.1 Concepts- Purpose, Tone, Point of view
- 3.2 Para jumbles
- 3.3 Jumbled Sentences

Unit 4: Critical Reading Skills

Overview:

Research shows that good reading skills can lead to well written assignments. In this unit, students will learn, develop and improve reading and study skills needed for college work. Building on these basic strategies, students will develop skills to critically analyze texts and then the ability to identify its theme.

- 4.1 Concepts- Basic Introduction & Short Passages
- 4.2 Article & Article Based Passages
- 4.3 Theme Detection

Unit 5: Spotting the Errors

Overview:

In this unit students will focus on identifying errors in sentences, rectifying them and improving the quality of sentences. Building on these skills will also have an impact on the written and spoken skills of students since they will be aware of the common and often made errors and therefore be able to avoid them while using language.

5.1 Concepts- Basic Introduction & Sentence Fillers

5.2 Spot the Errors

5.3 Sentence Improvement

METHODOLOGY

- Demonstration
- Presentations
- Expert lectures
- Writing and Audio-visual lessons

ASSESSMENTS

- Online assignments
- Individual and Group

Learning Resources:

learn.talentsprint.com

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	20
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			

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

DEPARTMENT OF CIVIL ENGINEERING
DESIGN OF STEEL STRUCTURES

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):3 : 1 : 0	SEE Marks:60	Course Code: U24PC610CE
Credits: 4	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Understand the design philosophies of steel structures. 2. Design the bolted connections and welded connections including detailing. 3. Design tension members, compression members and beams by limit state design as per IS:800-2007. 4. Estimate the loads on roof trusses and design the members of roof truss.	1. Compare the different design philosophies and employ limit state design in the design of structural elements using rolled steel sections according to IS: 800-2007. Design bolted connection using black bolts and welded connections using fillet welds, groove welds subjected to concentric loads by limit state method according to IS:800-2007 2. Design tension members using limit state design according to IS:800-2007 3. Design compression members and column bases using limit state design according to IS:800-2007 4. Design laterally supported beams using limit state design according to IS:800-2007 5. Estimate loads on roof trusses subjected to different load combinations and design purlins, members of truss using angle sections by limit state according to IS: 800-2007

UNIT-I: Materials and Specifications (Limit State Design): Types of Structural Steel-classification of Rolled Steel Sections.

Design Philosophies: Plastic and limit design, limit stated design

Introduction to Limit State Design: Loads & Load combinations, characteristic loads, design loads, design strength, partial safety factors for materials and loads.

Bolted Connections: Types of bolts, types of bolted joints, load transfer mechanism, modes of failure of bolted joints. Design of bolted joints using ordinary black bolts for concentric loads. High strength friction grip bolts.

Welded Connections: Types of welds, types of welded joints, design of welded joints for concentric loads using fillet welds and groove welds.

UNIT-II: Design of Tension Members: Introduction to tension members-applications of tension members, modes of failure, design of tension members-design of lug angles.

UNIT-III: Design of Compression Members: Introduction, sections used for compression members. Effective length of compression members, slenderness ratio, types of buckling, design of compression members for axial loads with single section and built up sections (symmetric in both directions), lacing and battening.

Design of Column Bases: Design of slab base and gusseted base for axial load.

UNIT-IV: Design of Beams: Introduction to plastic analysis-plastic hinge, plastic moment, shape factor, Classification of cross sections, phenomenon of lateral torsional buckling; design of laterally restrained beams, Check for web crippling, web buckling & deflection.

UNIT-V: Design of Roof trusses: Types of trusses, estimation of loads-dead load, live load and wind load, design of purlins, analysis of roof trusses and design of its members with angles sections, bracings of roof trusses.

Pre-Engineered Buildings (PEB): Advantages of PEB, Applications of PEB Materials used for manufacturing of PEB.

Learning Resources:

1. Duggal S.K., "Limit state Design of Structures", 3rd Edition, McGrawHill Education, 2019
2. Shiykar, M.R "Limit state design in structural steel" , 3rd edition, 2017, PHI learning private limited.
3. Gambhir M.L., "Fundamentals of Structural Steel Design", McGrawHill Education (India) Pvt. Ltd., New Delhi, 2017
4. Bhavikatti S.S., "Limits state Design of steel Structures", 5th Edition, Dream tech Press 2019.

5. SubramanianN, "Design of Steel Structures (Limit State methods)", 2nd Edition Oxford University Press, 2023
6. K.S. Vivek and P. Vyshani "Pre- Engineered Steel Buildings" LAP Lambert Academic Publishing, 2025.
7. IS:800-2007: Code of Practice for General Construction in Steel, Bureau of Indian Standards, New Delhi.
8. IS: 875-2015: Code of Practice for Design loads for buildings and structures, Bureau of Indian Standards, New Delhi.
9. ISI Hand book No.1 or Steel Tables by Bhavikatti S S
10. <http://nptel.ac.in/courses/105103094/>
11. www.steel-insdag.org

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

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

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

DEPARTMENT OF CIVIL ENGINEERING
SOIL MECHANICS

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code:U24PC620CE
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. Study Origin, classification of soils and estimate index and engineering properties by different methods. 2. To comprehend effective stress under different hydraulic conditions 3. To analyze the vertical stress distribution in soil under applied loads. 4. Learn concepts of compaction and consolidation of soils	1. Interpret composition and structure of soils and classify them according to IS Soil classification. 2. Evaluate effective stress under Hydrostatic Conditions, 3. Analyze seepage through soils under various boundary conditions using flow net techniques, and evaluate seepage forces, quicksand conditions, and pore pressure distribution to assess stability. 4. Compute stress distribution and analyze mechanism of compaction of soils under given field conditions. 5. Determine and judge shear strength in soils under given field conditions

UNIT-I: Introduction and clay chemistry: – Brief history of discipline, Soil formation, structure of soils, composition and structure of clay minerals, clay-water interaction

Soil phase relationships pseudo-elastic three phase particulate medium, Mass-volume & weight-volume relationships and determination of specific gravity and water content.

Index properties: Shape and size characterization- Grain size distribution analysis of soils, Atterberg limits and consistency indices, Soil classification systems.

UNIT-II: Permeability of Soils: Validity of Darcy's Law-Factors affecting permeability– Field and laboratory tests to determine permeability-Equivalent permeability of stratified soils.

Effective stress: Effective stress principle, Determination and distribution of effective stress under hydrostatic conditions; variation of effective stress with depth due to fluctuations in water table, surcharge loading, and capillary action.

UNIT-III: Seepage Analysis: Seepage force-downward and upward flow conditions, Quicksand phenomena- Remedial measures.

Laplace equation-2D Steady flow, principles, and assumptions of flow net construction qualitative representation of flownets under defined boundary conditions; flownets and their applications–dams, and sheet piles.

UNIT-IV: Stress Distribution: Boussinesq's and Westergaard's equations for point load. Application of point load, line load, uniformly distributed load on circular and rectangular areas and other approximate methods. Use of Newmark's chart (for Boussinesq's equation). Contact pressure distribution and settlement under flexible and rigid foundations located on sands and clays.

Compaction Process: Compaction Mechanism; factors affecting compaction, influence of compaction on engineering properties. Determination of compaction characteristics- Light and Heavy compaction tests. Field and laboratory CBR tests.

UNIT-V: Shear Strength: Significance of Shear strength in soils–Mohr-Coulomb model–shear parameters-Determination of shear strength–Direct shear test, large shear box test Tri-axial compression tests (Unconsolidated Undrained (UU), Consolidated Undrained (CU) and Consolidated Drained (CD)), UCC test, Vane shear test. Stress- strain behavior of soils-Stress path-Skempton's pore water parameters

Learning Resources:

1. Gopal Ranjan, Rao A.S., "Basic and Applied Soil Mechanics", New age publications, 2023.
2. Murthy V.N.S., "A Textbook of Soil Mechanics & Foundation Engineering", CBS Publishers, 2018.
3. Venkatramaiah C., "Geotechnical Engineering", New Age Publishers, 6th

Edition, 2018.

4. ShashiK. Gulhatiand Manoj Datta,"Geotechnical Engineering",TataMc-GrawHill,2017
5. BrajaM.Das, Khaled Sobhan,"Principlesof Geotechnical Engineering", Cengage Learning, 2019
6. Craig's, R.F., "Soil Mechanics" Ninth edition,2020
7. Karl Terzaghi, Ralph B. Peck, Gholamreza Mesri., "Soil Mechanics in Engineering Practice" John Wiley & Sons, 07-Feb-1996-imported version.
8. William Lambe T., Robert V. Whitman.,Soil Mechanics" John Wiley & Sons, 2012
9. Scott,R.F.,"PrinciplesofSoil Mechanics",Addison-Wesley-Massachusetts,
10. ISCode: IS-2720, Methods of tests for Soils.
11. <http://nptel.ac.in/courses/105101084/>
12. <https://ocw.mit.edu/courses/1-361-advanced-soil-mechanics-fall-2004/pages/syllabus/>

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

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

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

DEPARTMENT OF CIVIL ENGINEERING
HIGHWAY ENGINEERING

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):3:0 : 0	SEE Marks:60	Course Code:U24PC630CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Provide comprehensive knowledge of highway development, functional classification, alignment principles, and geometric design elements. 2. equip students with fundamental understanding and practical skills in traffic characteristics, studies, regulation, and intersection design. 3. evaluate a range of pavement types, materials, characterization methods, and mixture design principles to facilitate understanding and application. 4. analyze factors influencing pavement design and apply appropriate methods for flexible and rigid pavement design. 5. develop proficiency in pavement construction techniques, and understand maintenance practices for addressing pavement failures.	1. Apply knowledge of geometric features to design horizontal and vertical alignment of highways/roads according to IRC guidelines. 2. Analyze traffic data and develop survey plans for solving urban traffic issues, utilizing key traffic elements and methodologies. 3. Evaluate highway materials through quality control tests, and formulate job mix formulas using the Rothfuch method. 4. Design flexible and rigid pavements for National highways in accordance with IRC guidelines. 5. Utilize diverse construction techniques, diagnose causes of pavement failures, and recommend appropriate remedial measures.

UNIT-I : Highway Classification, Alignment And Geometric Design:

Introduction, Highway development in India, Functional classification of roads as per IRC, Road patterns.

Highway alignment – Requirements and factors controlling alignment of roads – Factors governing geometric design.

Highway cross-sectional elements – Carriageway, Shoulders, Medians, Right of way, Footpaths, Bus bays, Cycle tracks, Service roads, Camber. Sight distances – Stopping and overtaking sight distance.

Design of horizontal alignment – Speed, radius, super elevation, extra widening, transition curves.

Design of vertical alignment – gradient, grade compensation, summit curves and valley curves

UNIT-II : Traffic Engineering: Basic traffic characteristics – Volume, speed, density, headways and relationships amongst them.

Traffic studies - Objectives of traffic studies, Methods of data collection and presentation of various traffic studies such as volume studies, speed studies, speed and delay studies, origin destination studies, parking studies, accident studies. Highway capacity and Level of service concepts as per HCM.

Traffic regulation and control – Traffic signs, signals, markings and channelization. Principles of design of at-grade intersections – Simple layouts. Design of isolated signal by IRC method. Introduction to grade separated interchanges.

UNIT-III : Pavement Material Characterisation: Types of pavements and materials for pavements.

Aggregates–Aggregate Sampling Methods -coning , quartering and riffing.characterizing the physical, mechanical and shape related properties of aggregate particles, Blending of aggregates and job mix formula by Rothfuch method.

Binders – Types of paving binders – bitumen, cutbacks and emulsions, modified binders, characterization of bituminous binders : flash and fire point test, penetration test, softening point test, ductility test, Fraass breaking point test, viscosity test , Specific gravity test , simulation of short term aging using RTFOT, simulation of long term aging using PAV. Gradation of bitumen - penetration grading, Viscosity grading and performance grading. Bituminous mixture design by Marshall's stability method(MS 2 Manual method).

UNIT-IV : Pavement Design: Factors affecting pavement design – Traffic, soils and materials

Flexible pavement design using IRC 37:2018.

Rigid pavement design using IRC 58: 2015, Introduction to expansion ,

contraction, construction and longitudinal joints for jointed plain cement concrete pavements

UNIT-V: Pavement Construction and Maintenance:

Pavement construction –Steps in construction of bituminous pavements as per MORTH specifications, Full depth reclamation of pavements.

Pavement failures and maintenance—Introduction to flexible and Rigid Pavement evaluation, Pavement failures – types, causes and remedies, Maintenance of bituminous pavements.

Overlay design – Overlay design of flexible pavements as per IRC:81-1997 and relevant latest IRC provisions.

Learning Resources:

1. Khanna S.K., Justo C.E.G., Veeraraghavan A., "Highway Engineering", 10th Edition, Nem Chand & Bros, 2024
2. Kadiyali L.R., Traffic Engineering and Transportation Planning, Khanna Publishers, 2024.
3. Roger P. Roess, Elena S. Prassas, William R. McShane "Traffic engineering" Pearson, 5th Edition, 2022.
4. Nicholas J. Garber Lester A. Hoel, Traffic and Highway Engineering- III edition, Cengage publication Indian edition 2019.
5. Yoder E.J., Witczak M.W., Principles of Pavement Design, John Wiley & Sons –Indian edition. 2024
6. Srinivasa Kumar R., Pavement design, Orient Blackswan Pvt. Ltd., New Delhi, 2023
7. IRC:37 : 2018 : Guidelines for the design of flexible pavements
8. IRC 58 :2015: Guidelines for the design of plain jointed rigid pavements
9. IRC 120-2015: Recommended practice for recycling of bituminous pavements
10. IRC 81 – 1997:Guidelines for Strengthening of Flexible Road Pavements Using Benkelman Beam Deflection Technique.
11. IRC MORT&H- Specifications for road and bridge works, Reprint 2016 (Fifth Revision)
12. IRC 35 -2015 (Road markings), IRC 38 -1988 (Horizontal curves), IRC 53 -2012 (Accident forms), IRC 67 -2012 (Road signs), IRC:82-2015 (Maintenance of BT roads), IRC:86-1983 (geometric design standards), IRC:93-1985 (traffic signals), IRC:106-1990 (capacity), IRC:SP:23-1993 (vertical curves), IRC:SP:41-1994 (at-grade intersection)
13. Indo Highway Capacity Manual (Indo HCM) 2017 by CSIR –Central Road research institute
14. www.pavementinteractive.org
15. <http://nptel.ac.in/courses/105105107/>

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

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

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

DEPARTMENT OF CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT AND ADMINISTRATION

SYLLABUS FOR B.E.VI SEMESTER

L : T : P (Hrs./week):3:0:0	SEE Marks:60	Course Code: U24PC640CE
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 concept of construction management along with functions and objectives. 2. Understand the various techniques used for construction planning such as bar charts, CPM, PERT and crashing of networks 3. Acquire knowledge on various types of construction contracts, tenders and acts related to construction and construction safety 4. Understand the concept of Linear Programming in Construction along with application of Graphical and Simplex methods.	1. Identify and report the importance and necessity of construction management. 2. Employ bar charts, networks to determine the critical path and alter the construction schedules accordingly. 3. Interpret the terms related to costs and time, and there by solve problems on crashing of networks. 4. Categorize various construction contracts, acts and examine various documents related to construction. 5. Interpret the concept of Linear Programming in Construction, and solve problems on Graphical and Simplex methods.

Unit-I: Significance of Construction Management: Objectives and functions of construction management, construction management team, principles of organization and types of organization.

Unit-II: Construction Planning: Construction planning, bar charts, network techniques in construction management – CPM, Expected likely, pessimistic and optimistic time, normal distribution curve and network problems of PERT.

Unit-III: Time Cost Analysis: Cost time analysis in network planning, updating, Earned value Management, simple problems of civil engineering works.

Unit-IV: Contracts: Introduction, types of construction contracts and their advantages and disadvantages, conditions of contracts, Introduction to Indian contract act.

Tender: Tender form, Tender Documents, Tender Notice, e-tendering, Government e-procurement system, GEM (Government e Market) procurement, Work orders, Earnest money, Security Deposit, Arbitration.

Safety in construction: Safety measures, workmen compensation act, construction labour act. Demolition of buildings – safety measures.

Unit – V: Linear programming and optimization in construction:

Introduction to optimization – Linear programming, Importance of optimization in construction, Simple problems on formulation of LP, Graphical method, Simplex method – using software based approach.

Learning Resources:

1. Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 2023.
2. Srinath L.S., PERT and CPM: Principles and Application, Vision IAS, 2020.
3. Kumar NeerajJha., Construction Project Management: Theory and Practice, Pearson Education, India, reprint 2020.
4. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2019.
5. Gahloj. P.S. and Dhiv. B.M., Construction Planning and Management, Wiley Eastern Ltd., 2018.
6. Seetharaman S., Construction Engineering and Management, Umesh Publications, 2017.

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

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

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

DEPARTMENT OF CIVIL ENGINEERING
SKILL DEVELOPMENT COURSE-VIII: (TECHNICAL SKILLS-III)

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):1: 0 : 0	SEE Marks:40	Course Code:U24PE610CE
Credits : 1	CIE Marks:30	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. Software package on construction management technology	1. Plan, execute and monitor large scale projects execution using Project Management software.
2. Element wise assembling the parts of a building.	2. Execute Exterior designing plans and graphs of building by using Building Information Modelling Software.

**Project Management Software
UNIT-I**

- Training on Installation and setup
- Introduction to project management
- Introduction to primavera
- Enterprise project structure (EPS)

UNIT-II

- Organisational breakdown structure
- Project codes and values
- Global and project calendars
- Adding a project (W/O project architect)
- Work breakdown structure (WBS)

Civil 3D

- Introduction to Civil 3D
- Benefit of Civil 3D
- Comparison with Autodesk Products
- Importing of Point
- Introduction to User Interface

- Types of Elements, Levels and Grids
- Triangulated Irregular Network (TIN)
- Point Groups & Modifying Contours
- Break Lines & Limiting Boundary
- Adding / Deleting points

Project Management Software

UNIT-III

- Budget and establishing spending plan
- Activity codes and values
- Work products and documents
- Activities, relationships and scheduling
- Constraints

UNIT-IV

- Grouping and filtering activities
- Bars and layouts
- Resources, roles and costs
- Baseline plan

UNIT-V

- Monitoring the current schedule
- Threshold monitoring and issues
- Project tracking and reports
- Role plays and Use cases discussion

Civil 3D

- Creating & Labelling the Alignment line
- Creating & Labelling feature line
- Add / Delete points on feature line

- Create ground profile in Profile view & Creating Profile with Profile Tools
- Working on Bands & Importing Bands
- Creating an Assembly
- Working with ready made assembly
- Mirroring the assemblies

- Inserting points, links and shape
- Corridor creation
- Understanding targets and Modifying a Corridor
- Intersection
- Creating multiple cross section views
- Create view frames.

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

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

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

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):0 : 0 : 2	SEE Marks:50	Course Code:U24PC621CE
Credits : 1	CIE Marks:30	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. Index and engineering properties of various soils	1. Determine the index properties of soils and classify soils. 2. Determine shear strength of a soil sample 3. Determine Permeability and the compaction characteristics of soils 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

DETERMINATION OF INDEX PROPERTIES:

1. Determination of Specific Gravity of soil solids using "Density bottle" method, Determination of Specific Gravity & water content using "Pycnometer" method.
2. Determination of Liquid limit using Casagrande's and Cone Penetration standard LL device.
3. Determination of Plastic limits, Shrinkage limits
4. Sieve Analysis including Hydrometer Analysis for plotting Particle size distribution curve
5. Determination of Field Density using Core cutter Method
6. Determination of Field Density using Sand Replacement Method

DETERMINATION OF ENGINEERING PROPERTIES

7. Determination of Compaction Characteristics by Light Compaction Test
8. Determination of Laboratory California Bearing Ratio (CBR) value
9. Determination of Co-efficient of Permeability by Constant Head Permeameter test and Variable Head Permeameter tests
10. Determination of shear strength parameters by Direct Shear Test
11. Determination of Shear Strength by conducting "UCC Test"
12. Study on hardness of various rock minerals with the help of Moh's scale of hardness

DEMONSTRATION OF TEST PROCEDURES:

13. Determination of Shear Strength of Cohesive soils by "vane shear test"
14. Standard Penetration Test
15. Swell pressure test on expansive soils
16. Determination of Co-efficient of Consolidation (Virtual Mode)
(<http://eerc02-iiith.virtual-labs.ac.in/>)-
17. Bio-cementation of Soil -Determination of Calcium carbonate content using Calcimeter.
18. Determination of Shear Strength by conducting "Triaxial Test"

Learning Resources:

1. <http://eerc02-iiith.virtual-labs.ac.in/>
2. <http://home.iitk.ac.in/~madhav/geolab.html>

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
COMPUTER AIDED STRUCTURAL ENGINEERING LAB

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):0:0: 2	SEE Marks:50	Course Code:U24PC631CE
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Use a structural Design software for analysis and design of RCC and Steel Structures.	1. Perform analysis and design of RCC beams and frames subjected to various loads using a structural design software. 2. Design of G + 2 residential building subjected to dead load and live load combination using software. 3. Design an RCC multi-storeyed building subjected to DL, LL and wind load combination using software. 4. Perform analysis and design of an RCC multi-storeyed building subjected to DL, LL, WL and seismic load combination using software 5. Perform analysis and design of steel trusses and frames subjected to various loads using software.

LIST OF EXPERIMENTS

Introduction to structural analysis and designs using software packages for the design of RCC and Steel structures:

RCC Design:

Perform the analysis and design of:

1. Beams
2. Plane frames
3. Space frames
4. G+2 residential building
5. Wind analysis of multistoried structures
6. Seismic analysis of multi-storeyed structures

Steel Design:

Perform analysis and design of:

7. Trusses
8. Frames

Learning Resources:

1. STAAD Pro software package
2. ETABS Software package

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
HIGHWAY ENGINEERING LAB

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):0: 0 : 2	SEE Marks:50	Course Code:U24PC631CE
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Impart basic knowledge to carry out quality control lab tests for roads in highway engineering practice. 2. Conduct quality control in road construction as per standards and introduce the concepts of design mix 3. Conduct traffic studies and present the data for transportation engineering applications	1. Perform experiments on aggregates and bitumen on their suitability for road construction 2. Understand basic traffic studies for transportation planning and design 3. Conduct tests on job mix formula and Marshall stability 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

A) Tests on road aggregates

1. Aggregate crushing value test
2. Los Angeles abrasion test
3. Aggregate impact value test
4. Aggregate shape test (flakiness & elongation)
5. Water absorption & Specific gravity of aggregates

B) Tests on bitumen

6. Penetration Test

7. Ductility Test
8. Softening point Test
9. Specific gravity Test
10. Viscosity Test
11. Flash and fire point Test

C) Traffic Studies

12. Classified Traffic volume study at mid blocks
13. Spot Speed Study
14. Origin & Destination studies

D) Miscellaneous Tests (demonstration only)

15. Job mix formula by Rothfuch's Method
16. Design of Bitumen mixture by Marshall stability test as per ASTM D 6927-15
17. Bitumen extraction test

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
THEME BASED PROJECT

SYLLABUS FOR B.E. VI-SEMESTER

L : T : P (Hrs./week):0 : 0 : 2	SEE Marks:50	Course Code:U24PW619CE
Credits: 1	CIE Marks:30	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 of 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 and present the conclusions in a way to benefit the society.

Instructions to Students:

Faculty members should prepare project briefs (giving scope and references) well in advance. The project may be classified based on the specialization. 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 2nd week of VI 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.

The students are required to carry out a theme based project by selecting any one of the themes specified by the Project monitoring committee in any area relevant to Civil engineering. Students are required to submit a report on the theme based project at the end of the semester. The evaluation is based on CIE and SEE. CIE will be made based on the progress of the work developed on the rubrics. SEE is evaluated by external examiner through the group presentation given by the group members followed by the viva.

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. VI-SEMESTER

Dept	Course Code	Name of the Course	Stream Type	Stream Name	credits
Civil	U24OE610CE	Project Management	General	-	3
CSE	U23OE610CS	Fundamentals of Database Management System	General	-	3
CSE	U23OE620CS	Fundamentals of Machine Learning	Stream	AI&ML	3
EEE	U24OE610EE	Introduction to Batteries and Battery management System	General	-	3
IT	U24OE610IT	Web application development & Security	General	-	3
IT	U24OE620IT	Introduction to Machine Learning	Stream	AI&ML	3
Mech.	U24OE610ME	Autonomous Mobile Robots	Stream	-	3
Mech.	U24OE620ME	Additive Manufacturing and its Applications (General Pool)	General	-	3
Mech.	U24OE630ME	Advanced Course In Entrepreneurship	General	-	3
H&SS	U24OE630EH	Psychology	General	-	3

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

DEPARTMENT OF CIVIL ENGINEERING
PROJECT MANAGEMENT (OPEN ELECTIVE-IV)

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P(Hrs/Week):3:0:0	SEE Marks:60	CourseCode:U24OE610CE
Credits: 3	CIEMarks:40	DurationofSEE:3Hours

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 concept of project management along with function and objectives. 2. Understand various techniques used for project planning such as bar charts, CPM, PERT and crashing of networks. 3. Acquire knowledge on various types of contracts, tenders.	1. Understand the objectives, functions and principles of management in projects. 2. Practice the network techniques like CPM and PERT for better planning and scheduling of engineering works. 3. Analyse the importance of cost and time in network analysis and planning the work accordingly. 4. Knowledge on Contracts, Tenders, and Work orders related to the projects. 5. Interpret the concept of Linear Programming and solve problems by Graphical and Simplex methods.

UNIT-I: Significance of Project Management: Importance of Project Management, Types of projects, Project Management Cycle, Objectives and functions of project management, management team, principles of organization and types of organization.

UNIT-II: Planning: Project Planning, bar charts, network techniques in project management – CPM Expected likely, pessimistic and optimistic time, normal distribution curve and network problems of PERT.

UNIT-III: Time Cost Analysis: Cost time analysis in network planning, updating

UNIT-IV: Contracts: Introduction, types of contracts and their advantages and disadvantages, conditions of contracts, Introduction to Indian contract act.

Tender: Tenderform, Tender Documents, Tender Notice, Work Order

UNIT-V: Linear Programming and Optimization Techniques: Introduction to optimization-Linear programming, Importance of optimization, Simple problems on formulation of LP. Graphical method, Simplex method- software based approach.

Learning Resources:

1. Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 2023.
2. Srinath L.S., PERT and CPM: Principles and Application, Vision IAS, 2020.
3. Kumar NeerajJha., Construction Project Management: Theory and Practice, Pearson Education, India, reprint 2020.
4. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2019.
5. Gahloj. P.S. and Dhiv. B.M., Construction Planning and Management, Wiley Eastern Ltd., 2018.
6. Seetharaman S., Construction Engineering and Management, Umesh Publications, 2017.

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

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD-500 031

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEM
(OPEN ELECTIVE-IV)
(COMMON FOR CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code :U24OE610CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
1 Identify different issues involved in the design and implementation of a database system.	1 Identify the functional components of database management system. Create conceptual data model using Entity Relationship Diagram
2 Understand transaction processing.	2 Transform a conceptual data model into a relational model 3 Design database using normalization techniques 4 Apply indexing and hashing techniques for effective data retrieval 5 Explain transaction processing.

UNIT-I: Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Architecture, Database Users and Administrators.

Database Design and E-R Model: Overview of the Design Process, the E-R Model, Constraints, E-R Diagrams.

UNIT-II: Relational Model: Structure of Relation Database, Relational Algebra Operations, Modification of the Database.

Structured Query Language: Introduction, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Views.

UNIT-III: Relational Database Design: Features of Good Relational Designs, Atomic Domains and first Normal form, Decomposition Using Functional Dependencies.

UNIT-IV: Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing.

UNIT-V: Transaction Management: Transaction concept, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation and Atomicity, Serializability, Recoverability.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
2. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System , 8th Edition(2006) Pearson Education.
3. Raghu Ramakrishna, and Johannes Gehrke, Database Management Systems, 3rd Edition(2003), McGraw Hill.
4. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
5. Peter rob, Carlos coronel, Database Systems, (2007), Thomoson.
6. <http://nptel.ac.in/courses/106106093/>

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

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

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
FUNDAMENTALS OF MACHINE LEARNING
Stream- Artificial Intelligence & Machine Learning
(OPEN ELECTIVE-IV)
(COMMON for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E VI SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:U24OE620CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
To formulate machine learning problems corresponding to an application.	1. Explain the basics machine learning. 2. Prepare the data for learning 3. Select the feature and transform it . 4. Classify the data using classification models 5. Solve problems using Unsupervised learning models

UNIT I: Introduction to Machine Learning: Introduction, types of Human learning, types of learning, Problems not to be solved by Machine learning , applications of machine learning , Issues in machine learning,

UNIT-II: Preparing to Model: Introduction, Machine Learning Activities, Basic Data types in machine learning , Exploring Structures of Data.

UNIT- III: Basics of Feature Engineering: Introduction, feature transformation: feature Construction .

UNIT-IV: Supervised Learning – Classification: Introduction, Example of supervised learning, classification model, classification learning steps, common classification algorithms: KNN and Decision Tree, Regression : Introduction , Simple Linear regression.

UNIT- V: Unsupervised Learning – Introduction: Unsupervised vs supervised learning, Application of Unsupervised Learning , types of Clustering techniques, Partitioning methods, k-medoids.

Learning Resources:

1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, -Machine Learning, Pearson Education
2. Tom Mitchell, —Machine Learning||, McGraw-Hill Science, First edition.
3. Christopher Bishop, —Pattern Recognition and Machine learning||, Springer(2006).
4. Stephen Marsland,||Machine Learning –an algorithmic perspective||, CRC Press.
5. Daniela witten, Trevor Hastie Robert Tibshirani and Gareth James, —Anintroduction to statistical Learning with applications in R, Springer 2013
6. https://onlinecourses.nptel.ac.in/noc18_cs26/preview
7. <https://www.coursera.org/learn/machine-learning>

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 ELECTRICAL AND ELECTRONICS ENGINEERING
INTRODUCTION TO BATTERIES AND BATTERY MANAGEMENT SYSTEM

(Open Elective-IV)

SYLLABUS FOR B.E. VI SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U24OE610EE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
The objective of this course is to introduce learner to batteries, its parameters, modelling and charging requirements. The course will help learner to develop battery management algorithms for batteries.	1. Interpret the role of battery management system. 2. Identify the requirements of Battery Management System. 3. Interpret the concept associated with battery charging/discharging process. 4. Calculate the various parameters of battery and battery pack. 5. Design the model of battery pack

UNIT-I: Introduction to Battery Management System: Cells & Batteries, Nominal voltage and capacity, C-rate, Energy and power, Cells connected in series, Cell connected in parallel, Electrochemical and lithium-ion cells, Rechargeable cell, Charging and Discharging Process, Overcharge and Undercharge, Modes of Charging.

UNIT -II: Battery Management System Requirement: Introduction and BMS functionality, Battery pack topology, BMS Functionality, Voltage Sensing, Temperature Sensing, Current Sensing, High-voltage contactor control, Isolation sensing, Thermal control, Protection, Communication Interface, Range estimation, State-of-charge estimation, Cell total energy and cell total power.

UNIT –III: Battery State of Charge and State of Health Estimation,

Cell Balancing: Battery state of charge estimation (SOC), voltage-based methods to estimate SOC, Model-based state estimation, Battery Health Estimation, Lithium-ionaging:Negativeelectrode, Lithium-ion aging:Positive electrode,Cell Balancing,Causesofimbalance,Circuitsforbalancing.

UNIT –IV: Modelling and Simulation:

Equivalent-circuit models (ECMs), Physics-based models (PBMs), Empiricalmodelling approach, Physics-based modelling approach, simulating an electricvehicle, Vehicle range calculations, simulating constant power and voltage,Simulatingbattery packs.

UNIT -V: Design of battery BMS:

Designprinciplesof battery BMS,Effectofdistance,load,andforceonbattery lifeand BMS, energy balancing with multi-battery system.

Learning Resources:

1. Plett,GregoryL.Battery managementsystems,VolumeI:Battery modeling.ArtechHouse,2015.
2. Plett, Gregory L. Battery management systems, Volume II: Equivalent-circuitmethods.Artech House,2015.
3. Bergveld, H.J., Kruijt, W.S., Notten, P.H.L "Battery Management Systems -Design byModelling"Philips Research BookSeries2002.
4. Davide Andrea," Battery Management Systems for Large Lithium-ion Battery Packs"ArtechHouse, 2010.

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

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

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

DEPARTMENT OF INFORMATION TECHNOLOGY
WEB APPLICATION DEVELOPMENT AND SECURITY
(GENERAL TRACK : OPEN ELECTIVE-IV)
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E VI- SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks : 60	Course Code :U24OE610IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
1. Acquire basic skills for designing static and dynamic Web Applications using HTML, CSS, Java Script, Bootstrap and XML. 2. Acquire fundamental knowledge of Web Security concepts	1. Design a static web pages using HTML, CSS. 2. Create dynamic web pages and client side validation using JavaScript. 3. Develop responsive web applications using Bootstrap. 4. Build an application using an MVC Framework and XML 5. Analyze and evaluate web security attacks.

UNIT-I: Introduction: Introduction: World Wide Web, Web Browsers, Web Servers, URL, HTTP, TCP Port. HTML: Standard HTML document structure, Basic Tags, Images, Hypertext Links, Lists, Tables, Frames. CSS: In-line style sheets, Internal Style sheets and External Style sheets.

UNIT-II: Basics of JavaScript: JavaScript: Introduction, Basics of JavaScript-variables, data types and operators, Control Structures, Arrays, Functions, HTML Forms, Events and event handling.

UNIT-III: Bootstrap: Bootstrap: The Grid system, Layout components: Tables, Images, alerts, buttons, badges, progress bars, cards, drop downs, pagination, Collapse, Navbar, Carousel.

UNIT-IV: XML: XML- The Syntax of XML, XML Document Structure, Document Type Definitions.

Introduction to MVC - Introduction to Model View Controller Architecture

UNIT-V: Web Security Fundamentals: Web Hacking Basics, HTTP & HTTPS URL, Evolution of Web Applications - Web Application Security - Core Defence Mechanisms - Handling User Access - Handling User Input- Handling Attackers - Managing the Application, Introduction to Web 2.0

Learning Resources:

1. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.
2. "Web Technologies", 7th Edition, Uttam K.Roy, 2012.
3. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
4. <http://getbootstrap.com/>

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

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

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

DEPARTMENT OF INFORMATION TECHNOLOGY
INTRODUCTION TO MACHINE LEARNING

(AI&MLTRACK : OPEN ELECTIVE-IV)
(Common for ECE, EEE, MECH & CIVIL)

SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code: U24OE620IT
Credits: 3	CIE Marks: 40	Duration of SEE :3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
1. Introduce the fundamental concepts, techniques and modern tools in Artificial intelligence and Machine Learning field to effectively apply it to the real-world problems.	2. Demonstrate knowledge of the Artificial intelligence and machine learning literature. 3. Understand and apply latest Python libraries for Machine learning models. 4. Apply an appropriate algorithm for a given problem. 5. Apply machine learning techniques in the design of computer systems. 6. Explain the relative strengths and weaknesses of different machine learning methods and approaches.

UNIT-I: Introduction to AIML: Foundations of AI, Sub areas of AI, Applications. Introduction to learning, Types of Learning: Supervised Learning, Unsupervised Learning, Reinforcement Learning.

Introduction to Python and ML libraries: intro to python data types, control flow, loops, functions, modules & packages. Intro to NumPy & Scikit-learn.

UNIT-II: Supervised learning: ML Task, ML Experience or Data, ML Performance metric, Linear Regression, Linear regression Simulator, Logistic Regression.

Supervised Non-parametric learning: Introduction to Decision Trees, K-Nearest Neighbor, Feature Selection.

UNIT-III: Supervised Parametric learning (Neural networks): Perceptron, Multilayer Neural Network, Playground Simulator, Backpropagation.

UNIT-IV: Supervised Parametric learning: Support Vector Machine, Kernel function and Kernel SVM.

Supervised Parametric Bayesian learning: Introduction, Naive Bayes Classification, Bayesian Network.

UNIT-V: Unsupervised learning: Clustering, K-means Clustering, DBSCAN

Learning Resources:

1. Tom Mitchell, Machine Learning, First Edition, McGraw-Hill, 1997
2. Christopher Bishop. Pattern Recognition and Machine Learning. Second Edition.
3. Ethem Alpaydin, Introduction to Machine Learning, Second Edition
4. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.
5. <http://nptel.ac.in/courses/106106139/>
6. <https://www.w3schools.com/python/>
7. <https://www.w3schools.com/python/numpy/default.asp>
8. <https://scikit-learn.org/stable/>
9. [Linear Regression Simulator \(mladdict.com\)](http://mladdict.com/linear-regression-simulator)
10. [Neural Network Playground simulator](http://mladdict.com/neural-network-playground-simulator)
11. <https://www.mladdict.com/neural-network-simulator>

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

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

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

DEPARTMENT OF MECHANICAL ENGINEERING

AUTONOMOUS MOBILE ROBOTS

(Stream: Robotics) (Open Elective-IV)

SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U24OE610ME
Credits: 03	CIE Marks:40	Duration of SEE : 03 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course is to	On completion of the course, students will be able to
1. Provide students with fundamental understanding of mobile robots and their operation in real-world environments.	1. Understand different types of mobile robots and analyze their motion mechanisms. (CO1)
2. Introduce concepts of robot motion, navigation, and interaction with surroundings.	2. Apply kinematic relationships to determine position and velocity of mobile robots. (CO2)
3. Develop analytical understanding of robot positioning, movement, and path planning.	3. Estimate robot position using basic localization techniques. (CO3)
4. Familiarize students with basic autonomous decision-making in robotic systems.	4. Analyze path planning methods for navigating structured environments. (CO4)
	5. Understand fundamental navigation and obstacle avoidance strategies in autonomous robots. (CO5)

UNIT-I: Introduction to Mobile Robots: Definition and classification of mobile robots. Comparison between fixed and mobile robots. Applications of mobile robots in industry and service sectors. Types of locomotion: wheeled, tracked, and legged robots. Degrees of freedom and mobility. Basic concepts of robot motion and constraints.

UNIT-II: Kinematics of Mobile Robots: Kinematic modeling of wheeled mobile robots. Differential drive and skid-steer mechanisms. Forward and inverse velocity relationships. Instantaneous center of rotation. Motion analysis of mobile robots under simple constraints.

UNIT-III: Localization of Mobile Robots: Introduction to robot localization. Dead reckoning and odometry. Position estimation using wheel encoders. Sources of error in localization. Basic techniques for improving position estimation. Concept of probabilistic localization.

UNIT-IV: Path Planning Techniques: Introduction to path planning. Representation of environment: grid-based and graph-based methods. Shortest path concepts. Basic algorithms for path planning. Trajectory generation for mobile robots. Planning under simple constraints.

UNIT-V: Navigation and Obstacle Avoidance: Autonomous navigation concepts. Reactive and deliberative navigation. Obstacle detection and avoidance strategies. Line following robots. Basic potential field method. Introduction to behavior-based robotics.

Learning Resources

1. Roland Siegwart, Illah R. Nourbakhsh, Davide Scaramuzza, *Introduction to Autonomous Mobile Robots*, MIT Press, 2011.
2. Ghosh, *Control in Robotics and Automation: Sensor-Based Integration*, Allied Publishers.
3. Dudek, G., and Jenkin, M., *Computational Principles of Mobile Robotics*, Cambridge University Press.
4. Saeed B. Niku, *Introduction to Robotics: Analysis, Control, Applications*, Wiley India.
5. R. Murphy, *Introduction to AI Robotics*, MIT Press.

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	5
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	5
Duration of Internal Test: 90 Minutes				

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES**

**COURSE TITLE: -PSYCHOLOGY
OPEN ELECTIVE-COMMON TO ALL BRANCHES**

w.e.f Academic Year 2026-27B.E-VI SEMESTER

Instruction: 3 Hrs/week	SEE Marks: 60	Course Code: U24OE630EH
Credits: 3	CIE Marks:40	SEE: 3 hrs.

Course Objectives	Course Outcomes
By the end of the course, learners will be able to: 1. Introduce students to the foundational concepts, theories, and branches of psychology. 2. Develop an understanding of human behaviour and mental processes through scientific approaches. 3. Encourage critical thinking and analytical reasoning in the study of psychological phenomena. 4. Foster awareness of biological, cognitive, and socio-cultural influences on behaviour. 5. Equip students with basic research skills and ethical considerations in psychological practice.	On completion of the course, learners will be able to: 1. Explain core psychological theories and their relevance to everyday life. 2. Analyze behaviour using major psychological perspectives. 3. Apply psychological principles to real-world situations. 4. Demonstrate basic skills in psychological research. 5. Evaluate ethical issues and cultural factors influencing psychological practice and research.

UNIT-I: Foundations of Psychology: History of psychology (Structuralism, Functionalism, behaviorism), Major perspectives to understand psychology (biological and sociological)

UNIT-II: Cognitive Psychology: Cognition and Cognitive Development (Piaget), Intelligence, Working memory & Executive Function

UNIT-III: Positive Psychology: Building Human strength: Moving from Negative to positive, Classification of Strengths, PERMA Model of well-being

UNIT-IV: Health Psychology: Illness-Wellness continuum, Stress and coping stress, Health Protective Behavior

UNIT-V: Social Psychology: Socio-emotional development(Eric Erikson), Attitudes, conformity, and group behaviour, Academic Motivation

Learning Resources:

1. Galloti: Cognitive Psychology
2. Baron, R.A., & Branscomb, N.R. (2012). Social Psychology (13thed.). NJ, USA: Pearson.
3. Lopez, S.J., Pedrotti, J.T., & Snyder, C.R. (2019). Positive Psychology - The Scientific and Practical Exploration of Human Strengths (4th edition). New Delhi: Sage Publications India Private Limited.
4. Taylor Shelley.E(2012) Health Psychology(8thEdition) Pub by McGraw-Hill ISBN:978-0-07-803519-7

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	5
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	5
	Duration of Internal Test:	90 Minutes		