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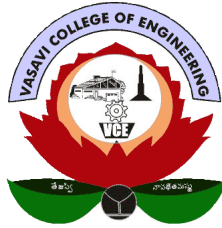# IBRAHIMBAGH, HYDERABAD-31

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 2025–2026
(For the students admitted in 2023-24)

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

DEPARTMENT MISSION

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

DEPARTMENT VISION

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

Institution Vision

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

Institution Mission

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

Department Vision

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

Department Mission

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

Program Educational Objectives (PEOs):

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

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

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

Program Outcomes (POs)
Engineering Graduates will be able to:

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

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

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

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

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

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

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

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

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

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

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

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

Program Specific Outcomes (PSOs)

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

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

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)
BE (CIVIL ENGINEERING) V-SEMESTER ACADEMIC YEAR 2025-2026
(Students Admitted in 2023-24)

Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U23HS510EH	Skill Development Course-V:(Communication Skills-II)	1	-	-	2	40	30	1
U23HS530EH	Design Thinking	1	-	-	2	40	30	1
U23PC510CE	Structural Analysis	3	-	-	3	60	40	3
U23PC520CE	Hydraulics and Hydraulic Machinery	3	1	-	3	60	40	4
U23PC530CE	Environmental Engineering	3	-	-	3	60	40	3
U23PC540CE	Reinforced Concrete Design	3	-	-	3	60	40	3
U23PE510CE	Skill Development Course-VI:(Technical Skills-II)	1	-	-	2	40	30	1
U23OEXXXXX	Open Elective-III	3	-	-	3	60	40	3
PRACTICALS								
U23PC521CE	Hydraulics and Hydraulic Machinery Lab	-	-	2	3	50	30	1
U23PC531CE	Environmental Engineering Lab	-	-	2	3	50	30	1
U23PC541CE	Concrete Lab	-	-	2	3	50	30	1
U23PC551CE	Surveying Camp	-	-	-	-	-	50	1
Student should complete one NPTEL (8 weeks) certificate course equivalent to 2 credits by the end of VI-Semester								
Total		**18**	**1**	**6**		**570**	**430**	**23**
Grand Total		**25**				**1000**		
Note: Surveying Camp will be conducted for one week before the commencement of V-Semester.								
Note: The left over hours are to be allotted to ECA-II / Sports / Library / Mentor Interaction based on the requirement.								

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS),
IBRAHIMBAGH, HYDERABAD-500031

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: U23HS510EH
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			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS),
IBRAHIMBAGH, HYDERABAD-500031

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: U23HS530EH
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

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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IBRAHIMBAGH, HYDERABAD – 500 031

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: U23PC510CE
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.	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 stiffness method.

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.
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, 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 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: Matrix Methods of Analysis (Stiffness Method): Load-displacment relationship, Stiffness method of anlaysis for beams.

Learning Resources:
1. Vazirani V.N.,Ratwani M.M, Duggal S.K.,"Analysisof Structures-Vol.II Theory, Design and Details of Structures",Khanna Publishers, 16[th]Edition, 2015.
2. ThandavamoorthyT.S.,"Structural Analysis",Oxford Higher Education, Second Edition,2012.
3. Ramamrutham. S,Narayan R.,"Theoryof Structures", Dhanpath Rai publications, 11th edition, 2020
4. Devdas Menon,"Structural Analysis", 2nd Edition, Narosa Book Distributors Pvt Ltd, 2018.
5. Reddy C.S.,"Basic Structural Analysis",3rd Edition, Mc GrawHill, 2017.
6. Junarkar S. B.,Shah,"Mechanics of Structures", Volume-II, CharotarPub. House, 24th edition, 2015.
7. Chu-Kia Wang,"Intermediate Structural Analysis (English)1st Edition", Mc GrawHill Education,2017.
8. HibbelerR.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

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

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: U23PC520CE
Credits:4	CIE Marks: 40	Duration of SEE: 3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Up on the completion of the course, students are expected to
1. Study various aspects of open channel flow. 2. understand and analyses the impact of fluid jets on various surfaces 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, classify flow profiles and apply the dynamic equation of gradually varied flow. 3. Understanding fundamentals of impact of jets and compute the force exerted by jets. 4. Evaluate the performance characteristics and perform design of turbines for various conditions of head, discharges and power 5. Evaluate the performance characteristics and perform design of centrifugal pump for various conditions of head, discharges 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 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. VenTeChow "Open-Channel Hydraulics" International Student Edition, McGraw-Hill, 2009.
2. Modi P.N., Seth S.M., "Hydraulics and Fluid Mechanics including Hydraulics Machines", Standard Book House, 2019
3. Bansal R.K., "A Textbook Of Fluid Mechanics And Hydraulic Machines", Laxmi Publications, 2018
4. Rama Durgaiah D., "Fluid Mechanics and Machinery" New Age International Publishers, 2002
5. Ojha C.S.P., Brendts son R., Chandramouli P.N., "Fluid Mechanics and Machinery", Oxford University Press,2010.
6. K SrinivasaRaju and D Nagesh Kumar, "Fluid Mechanics problem solving using MATLAB" Prentice Hall of India, 2020
7. K. Subrmanya, "Flow in Open Channel", Tata McGraw Hill Publishers, 5th Edition, 2019
8. http://nptel.ac.in/courses/105103096/3, Hydraulic
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

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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: U23PC530CE
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.

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

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. Birdi G.S, "Water Supply and Sanitary Engineering", DhanpatRai& Sons, 2014
6. Peavy H.S., Rowe D.R., Tchobanoglous G., "Environmental Engineering",

Tata McGraw Hills, New Delhi, 2017 Page | 16 \With effect from the Academic Year 2023-24 (R21)

7. Metcalf & Eddy M.C., "Waste Water Engineering – Treatment & Reuse", Tata McGraw Hill Publications, New Delhi, 2003 8. 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		

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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: U23PC540CE
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. 2. Indian standard codes of practice for Reinforced Concrete 3. Design of concrete structural elements using limit state method as per Indian code of practice.	1. Understand design philosophies of concrete and design beams for flexure with working stress method according to IS: 456:2000. 2. Design beams for flexure with limit state method according to IS: 456:2000. 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.
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,Narosha publications,4th edition,2021
2. Unni krishna Pillai S and Devdas Menon,"Reinforced Concrete Design",Mc Graw Hill EducationIndia Pvt Ltd.,2017.
3. Varghese P.C,"Limit State Design of Reinforced Concrete",Prentice Hall of India,2008.
4. Subramanian N.,"Design of Reinforced Concrete Structures",Oxford University Press,2013.
5. Robert Park and Thomas Paulay, "Reinforced Concrete structure", Wiley India Pvt. Ltd, 2013.
6. Shah H.J.,"ReinforcedConcrete",Vol.1,CharotarPublishingHouse,2016.
7. Punmia B.C., Ashok K.Jain, Arun K.Jain,"Limit State Design of Reinforced Concrete", Laxmi Publications(P) Ltd.2016.
8. Ramamrutham,"Design of Reinforced Concrete Structures", Dhanpat Rai Publishing Co.,2016.
9. Nptel.ac.in /courses/105105105, Design of Reinforced Concrete Structures.

10. IS:456-2000, Code of Practice for Plain and Reinforced Concrete, Bureau of Indian Standards, New Delhi, India.
11. SP16:Design Aids for Reinforced Concrete to IS456:1978,Bureau of Indian Standards, New Delhi, India
12. 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
13. SP34:Hand bookon Concrete Reinforcement and Detailing (With Amendment1), Bureau of Indian Standards, NewDelhi, India
14. IS:875-1987 Code of Practice For Design Loads (Other Than Earth quake) For Buildings And Structures Parts (1,2,3,4&5), Bureau of Indian Standards, New Delhi, India

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

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

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IBRAHIMBAGH, HYDERABAD – 500 031

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: U23PE510CE
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	: 5
3 No. of Quizzes	: - Max. Marks for each Quiz Test	: 5

Duration of Internal Tests   :   90 Minutes

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

DEPARTMENT OF CIVIL ENGINEERING
HYDRAULICS & HYDRAULIC MACHINERY LAB

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0:2	SEE Marks:50	Course Code: U23PC521CE
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. 2. Impact coefficient on different types of vanes and drag and lift force in wind tunnel 3. Pre and post jump depths and calculate loos of energy in hydraulic jump. 4. Familiarize with the procedures of calculating over all efficiency of different types of pumps and turbines.	1. Determine Manning's rugosity coefficient and measure super elevation in an open channel and estimate loss of energy in hydraulic jump. 2. Evaluate impact coefficient for different types of vanes. 3. Evaluate the overall efficiency of various pumps and turbines and draw performance characteristic curves. 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	Open Channel Flow	Determination of Manning's rugosity coefficient
2	Open Channel Bend	Determination of super elevation
3	Impact of Jets	Determination of vane coefficient on different types of vanes (Virtual Mode) https://eerc03-iiith.vlabs.ac.in/exp/jets/
4	Centrifugal pump	Determination of efficiency and performance

5	Centrifugal pump testing	Determination of efficiency and performance Characteristics under varying loads
6	Pelton Wheel Turbine	Determination of efficiency and Performance
7	Francis Turbine	Determination of efficiency and Performance
8	Kaplan Turbine	Determination of efficiency and Performance
9	Self primingpump	Determination of efficiency and performance
10	Hydraulic Jump	Determination of pre and post jump depth in

Learning Resources:

http://eerc03-iiith.virtual-labs.ac.in/ index.php? section=List%

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: U23PC531CE
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 Reduction of turbidity and disinfection dosage. 4. Practice working of flame photometer.	1. Analyse the water samples for the determination of alkalinity, hardness, chlorides, calcium, pH, contents of sodium and potassium in water using flame photometer, total dissolved solids and turbidity. 2. Estimate the Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (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.
2. Determination of Chlorides.
3. Determination of Acidity.
4. Determination of Dissolved Oxygen
5. Determination of Biochemical Oxygen Demand (B.O.D.)
6. Determination of total solids and Sludge Volume Index (SVI)

7. Determination of residualchlorine.
8. Determination of turbidity
9. Determination of Nitrates and Sulphates using UV Spectrophotometer
10. Determination of coagulant dose –Jar test.
11. Determination of Chemical Oxygen Demand (C.O.D.)
12. Determination of Sodium &Potassium present in water using flame photometer (Demonstration).
13. 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: U23PC541CE
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 ablility 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.

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: U23PC551CE
Credits: 1	CIE Marks: 30	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

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	U23OE510CE	Geo Spatial Information Technology	General	-	3
CSE	U23OE510CS	Introduction to Operating Systems	General	-	3
CSE	U23OE520CS	Fundamentals of Artificial Intelligence	Stream	AI&ML	3
ECE	U23OE510EC	Introduction to Biomedical Electronics	General	-	3
EEE	U23OE510EE	Modelling and Simulation of Basic Photovoltaic Systems	General	-	3
IT	U23OE510IT	Essentials of Operating Systems	General	-	3
IT	U23OE520IT	Introduction to Artificial Intelligence	Stream	AI&ML	3
Mech.	U23OE520ME	Introduction to Robotics	General	-	3
Mech.	U23OE540EH	Basics of Entrepreneurship	General	-	3
Mech.	U23OE510ME	Drives and Control Systems for Robotics	Stream	Robotics	3
H&SS	U23OE540EH	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:U23OE510CE
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. BasudebBhatta, 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. ThanappanSubash., Geographical Information System, Lambert Academic Publishing, 2011.
8. Paul Longley., Geographic Information systems and Science, John Wiley & Sons, 2010
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, 2017.
11. Burrough, P.A., Principles of GIS for Land Resource Assessment, Oxford Publications, 2016.
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)
(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 :U23OE510CS |
| Credits : 3 | CIE Marks : 40 | Duration of SEE : 3 Hours |

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
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. Robet 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:U23OE520CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
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.

LearningResources:
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, ThirdEdition(2019),Pearson
4. NilsJ.Nilsson,ArtificialIntelligence:ANewSynthesis,(1998),Elsevier

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 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: U23OE510EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide fundamental knowledge of biomedical signals, transducers and various instruments.	On completion of the course, students will be able to 1. Recite the basic need of biomedical signals and basic instruments. 2. Comprehend the principles of basic bioelectric signals, electrodes and transducers in biomedical electronics. 3. Demonstrate the principle of various therapeutic, prosthetic and non invasive instruments for use and prediction of diseases. 4. To acquire knowledge of the mathematical, physical and computational principles underlying modern medical imaging system for visualization and analysis of medical image data.

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:
1. L. Cromwell, Biomedical Instrumentation and Measurements, Prentice Hall.
2. Handbook of Biomedical Instrumentation by R.S. Khandpur.
3. S.K. Venkata Ram, Bio-medical Electronics and Instrumentation, Galgotia Publications, Pvt. Ltd.

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

SYLLABUS FOR B.E. V SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U23OE510EE
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 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 PSpicesubcircuits 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 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
ESSENTIALS OF OPERATING SYSTEMS
(GENERAL 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 : U23OE510IT
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
Learn the principles of modern operating systems i.e various functionalities provided by an operating system such as process management, memory management, Storage and I/O management.	1. Analyze the importance and its key principles by differentiating and categorizing the functionalities of an operatingsystem 2. Examine mechanisms involved in memory management to handle processes and threads. 3. Evaluate and solve deadlocks by assessing various handling strategies related to each of the conditions for deadlock. 4. Interpret the mechanisms adopted for storage organization and access. 5. Interpret the mechanisms adopted for I/O organization and access.

UNIT-I: Introduction and Process Management: Operating System Functionalities, Types of Operating Systems, User Operating System Interface, System calls, System Boot. Process Concept: Overview, Threads. Process Scheduling - Uniprocessor scheduling algorithms, Multiprocessor and Real-time scheduling algorithms.

UNIT-II: Memory Management: Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation. Virtual Memory Management: Demand Paging, Page replacement algorithms, Thrashing.

UNIT-III: Process Synchronization: Inter Process Communication, Process Synchronization - Peterson's Solution, Bakery Algorithm, Semaphores, Critical Section, Monitors. Classical problems of synchronization. Deadlocks: Deadlock prevention, deadlock avoidance and Deadlock Detection and Recovery - Bankers Algorithm.

UNIT-IV: Storage Management: File System-Basic Concepts, File System Structure, File System Mounting, Directory Structure, Allocation Methods, Free Space Management.

UNIT-V: I/O Management: I/O Management: Disk Structure, RAID Structure, Disk Scheduling, Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix.

Learning Resources:
1. Operating System Concepts - Operating System Concepts, Tenth Edition, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, John Wiley & Sons Inc.
2. Modern Operating Systems- Andrew S Tanenbaum, Prentice Hall
3. Operating Systems - Operating System: Internals and Design Principles , William Stallings
4. Operating Systems - System Programming and Operating Systmes D M Dhamdhere, Tata Mc Graw Hill
5. Operating Systems - Operating Systems: A Modern Perspective, Gary Nutt, Addison Wesley
6. Operating Systems - Operating Systems, Achyut S Godbole, Tata Mc Graw Hill
7. https://nptel.ac.in/courses/106108101/
8. https://www.classcentral.com/course/udacity-introduction-to-operating-systems-3419

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: U23OE520IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
	On completion of the course, students will be able to
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 Tests		:	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 : U23OE510ME
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-Hurwicz 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 MECHANICAL ENGINEERING
INTRODUCTION TO ROBOTICS (General Pool)
(Open Elective-III)

SYLLABUS FOR B.E. V-SEMESTER

L:T:P(Hrs./week):3	SEE Marks : 60	Course Code: U23OE520ME
Credits : 3	CIE Marks: : 40	Duration of SEE: 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: 1. Identify robots and its peripherals for satisfactory operation and control of robots for industrial and non-industrial applications.	On completion of the course, the student will be able to 1. understand the anatomy of the robot and various robot configurations for it's selection depending on the task. 2. classify the end effectors , understand different types of joints, various types of robot drive systems for carrying out the assigned job effectively. 3. analyze a planar manipulator through forward kinematics and understand the control of robot manipulator for better reliability and efficiency using python programming. 4. Classify the various sensors used in robots for proper selection to an application. 5. summarize various industrial and non-industrial applications of robots for their selection to a particular task.

UNIT-I: Robot Basics: Robot-Basic concepts, Definition, Need, Law, History, Anatomy, specifications. Robot configurations-cartesian, cylindrical, polar ,articulated and SCARA, Robot wrist mechanism, Precision and accuracy of robot.

UNIT-II:Robot Elements: End effectors-Classification, Robot drive system types: Electrical, pneumatic and hydraulic. Robot joints and links-Types, Robot trajectories2D and 3D Transformation- Scaling, Rotation and Translation, Homogeneous transformation

UNIT-III: Robot Kinematics and Control: Robot kinematics – Basics of direct and inverse kinematics. D-H matrix. Forward kinematics for a 2-link RR planar manipulator. Control of robot manipulators – Point to point and Continuous Path Control. Robot programming methods.

UNIT-IV: Robot Sensors: Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors, Light Introduction to Machine Vision and Artificial Intelligence.

UNIT-V : Robot Applications: Applications of robots in Industries, Medical, Household, Entertainment, Space, Underwater, Defense, and Disaster management. Applications of Micro and Nanorobots, Future Applications of robots.

Learning Resources:
1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel and Nicholas G Odrey, "Industrial Robotics   Technology, Programming and Applications", TataMcGraw-Hill Publishing Company Limited , 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw HillPublishing Company Limited, 2010.
3. KlafterR.D, Chmielewski T.A, and Negin. M, "Robotic Engineering: An Integrated Approach",   Prentice Hall of India Pvt. Ltd.,1994.
4. K.S. Fu,R.C. Gonzalez and C.S.G.Lee , "Robotics control, sensing, vision and intelligence",TataMcGraw-Hill Publishing Company Limited, 2008
5. R.K. Mittal and I.J.Nagrath"Robotics and Control", Tata McGraw-Hill Publishing Company Limited, 2003.

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 ENGINEEING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

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

SYLLABUS FOR B.E V Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U23OE540EH
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 it importance.	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 instartups.

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, Customer Adoption Process, Crafting your Value Proportions, Customer-Driven Innovation.

UNIT-II: Business Model and its Validation: Types of Business Models, Lean Approach, the Problem-Solution Test, Solution Interview Method, Difference between Start-up Venture and small Business, Industry Analysis, Identify Minimum Viable Product (MVP), Build-Measure-Lean 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 Respondents, Explore Collaboration Tools and Techniques-brainstorming, Mind Mapping. Importance of Project Management, Time Management, Work Flow, Network Analysis Techniques.

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, Government schemes.

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-23)
BE (CIVIL ENGINEERING) VI-SEMESTER ACADEMIC YEAR 2025-2026
(Students Admitted in 2023-24)

Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U23HS040EH	Economics & Finance for Engineers	2	-	-	3	60	40	2
U23HS630EH	Skill Development Course-VII (Verbal Ability)	1	-	-	2	40	30	1
U23PC610CE	Design of Steel Structures	3	-	-	3	60	40	3
U23PC620CE	Soil Mechanics	3	-	-	3	60	40	3
U23PC640CE	Highway Engineering	3	-	-	3	60	40	3
U23PC650CE	Construction Management and Administration	3	-	-	3	60	40	3
U23PE610CE	Skill Development Course-VIII (Technical Skills-III)	1	-	-	2	40	30	1
U23OEXXXXX	Open Elective-IV	3	-	-	3	60	40	3
PRACTICALS								
U23PC621CE	Soil Mechanics Lab	-	-	2	3	50	30	1
U23PC631CE	Computer Aided Structural Engineering Lab	-	-	2	3	50	30	1
U23PC641CE	Highway Engineering Lab	-	-	2	3	50	30	1
U23PW619CE	Theme Based Project	-	-	2	-	50	30	1
Student should complete one NPTEL (8 weeks) certificate course equivalent to 2 credits by the end of VI-Semester								
Total		**19**	**-**	**8**		**640**	**420**	**23**
Grand Total		**27**				**1060**		
Note: The left over hours are to be allotted to Sports / Library / Mentor Interaction based on the requirement.								

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
ECONOMICS AND FINANCE FOR ENGINEERS

SYLLABUS FOR B.E.VI SEMESTER

Instruction: 2Hrs/week	SEE Marks: 60	Course Code: U23HS040EH
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 its importance. 4. Analyze the financial position of business firm through calculation and interpretation of ratios. 5. 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 - Demand function - Determinants of Demand - Law of Demand - assumptions and exceptions – Elasticity of demand (Price, Income and cross elasticity)- numericals on elasticity of demand - Application-oriented approach of Elasticity - Law of supply - Introduction to market structures.

UNIT-II: **Cost Analysis and Profit Planning :** Concept of Cost - Classification of Costs - Cost sheet (simple numericals) – Marginal Costing Analysis (simple numericals) - Application oriented approach (Make or buy, continue or shutdown decisions - Theory)

UNIT-III: **Conceptual Understanding of Accounting:** Accounting Cycle – Principles of Accounting - Journal - Subsidiary Books – Ledger - Trial Balance Preparation of Trading and Profit and Loss Account and Balance Sheet numericals with adjustments for closing stock, outstanding expenses, prepaid expenses, accrued incomes, incomes received in advance, depreciation, bad debts and provision for bad debts) – Introduction to Corporate Balance Sheet

UNIT IV: **Financial Statement Analysis :** Ratio Analysis - uses and limitations - Liquidity, Solvency, Activity & Profitability Ratios (simple numericals)

Unit V: **Financial Management decisions :** Financing decisions - Dividend decisions - Investment decisions - Long term – Capital budgeting – Traditional and DCF Techniques (Numericals on capital budgeting techniques namely PBP, ARR, NPV, PI and IRR) – Short term - Introduction to working capital.

Learning Resources for students:
1. S.P.Jain and K.L Narang., "Financial Accounting", Kalyani Publishers – Latest edition.
2. S.P.Jain and K.LNarang., "Cost Accounting", Kalyani Publishers, Latest edition.
3. M.Y.Khan and P.K. Jain., "Financial Management – Text, Numericals and Cases", Mc Graw Hill Education Private Limited, New Delhi.Latest edition
4. M. Kasi Reddy &Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, Latest edition.

Reference books:
1. Mehta P.L.,"Managerial Economics: Analysis,Numericals and Cases", Sultan Chand and Sons. Latest edition.
2. Narayanaswamy, "Financial Accounting: A Managerial Perspective", Prentice Hall India
3. M. L. Seth., "Micro Economics", *Lakshmi Narain Agarwal.* Latest edition
4. Dr. R.P. Rustagi., "Fundamentals of Financial management" Taxmann Publications, Latest edition

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

1	No. of Internal Tests	: 2	Max. Marks for each Internal 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-VII: (VERBAL ABILITY)

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):2 : 0 : 0	SEE Marks:40	Course Code: U23HS630EH
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

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

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 ASSESSMENTS

- Demonstration - Online assignments
- Presentations - Individual and Group
- Expert lectures
- Writing and Audio-visual lessons

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: U23PC610CE
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: Elastic or working stress design, plastic or 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", 3rdEdition, 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.,NewDelhi,2013

4. BhavikattiS.S., "Limits state Designof steelStructures",5thEdition, Dream tech Press 2019.
5. SubramanianN,"Design of Steel Structures (Limit State methods)", 2nd Edition Oxford University Press, 2018
6. K.S. Vivek and P. Vyshani "Pre– Engineered Steel Buildings" LAP Lambert Academic Publishing, 2021.
7. IS:800-2007: Code of Practice for General Construction in Steel, Bureau of Indian Standards, New Delhi.
8. IS: 875-1987: Code of Practice for Design loads for buildings and structures, Bureau of Inidan 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: U23PC620CE
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. 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. Analyze mechanism of consolidation of 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 including wet analysis-hydrometer analysis, 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, Fundamentals of Effective stress under hydrostatic condition, distribution of stress with depth influence of shifting water table, shift in ground surface and capillarity.

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–computation of seepage quantity, total, effectiveandneutralstress.

UNIT-IV: Stress Distribution: Boussinesq'sand West ergaard'sequations for point load. Application of point load formulae for uniformly distributed load on circular and rectangular areas. Use of Newmark's chart (for Boussinesq'sequation). Contact pressure distribution.
Compaction Process: Compaction Mechanism; factors affecting compaction, influence of compaction on engineering properties. Determination of compaction characteristics- standard and modified Proctor tests- Light and Heavy compactiontests.CBR test – Field and laboratory based.

UNIT-V: Consolidation Process: Spring analogy-Voidratioand effective stress (eVslog P) relationship–Terazaghi's theory of one dimensionalconsolidation-assumptions and derivation of one dimensional consolidation equation, computation of magnitude of settlement and time rate of settlement.

Learning Resources:
1. Gopal Ranjan, Rao A.S.,"Basicand Applied Soil Mechanics",New age publications, 2023.
2. Murthy V.N.S.,"ATextbookof Soil Mechanics &Foundation Engineering",CBS Publishers, 2018.
3. VenkatramaiahC.,"GeotechnicalEngineering",NewAgePublishers, 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. Arora K.R., "Soil Mechanics and Foundation Engineering",Standard Publishers Distributors revised and enlarged 7th Edition, 2021.
10. Scott,R.F.,"Principlesof Soil Mechanics",Addison-Wesley-Massachusetts,
11. ISCode: IS-2720, Methods of tests for Soils.
12. http://nptel.ac.in/courses/105101084/
13. https://ocw.mit.edu/courses/1-361-advanced-soil-mechanics-fall-2004/pages/syllabus/

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal 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: U23PC630CE
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 – 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 - Construction of Water bound Macadam, Wet Mix Macadam and Granular sub base layers. Construction of Dense Bituminous macadam, Bituminous Macadam, Bituminous Concrete, Open Graded Premix Carpet, Mix Seal Surfacing, prime coat, tack coat, seal coat as per MORTH specifications, Introduction to recycled pavements.

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

Learning Resources:

1. Khanna S.K., Justo C.E.G., Veeraraghavan A., "Highway Engineering", 10th Edition, Nem Chand & Bros, 2018
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, 4th Edition, 2010.
4. Nicholas J. Garber Lester A. Hoel, Traffic and Highway Engineering- III edition, Cengage publication Indian edition 2014.
5. Yoder E.J., Witczak M.W., Principles of Pavement Design, John Wiley & Sons –Indian edition. 2012
6. Srinivasa Kumar R., Pavement design, Orient Blackswan Pvt. Ltd., New Delhi, 2013
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 MORT&H- Specifications for road and bridge works, 2013 (Fifth Revision)
10. 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)
11. Indo Highway Capacity Manual (Indo HCM) 2017 by CSIR –Central Road research institute
12. www.pavementinteractive.org
13. 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: U23PC640CE
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.	1. Identify and report the importance and necessity of construction management.
2. Understand the various techniques used for construction planning such as bar charts, CPM, PERT and crashing of networks	2. Employ bar charts, networks to determine the critical path and alter the construction schedules accordingly.
3. Acquire knowledge on various types of construction contracts, tenders and acts related to construction and construction safety	3. Interpret the terms related to costs and time, and there by solve problems on crashing of networks.
4. Understand the concept of Linear Programming in Construction along with application of Graphical and Simplex methods.	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.

Learning Resources:
1. Srinath L.S., PERT and CPM: Principles and Application, Vision IAS, 2020.
2. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2019
3. Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 2022.
4. Ghalot. P.S. and Dhir. B.M., Construction Planning and Management, Wiley Eastern Ltd., 2018.
5. Kumar Neerajha., Construction Project Management: Theory and Practice, Pearson Education, India, 2015.
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:U23PE610CE
Credits : 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Theobjectivesofthecourseareto introduce	Upon the completion of the course, students are expected to
1. Software package on construction management technology 2. Element wise assembling the parts of a building.	1. Plan, execute and monitor large scale projects execution using Project Management software. 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)

UNIT-III

Civil 3D

- Introduction to Civil 3D
- Benefit of Civil 3D
- Comparision 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
- 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 Alighment 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 assesmblies

- 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:U23PC611CE
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.

LISTOF EXPERIMENTS
DETERMINATION OF INDEX PROPERTIES:
1. Determination of Specific Gravity of soil solids using "Density bottle"method, Determination of Specific Gravity &water contentusing "Pycnometer" method.
2. Determination of Liquidlimit using Casgrande's and Cone Penetration standard LL device.
3. Determination of Shrinkage and Plastic 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 OFENGINEERINGPROPERTIES

7. Determination of Compaction Characteristics by Standard Proctor 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. Study on hardness of various rock minerals with the help pH Moh's scale of hardness

DEMONSTRATIONOF TESTPROCEDURES:

12. Determination of Shear Strength of Cohesivesoils by "vane shear test"
13. Determination of Shear Strength by conducting "UCC 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: U23PC621CE
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.

LISTOF EXPERIMENTS
Introduction of a structural analysis and designs of ware 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

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:60	Course Code: U23PC631CE
Credits: 1	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. 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

6. Job mix formula by Rothfuch Method

B) Tests on bitumen

7. Pentration Test

8. Elastic Recovery Test

9. Ductility Test

10. Softening point Test

11. Specific gravity Test

12. Viscosity Test

13. Flash and fire point Test

C) Traffic Studies

14. Classified Traffic volume study at mid blocks

15. Spot Speed Study

16. Origin & Destination studies

D) Miscellaneous Tests (demonstration only)

17. Design of Bitumen mixture by Marshall stability test as per ASTM D 6927-15

18. 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: U23PW619CE
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	U23OE610CE	Project Management	General	-	3
CSE	U23OE610CS	Fundamentals of Database Management System	General	-	3
CSE	U23OE620CS	Fundamentals of Machine Learning	Stream	AI&ML	3
EEE	U23OE610EE	Introduction to Batteries and Battery management System	General	-	3
IT	U23OE610IT	Web application development & Security	General	-	3
IT	U23OE620IT	Introduction to Machine Learning	Stream	AI&ML	3
Mech.	U23OE610ME	Industry 4.O	General	-	3
Mech.	U23OE620ME	Additive Manufacturing and its Applications (General Pool)	General		3
H&SS	U24OE320EH	Introduction to Psychology	General	-	3
H&SS	U23OE640EH	Advanced Course In Entrepreneurship			

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:U23OE610CE
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 ofproject 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: Tender form, 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.

Learning Resources:
1. Srinath L.S., PERT and CPM: Principles and Application, Vision IAS, 2020.
2. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2019
3. Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 2022.
4. Gahloj. P.S. and Dhiv. B.M., Construction Planning and Management, Wiley Eastern Ltd., 2018.
5. Kumar NeerajJha., Construction Project Management: Theory and Practice, Pearson Education, India, 2015.
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 :U23OE610CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Identify different issues involved in the design and implementation of a database system. 2 Understand transaction processing.	1 Identify the functional components of database management system. Create conceptual data model using Entity Relationship Diagram 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 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 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:U23OE620CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
Toformulatemachinelearningproblemscorrespondingtoanapplication.	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.

LearningResources:
1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, -Machine Learning, Pearson Education
2. TomMitchell,—MachineLearning‖,McGraw-HillScience,Firstedition.
3. ChristopherBishop,—PatternRecognitionandMachinelearning‖,Springer(2006).
4. StephenMarsland,‖MachineLearning–analgorithmicperspective‖,CRCPress.
5. Danielawitten,TrevorHastieRobertTibshiraniandGarethJames,—AnintroductiontostatisticalLearningwithapplicationsin R,Springer2013
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-III)

SYLLABUS FOR B.E. V SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U23OE610EE
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: IntroductiontoBatteryManagementSystem:
Cells & Batteries, Nominal voltage and capacity, Crate,Energy and power, Cells connected in series, Cells 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-chargeestimation,Cell total energyand 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: Negative electrode, Lithium-ion aging: Positive electrode, Cell Balancing, Causes of imbalance, Circuits for balancing.

UNIT –IV: Modelling and Simulation:

Equivalent-circuit models (ECMs), Physics-based models (PBMs), Empirical modelling approach, Physics-based modelling approach, simulating an electric vehicle, Vehicle range calculations, simulating constant power and voltage, Simulating battery packs.

UNIT -V: Design of battery BMS:

Design principles of battery BMS,Effect of distance,load,and force on battery life and BMS, energy balancing with multi-battery system.

Learning Resources:

1. Plett, Gregory L. Battery management systems,Volume I:Battery modeling.Artech House,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 : U23OE610IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
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 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 MACHINE LEARNING
(AI&ML TRACK : 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: U23OE620IT |
| Credits: 3 | CIE Marks: 40 | Duration of SEE :3Hrs |

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

UNIT-I: ntroduction 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 leaning: 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. EthemAlpaydin , 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)
10. 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 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 ENGINEEING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF MECHANICAL ENGINEERING

INDUSTRY 4.O
(Open Elective-IV)
SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U23OE610ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course is to	On completion of the course, students will be able to
1. Provide an overview of Industry 4.O and its impact on modern manufacturing and develop skills for implementing industry 4.O technologies in production processes.	1. Analyses the basic principles and technologies for smart factories and identify their applications in modern manufacturing. 2. Evaluate the concepts of Cyber-Physical Systems (CPS) and Cyber-Physical Production Systems (CPPS) and their role in creating new business models. 3. Apply the concepts of Digital Twins and Assistance Systems in production processes and their benefits. 4. Develop strategies for ensuring safety and security in networked production environments and analyse the challenges and opportunities of Human-Robot Collaboration (HRC). 5. Analyses the benefits and challenges of Cloud Manufacturing and the Connected Factory and develop strategies for implementing smart work pieces.

UNIT – I
Introduction
Definition of Industry 4.0, Comparison of Industry 4.0 Factory and today's Factory, Difference between conventional automation and Industry 4.0.
Basic principles and technologies of a Smart Factory
Internet of Things (IoT) & Industrial Internet of Things (IIoT) & Internet of Services, Big Data, Cyber-Physical Systems, Value chains in manufacturing companies, Customization of products, Digital Twins, Cloud Computing / Cloud Manufacturing, Security issues within Industry 4.0 networks.

UNIT – II
Cyber-Physical Systems (CPS) and Cyber-Physical Production Systems (CPPS)

Definition of Cyber-Physical System, Core elements of Cyber-Physical Systems and Cyber-Physical Production Systems, Control theory and real-time requirements, Self-organization principles, Communication in cyber-physical systems, Design Methods for Cyber-physical Systems, Applications for cyber-physical systems.

Cyber-Physical Systems and new Business Models

How CPS can induce new Business Models, The Role of horizontal and vertical value streams, New Business Models for the Smart Factory, Characteristics of Business Models within the Smart Factory, Examples of new Business Models: Service provider, Data provider, Technology provider, Platform provider.

UNIT – III
Digital Twins in Production

Basic concepts of Digital Twins, Benefits, impact and challenges of Digital Twins, Features and Implementation of Digital Twins, Types of Digital Twins, Digital Twin use cases, Applications for digital twins in production.

Assistance systems for production

The connected worker within the Industry 4.0 scenario, Diversity-driven workplaces, Human-and task-centered assistance systems, Technical tools ("Ambient Assisted Working" (AAW)), Mobile information technologies, Shop floor information systems, Production line support systems, Manipulator systems and intelligent chairs, Human work support by using exoskeletons, Applications of assistance systems in production.

UNIT –IV
Human-Robot Collaboration

Human-Robot Collaboration in Industry, Collaborative Robots: tasks, examples, Types of Human-Robot Collaboration, Safety of Human-Robot Collaboration, Applications with Collaborative Robots.

Safety and Security in networked Production Environments

Definition of Safety with Industry 4.0, Safety for connected Machines and Systems, Safety in Human Robot cooperation, Optimizing Safety with Industry 4.0, Security & Security Risks with Industry 4.0.

UNIT – V
Cloud Manufacturing and the connected factory

Virtualization, Cloud Platforms, Big data in production, Cloud-based ERP and MES solutions, Connected factory applications, IT security for cloud applications.

The smart work piece

Intelligent work piece, Work piece tagging, QR codes and RFID, Communication between work piece and environment, Multi-agent systems in production, Applications for smart work pieces.

Learning Resources:

1. Alasdair Gilchrist, Industry 4.0: The Industrial Internet of Things, Apress, 2016.
2. Ibrahim Garbie, Sustainability in Manufacturing Enterprises: Concepts, Analyses and Assessments for Industry 4.0, Illustrated Edition, Springer, 2016.
3. Klaus Schwab, The Fourth Industrial Revolution, Crown, 2017.

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 ENGINEEING (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 : U23OE620ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: 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 an Applications, World Scientific publications, 3rdEd., 2010
2. D.T. Pham and S.S. Dimov, "Rapid Manufacturing", Springer, 2001
3. Terry Wohlers, " Wholers Report 2000", Wohlers Associates, 2000
4. Paul F. Jacobs, " Rapid Prototyping and Manufacturing"–, ASME Press, 1996
5. 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-31
Department of Humanities & Social Sciences

ADVANCED COURSE IN ENTREPRENEURSHIP
(Open Elective-IV)
SYLLABUS FOR B.E.VI-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: U23OE640EH
Credits :03	CIE Marks:40	Duration of SEE: 03Hours

Course Objectives	**Course Outcomes**
The objectives of this course are to	On completion of the course the student will be able to
1. Develop an A-team 2. Refine business models and expand customer segments. 3. Develop strategies to grow revenues and markets, understand Financial Planning 4. Leverage technologies and platforms for growth stage companies 5. Develop key metrics to track progress.	1. Build and manage a high-performing startup team. 2. Refine business models and identify new customer segments. 3. Formulate revenue growth strategies and apply financial planning principles. 4. Utilize digital tools and platforms to scale growth-stage ventures. 5. Define and track key performance metrics for business progress.

Unit I: Pivoting and New Business Model
Introduction to Advanced Course and Recapping the key concepts; Revisit of idea/ solution, business model and team members, Need for a mentor; Pivoting and its need; Types of Business models; Refining business model; Analyzing the Business Model of Competitors; Adding new customer segments to existing business model.

Unit II: Business Planning
Product Management: Need for a product management with examples; Making a sales plan; Building sales organization: Entrepreneur interview, Hiring sales team; Making a people plan for the venture; Introduction and understanding financial planning and forecasting template; Discussing financial planning and revisiting business model; Creating a procurement plan; Negotiation.

Unit III: Customer Life cycle and Building the A-team

Customer life cycle; identifying secondary revenue streams; Funding Landscape: Funding options for an entrepreneur; Investor hunt: Creating funding plan and designing the pitch deck; Attracting right talent – I: Intro to building the A-team; Examples; Setting the team for success.

Unit IV: Branding and Channel Strategy, Leveraging Technologies

Creating brand Strategy: Drawing venture's golden circle; Defining the positioning statement: values; Creating a Public Image and Presence of the Venture; Identifying the right channel; Platforms for Marketing and Promotion; Platforms for Communication and Collaboration; Making the Tech Plan.

Unit V: Measuring Progress, Legal Matters and Role of Mentors & Advisors

Metrics for Customer Acquisition and Retention; Financial Metrics: Finding new revenue streams based on key financial metrics; Re-forecasting financial plan to increase margin; Professional Help and Legal & Compliance Requirements; Selecting IP for organization; Identifying mentors and advisors; Scouting board of directors; Capstone Project.

Learning Resources:

1. Clancy, Ann L. & Binkert, Jacqueline, "Pivoting- A coach's guide to igniting substantial change" Palgrave Macmillan US 2017
2. Porter, Michael, E., "Competitive Advantage: Creating and Sustaining Superior Performance", Free press, 1st edi.
3. Schwetje, Gerald & Vaseghi Sam, "The Business Plan", Springer-Verlag Berlin Heidelberg.
4. LeMay, Matt, "Product Management in Practice", O'Reilly Media Inc.
5. Smart, Geoff & Randy, Street., "Who: The A method of hiring", Ballantine books, 2008.
6. Blokdyk, Gerardus., "Customer Lifecycle Management - A complete guide", 5starcooks, 2018

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 AND SOCIAL SCIENCES
INTRODUCTION TO PSYCHOLOGY

SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code: U24OE320EH
Credits: 3	CIE Marks: 40	Duration of SEE :3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES *On completion of the course, students 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 the biological, cognitive, and socio-cultural influences on behaviour. 5. Equip students with basic research skills and ethical considerations in psychological practice.	1. Explain core psychological theories and their relevance to everyday life. 2. Analyze behaviour using major psychological perspectives (e.g., behavioural, cognitive, humanistic, etc.). 3. Apply psychological principles to real-world situations such as learning, motivation, and social interaction. 4. Demonstrate basic skills in psychological research, including hypothesis formulation, data collection, and analysis. 5. Evaluate ethical issues and cultural factors that influence psychological practice and research.

Course Description: This course provides an overview of psychology as a scientific discipline. Students will explore the biological, cognitive, social, and developmental foundations of human behaviour. No prior knowledge is required.

UNIT-I: Foundations of Psychology
1. History of psychology (structuralism, functionalism, behaviourism, etc.)

2. Major perspectives (biological, cognitive, behavioural, humanistic, psychodynamic)
3. Research methods in psychology

UNIT-II: Biological Bases of Behaviour
1. The nervous system and the brain
2. Neurotransmitters and hormones
3. Sleep and consciousness

UNIT-III: Development across the Lifespan
1. Cognitive and emotional development (Piaget, Erikson)
2. Social development
3. Nature vs. nurture debate

UNIT-IV: Learning and Memory
1. Classical and operant conditioning
2. Observational learning
3. Memory processes and types

UNIT-V: Social and Abnormal Psychology
1. Attitudes, conformity, and group behaviour
2. Psychological disorders and diagnosis (DSM overview)
3. Basic treatment approaches (CBT, psychotherapy)

Learning Resources:
1. "Psychology" by Saundra K. Ciccarelli& J. Noland White

The break-up of CIE: Internal Tests + Assignments + Quizzes
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2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			