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) III and IV SEMESTER
UNDER CBCS WITH EFFECT FROM 2024–2025
(For the students admitted in 2023-24)

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

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) III-SEMESTER ACADEMIC YEAR 2024 - 2025

(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								
U23HS030EH	Human Values and Professional Ethics-II	1	-	-	2	40	30	1
U23HS320EH	Skill Development Course-I (Communication Skills-I)	1	-	-	2	40	30	1
U23BS310MA	Transform Techniques and Partial Differential Equations	3	-	-	3	60	40	3
U23BS360MA	Skill Development Course-II (Aptitude-I)	1	-	-	2	40	30	1
U23ES310CE	Programming for Civil Engineering	3	-	-	3	60	40	3
U23PC310CE	Strength of Materials – I	3	-	-	3	60	40	3
U23PC320CE	Surveying	3	-	-	3	60	40	3
U23OEXXXX	Open Elective-I	2	-	-	3	60	40	2
PRACTICALS								
U23ES311CE	Programming for Civil Engineering Lab	-	-	2	3	50	30	1
U23PC321CE	Surveying Lab	-	-	2	3	50	30	1
U23PC331CE	Computer Aided Drafting Lab	-	-	2	3	50	30	1
Student should complete one NPTEL (8 weeks) certificate course equivalent to 2 credits by the end of VI semester								
Total		**17**	**-**	**6**		**570**	**380**	**20**
Grand Total		**23**				**950**		
Note: The left over hours are to be allotted to ECA-I / CCA-I /Sports / Library / Mentor Interaction based on the requirement.								

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS),
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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
HUMAN VALUES AND PFOFESSIONAL ETHICS-II
(Common to all branches)

SYLLABUS FOR B.E. III-SEMESTERS

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code : U23HS030EH
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	At the end of the course students will be able to:
1. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations 2. Understand professionalism in harmony with self and society. 3. Develop ethical human conduct and professional competence. 4. Enrich their interactions with the world around, both professional and personal.	1. Distinguish between Personal and Professional life goals–constantly evolving into better human beings and professionals. 2. Work out the strategy to actualize a harmonious environment wherever they work. 3. Distinguish between ethical and unethical practices, and start implementing ethical practices 4. Apply ethics and values in their personal and professional interactions.

UNIT-I:Normative Ethics & Societal Ethics: This unit deals with normative ethics, the branch of moral philosophy, or ethics, concerned with criteria of what is morally right and wrong. It includes the formulation of moral rules that have direct implications for what human actions, institutions, and ways of life should be like. This unit also covers societal ethics which is the systematic reflection on the moral dimensions of social structures, systems, issues, and communities.

1.1 Ethical Accountability
1.2 Society & Ethics
1.3 Rights & Responsibilities

UNIT-II: Professional Ethics - Need For Ethical Codes: This unit covers the code of Professional Ethics- it is designed to ensure that students learn the necessary skills that groom them to behave like employees should, one that is socially acceptable and respectful of one another. It establishes the rules for behavior and sends a message to every employee that universal compliance is expected.

2.1 Professional Ethics
2.2 Ethical Code
2.3 Flipped Classroom

UNIT-III: Privacy: This unit covers "Cyber ethics" - the code of responsible behaviour on the Internet. Just as we are taught to act responsibly in everyday life with lessons such as "Don't take what doesn't belong to you" and "Do not harm others," we must act responsibly in the cyber world as well. The basic rule is "Do not do something in cyberspace that you would consider wrong or illegal in everyday life."

3.1 Basics of Cyber Ethics
3.2 Privacy
3.3 Flipped Classroom

UNIT-IV: Media And Medical Ethics: This unit covers Media and Medical ethics is the best division of applied ethics dealing with the specific ethical principles and standards of media (including broadcast media, film, theatre, the arts, print media and the internet) and medicine (practice of clinical medicine and related scientific research)

4.1 Media Ethics
4.2 Medical Ethics
4.3 Flipped Classroom

MODE of DELIVERY

● Questionnaires ● Quizzes ● Case-studies ● Observations and practice ● Home and classroom Assignments	● Discussions ● Skits ● Short Movies/documentaries ● Team tasks and individual tasks ● Research based tasks ● Viva

Relevant Websites, CD's and Documentaries

- Value Education website, Http://www.universalhumanvalues.info UPTU website, Http://www.uptu.ac.in
- Story of stuff, Http://www.storyofstuff.com
- Al Gore, As Inconvenient Truth, Paramount Classics ,USA
- Charlie Chaplin, Modern Times, United Artists, USA
- IIT Delhi, Modern Technology-The Untold story-Anand Gandhi, Right Here Right Now, Cyclewala production.

Learning Resources:

1. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
2. B.L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
3. A.N Tripathy, 2003 Human values, New Age International Publishers.
4. EG Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.

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

1	No. of Internal Tests	:	1	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),
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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

SKILL DEVELOPMENT COURSE-I (COMMUNICATION SKILLS IN ENGLISH-I)

(Common to all branches)

SYLLABUS FOR B.E. 2/4-III SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 40	Course Code : U23HS320EH
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	At the end of the course students will be able to:
1. Get students proficient in both receptive and productive skills especially virtuall 2. Enable students to understand the importance and method of exchanging information in a formal space- both written and spoken 3. Introduce students to an ideal structure for a presentation and discussion- individually and in groups 4. Develop and improve reading skills needed for college work and reproduce the content based on the situational need.	1. Introduce themselves effectively and converse in a formal environment especially in the online space 2. Write emails with appropriate structure and content 3. Use appropriate structure based on the content employing appropriate transitions in written and spoken communication 4. Paraphrase content and write an effective summary

UNIT-1: Delightful Descriptions

1.1 Introductions on an Online Forum

1.2 Making Observations and Giving Opinion

1.3 Recalling and Describing

UNIT-2: Formal Conversation Skills

2.1 Ask for Information

2.2 Give Information

2.3 Give Feedback

2.4 Seek Permission

UNIT-3: Technical Expositions and Discussions

3.1 Classification
3.2 Sequence
3.3 Compare and Contrast
3.4 Cause and Effect
3.5 Problem and solution

Unit-4: Rational Recap

4.1 Paraphrasing - Written
4.2 Summarizing - Written
4.3 Paraphrasing – Spoken
4.4 Summarizing – Spoke

METHODOLOGY	**ASSESSMENTS**
- Case Studies - Demonstration - Presentations - Expert lectures - Writing and Audio-visual lessons	- Online assignments - Individual and Group

Learning Resources:

1. learn.talentsprint.com

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

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

Duration of Internal Tests : 90 Minutes

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DEPARTMENT OF MATHEMATICS

TRANSFORM TECHNIQUES AND PARTIAL DIFFERENTIAL EQUATIONS

(Common to Civil, EEE & Mechanical Engineering)

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code : U23BS310MA
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to:	*At the end of the course students will be able to:*
1. Understand the definition and properties of the Laplace transform. 2. Understand the definition and properties of the inverse Laplace transform. 3. Study the concept of Fourier series and its applications. 4. Learn the formation Partial Differential Equations and solution of linear and non-linear first order partial differential equations. 5. Study the applications of Partial Differential equations.	1. Evaluate Laplace transform of functions andapply Laplace transforms to evaluate integrals. 2. Find Inverse Laplace transforms of functions and apply the Laplace transform to solve linear differential equations. 3. Compute Fourier coefficients and find Fourier series of a function. 4. Formulate the Partial differential equations and solvethe linear and non-linear first orderPartial differential equations. 5. Solve the one-dimensional wave equation, one-dimensional heat equation, and two-dimensional heat equation under steady-state conditions.

UNIT-I: Laplace Transforms: Introduction to Laplace transforms - Sufficient Condition for Existence of Laplace Transform - Properties of Laplace Transform-First shifting theorem- Second shifting theorem-Change of scale property- Differentiation of Laplace transform - Integration of Laplace

Transform - Laplace Transform of Derivatives - Laplace Transform of Integrals - Evaluation of Integrals by Laplace Transforms.

UNIT-II : Inverse Laplace Transforms: Introduction to Inverse Laplace transforms - Properties of Inverse Laplace Transform-First shifting theorem - Second Shifting theorem -Change of scale theorem - Multiplication with s^n - Division by s –Convolution Theorem (without proof)- Application of Laplace transforms to higher order linear differential equation with Constant Coefficients.

UNIT –III: Fourier series: Introduction to Fourier series – Conditions for a Fourier expansion – Functions having points of discontinuity – Change of Interval - Fourier series expansions of even and odd functions - Fourier Expansion of Half- range Sine and Cosine series.

UNIT –IV: Partial Differential Equations: Formation of first and second order Partial Differential Equations - Solution of First Order Equations – Linear Equation - Lagrange's Equation - Non-linear first order equations – Standard Forms.

UNIT-V: Applications of Partial Differential Equations: Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation – Two-Dimensional Heat equation (steady state condition).

Learning Resources:

1. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics, Dr.B.S.Grewal 40th Edition, Khanna Publishers.
3. Advanced Engineering Mathematics, Kreyszig E, 8th Edition, John Wiley & Sons Ltd, 2006.
4. A text book of Engineering Mathematics by N.P. Bali& Manish Goyal, Laxmi Publication.
5. https://onlinecourses.nptel.ac.in/noc24_ma17/preview
6. https://onlinecourses.nptel.ac.in/noc24_ma37/preview

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

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

Duration of Internal Tests : 90 Minutes

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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
SKILL DEVELOPMENT COURSE-II APTITUDE- I
(Common to all branches)

SYLLABUS FOR B.E.2/4- III SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 40	Course Code :U23BS360EH
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to:	**At the end of the course the learners will be able to: -**
1. Students will be trained to enhance their employability skills. 2. Students will be introduced to higher order thinking and problem solving skills in the following areas - Arithmetic Ability, Numerical Ability and General Reasoning. 3. Students will be trained to work systematically with speed and accuracy while problem solving. 4. Students will be trained to apply concepts like percentages and averages to solve complex problems. 5. Students will be trained to use effective methods like elimination of options and shortcuts to solve problem accurately.	1. Solve questions in the mentioned areas using shortcuts and smart methods. 2. Understand the fundamentals concept of Aptitude skills. 3. Perform calculations with speed and accuracy. 4. Solve complex problems using basic concepts. 5. Use shortcuts with ease for effective problem solving.

UNIT 1: QUANTITATIVE APTITUDE - NUMERICAL ABILITY

1.1 Introduction to higher order thinking skills
1.2 Speed Math
1.3 Number systems
1.4 LCM & HCF

UNIT 2: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY FOUNDATION

2.1 Ratio proportions
2.2 Partnership

2.3 Ages
2.4 Allegations and mixtures
2.5 Averages

UNIT 3: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 1

3.1 Percentages
3.2 Profit and loss

UNIT 4: REASONING ABILITY- GENERAL REASONING PART 1

4.1 Blood Relations
4.2 Number Series
4.3 Coding and decoding

UNIT 5: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 2

5.1 Time and Work
5.2 Chain Rule
5.3 Pipes and Cisterns

Prescribed textbook for theory:

1. Quantitative Aptitude S.CHAND by Dr. R S Aggarwal
2. A Modern Approach to Verbal & Non-Verbal Reasoning S.CHAND by Dr. R S Aggarwal

Suggested Reading

1. Learn.talentsprint.com/References Courses
2. Quantitative Aptitude Disha Publications
3. LOGICAL Reasoning Disha Publications

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

Duration of Internal Tests : 90 Minutes

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DEPARTMENT OF CIVIL ENGINEERING

PROGRAMMING FOR CIVIL ENGINEERING

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U23ES310CE
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSEOBJECTIVES	**COURSEOUTCOMES** On completion of the course, students will be able to
1. Acquire problem solving skills. 2. Develop flow charts. 3. Understand structured programming concepts. 4. Write programs in C Language.	1. Design flow charts and algorithms for solving a given problem using the fundamentals of programming. 2. Apply decision making, looping constructs and functions to develop programs for a given problem. 3. Store data using arrays and perform searching and sorting operations on the data. 4. Design programs on string handling and operations on arrays using dynamic memory management techniques. 5. Develop programs to store data and perform operations using structures and files

UNIT-I: Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Flow charts. Number Systems (Binary, Octal, Decimal and Hexadecimal)

Introduction to C Language: Background, C Programs, Identifiers, Data types, Variables, Constants, Input / Output, Expressions, Precedence and Associatively, Evaluating Expressions, Type Conversion, Statements, Operators.

UNIT-II: Selection: simple if, if-else, else if ladder, nested if and switch – case.

Repetition: Introduction to Loops, while, for, do-while Statements, Loop Examples, break, continue, goto.

Functions: Designing Structured Programs, Functions Basics, User Defined

Functions, Inter-Function Communication, Standard Functions, Scope, Storage Classes-Auto, Register, Static, Extern, Scope Rules. Recursive Functions

UNIT-III: Arrays: Concepts, One-Dimensional Arrays in C, Array Applications: Linear Search and Binary Search, Selection Sort and Bubble Sort. Two-Dimensional Arrays, Applications: matrix operations

UNIT-IV: Pointers: Introduction, Pointers for Inter-Function Communication, Pointer Arithmetic. Introduction to dynamic memory allocation

Character handling functions: input, output character handling functions, built in character handling functions

Strings: Introduction to strings, Input and Output operations using scanf (), printf(), gets(), puts().String library functions: strlen(), strcpy(), strcat(), strcmp(), strlwr(), strupr(), strrev(); basic programs using string library functions, Array of strings.

UNIT-V: Structure: Definition and Initialization of Structures, Accessing Structures, Arrays of Structures, Structures and Functions, Unions.

Files: Introduction to files, file operations, reading data from files, writing data to files. Basic programs using files.

Pre-processor Directives: Types of pre-processor directives, examples.

Learning Resources:

1. Forouzan B.A &Richard F. Gilberg, A Structured Programming Approach using C, 3rdEdition (2013), CengageLearning.
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2ndEdition (2006),Prentice-Hall.
3. RajaramanV, The Fundamentals of Computer, 4th Edition (2006), Prentice-Hall of India
4. Steve Oualline, Practical C Programming, 3rdEdition (2006), O'Reilly Press.
5. Jeri R.Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, 5thEdition(2007), Pearson Education.
6. BalagurusamyE, Programming in ANSIC, 4thEdition (2008),TMG.
7. Gottfried,ProgrammingwithC,3rdEdition(2010),TMH.
8. RGDromey,HowtoSolveitbyComputer,1stEdition(2006),Pearson Education.

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

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

Duration of Internal Tests : 90 Minutes

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DEPARTMENT OF CIVIL ENGINEERING

STRENGTH OF MATERIALS–I

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):3:0:0	SEE Marks:60	Course Code: U23PC310CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
In this subject the students will:	Upon the completion of course students will be able to:
1. Examine and interpret basic concepts of Strength of materials and analyze statically determinate and indeterminate structures. 2. Analyze simple beams subjected to various types of loading and plot shear force and bending moment diagrams and compute bending stresses. 3. Define and analyze shear stresses in beams and plot shear stress distribution across cross section of beams 4. Define and analyze problem of columns subjected to direct and bending stresses 5. Define the concepts of compound stresses and strains in beams and also Investigate the behaviour of thin cylinder, spherical shells and thick cylinders	1. Express understanding of the basic concepts and principles of Strength of materials and solve problems of composite sections, statically determinate and indeterminate structures. 2. Construct shear force and bending moment diagrams for beams and compute stresses and strains in bending and shear in the cross section of beams subjected to transverse loading. 3. Compute direct and bending stresses in columns and beams subjected to eccentric loading. 4. Identify and interpret the governing equation for compound stress and strains and compute the principal stress and strains 5. Compute stresses in thin cylinders, spherical shells and thick cylinders subjected to internal and external pressure.

UNIT-I: **Simple Stresses and Strains:** Definitions, types of stresses and strains. SI units, and notation. Hooke's law, modulus of elasticity, stress-strain curves for mild steel and typical engineering materials.Ductile and brittle materials.Working stress and factor of safety.Deformation of bars under axial loads; prismatic and non-prismatic bars.Deformations due to self-weight.Bars of uniform strength.Poisson's ratio; volumetric strain and restrained

strains.Relationship between elastic constants.Compound bars and temperature stresses.Statically indeterminate problems in tension and compression.

UNIT-II: Shear Force and Bending Moment: Definitions. Different types of beams and loads; shears force and bending moment diagrams for cantilever and simply supported beams with and without overhangs subjected to different types of loads viz., point loads, uniformly distributed loads, uniformly varying loads and couples. Relationship between loading, shear force and bending moment.

UNIT-III: Bending Stresses in Beams: Theory of simple bending. Moment of resistance, Elastic section modulus of section. Stresses in beams of various cross sections; flitched beams.
Shear Stresses in Beams: Distribution of transverse shear stresses over rectangular, circular, triangular, I- and T- sections.

UNIT-IV: Direct and Bending Stresses: Distribution of stresses over symmetrical sections under combined axial load and bending moment. Cores of solid and hollow circular and rectangular sections.
Compound stresses and strains: Principal stresses. Ellipse of stress.Mohr's circle for biaxial stresses. Principal strains. Introduction to failure theories.

UNIT-V: Thin Cylinders and spherical shells: Thin Cylinders subjected to internal fluid pressure; wire wound cylinders & shells
Thick Cylinders: Stresses under internal and external pressure. Compound cylinders.

Learning Resources:

1. Ferdinand P. Beer, E. Russell Johnston , John T. Dewolf, Mechanics of Materials, 2017.
2. Ramamrutham S., Narayanan R., Strength of Materials, Dhanpat Rai Publishing Company, New Delhi, 2011.
3. Bansal R.K., A text book of Strength of Materials, Laxmi Publications, New Delhi, 2010.
4. Rajput R.K., Strength of Materials, S.Chand Publications, New Delhi, 2006.
5. Junnarkar S.B., Mechanics of Structures (Vol-I & II), Charotar Publishing House, Anand, 2002.
6. Pytel and Singer F.L., Strength of Materials, Harper & Row, New York, 1999.
7. Subramanian R., Strength of Materials, Oxford University Press, 2010.
8. Hibbeler.R., Mechanics of Materials, Pearson Publishers, 2017.
9. Bhavikatti.S.S, Strength of Materials, Vikas Publishers, 2013.
10. NPTEL Course (www.nptel.ac.in)

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

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

Duration of Internal Tests : 90 Minutes

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DEPARTMENT OF CIVIL ENGINEERING

SURVEYING

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):3:0:0	SEE Marks:60	Course Code: U23PC320CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
In this subject the students will	Upon the completion of this course students will be able to
1. Learn the basic concepts and use of surveying in Civil Engineering 2. Understand the measurement techniques and equipment used in land surveying such as chain/tape, compass, and level with respect to equipments used, methods, errors and analysis of data 3. Acquire knowledge on use of theodolite and total station equipment, its adjustments, measurements, methods employed, errors and computation of data. 4. Study the modern techniques in surveying with GPS, aerial photogrammetry, remote sensing,	1. Employ basic surveying operations and computations for measurement of distances and angles using chain/tape and compass for the given site conditions in field 2. Apply the principles of leveling to measure elevations of objects with respect to known points and prepare contour maps. 3. Interpret the principles of measurement of angles with theodolite and total station, make traverse computations and solve for omitted measurements in traverse . 4. Compute the parameters required for setting out simple circular curve, reverse curve, compound curves and introduce the concepts of transition curves and vertical curves required for layout of roads and railways 5. Apply the concepts of modern tools such as GPS, Remote sensing and aerial photogrammetry for measurement of details on surface of earth and relate to civil engineering problems

UNIT-I: Introduction to Surveying: Surveying Objectives, Plane and Geodetic surveying, Principle of surveying, Classification of surveys.
Distance Measurement: Chains and Tapes, Ranging.

Compass Surveying: Measurement of direction and angles. Types of compass, meridians and bearings, Magnetic declination, Dip, local attraction.

UNIT-II: Levelling: Definitions and principles of levelling, Terms used in levelling, booking and reduction of levels. Fly levelling, Longitudinal leveling, Cross-section leveling, and Reciprocal leveling. Errors in levelling; curvature and refraction corrections.

Contouring: Definition and characteristics of contours, Direct and indirect methods of contouring, Interpolation of contours, Uses of contours.

UNIT-III: Theodolite and Total station surveying: Introduction to theodolite and total station, Electronic distance measurement concepts, Measurement of horizontal and vertical angles, Measurement of distances, Introduction to total station – Concepts, capabilities and functions

Traversing and Computations: Methods of traversing, Checks in open and closed traverse, Computation of latitude and departures, consecutive and independent coordinates, closing error and its adjustment by Bowditch method, Transit rule and Graphical method. Gale's traverse table, omitted measurements in traverse and their computations.

UNIT-IV: Curves: types of curves, elements of curves, setting of simple curves using linear and angular methods. Compound curves – Elements – Solution to different cases. Reverse curves – Parallel straights and Non-parallel straights. Introduction toTransition curves, Vertical curves

Unit V :**Advanced Surveying** : Introduction to remote sensing, Elements of remote sensing, Spectral reflectance, GPS- Overview of GPS, Segments of GPS , working principle of GPS/DGPS, Errors in GPS, Photogrammetry – Basic definitions, scale of a vertical photograph, Introduction to UAV systems - classification and applications

Learning Resources:

1. Punmia B.C., Ashok Kumar Jain, Arun Kumar Jain, Surveying, Vol. 1 and 2, Laxmi Publications, 2018.
2. Arora K.R., Surveying, Vol.1, 2 and 3, Standard Publishers Distributors, 2019.
3. Duggal S K, Surveying Volume 1 and 2, Fifth edition, Mc. Graw Hill Education Pvt Ltd 2019.
4. Kanetker T.P. and Kulkarni S.V., Surveying and Levelling, Pune VidyarthiGruhaPrakshan, Pune, 2014.
5. Venkatramaiah C., A Text Book of Surveying, University Press, Hyderabad, 2013.
6. Surveying Theory and Practia, James, M Anderson and Edward M., Tata Mc Graw Hill, 2012.

7. Advanced Surveying: Total Station, GPS, GIS and Remote Sesnign, Gopi Satheesh, R Sathi Kumar, N.Madhen, Pearson education, 2017, 2nd edition.
8. NPTEL course - Surveying course by Prof Bharat Lohani, IIT Kanpur - http://www.nptelvideos.in/2012/11/surveying.html
9. NPTEL course – Digital land Surveying and mapping course by Dr.Jayanta K Ghosh, IIT Roorkee - https://nptel.ac.in/courses/105/107/105107158/

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

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

Duration of Internal Tests : 90 Minutes

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

DEPARTMENT OF CIVIL ENGINEERING

PROGRAMMING FOR CIVIL ENGINEERING LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : U23ES311CE
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

	COURSE OBJECTIVES		COURSE OUTCOMES *On completion of the course, students will be able to*
1	Write, compile and debug programs in C.	1	Choose appropriate data type for implementing programs in C language.
2	Formulate solution to problems and implement in C.	2	Design and implement modular programs involving input output operations, decision making and looping constructs.
3	Effectively choose programming components to solve computing problems.	3	Implement search and sort operations on arrays.
		4	Implement programs on string handling.
		5	Design and implement programs to store data in structures and files.

Programming Exercise:

1. Finding maximum and minimum of given set of numbers.
2. Finding roots of a quadratic equation.
3. Basic calculator program using switch-case statement.
4. Sin x and Cos x values using series expansion.
5. Conversion of binary to decimal, octal, hexadecimal and vice versa.
6. Generating pyramid of numbers.
7. Recursion: factorial, Fibonacci.
8. Bubble sort and selection sort.
9. Linear search and binary search.
10. Generating Pascals triangle using arrays.

11. Matrix addition, multiplication and transpose using arrays.
12. String copy, palindrome, concatenation .
13. Programs on structures and unions.
14. Finding the number of characters, words and lines of given text file.
15. File handling programs.

Learning Resources:

1. YashavanthKanetkar, "Let us C", 16th Edition, BPB Publications, 2018.
2. BalagurusamyE, Programmingin ANSI C, 7thEdition, TMG, 2016.
3. ReemaTharaja "Introduction to C Programming", Second Edition, OXFORD Press,2016.
4. J.R. Hanly and E.B. Koffman"Problem Solving and Program Design in C", 7th Edition, Pearson education, 2012.
5. PradeepDey and ManasGhosh, "Programming in C", Oxford Press, 2nd Edition, 2017.
6. https://www.tutorialspoint.com/cprogramming/index.htm
7. https://onlinecourses.nptel.ac.in/noc18-cs10/preview.

No. of Internal Tests: 01 Max. Marks for Internal Test: 12
Marks for assessment of each experiment 18
Duration of Internal Test: 2 Hours

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

SURVEYING LAB

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):0:0:2	SEE Marks:50	Course Code: U23PC321CE
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course students will be able to
1. Develop skills for applying classroom knowledge to field problems and handling of surveying tools such as chain, compass, Autolevel, theodolite, GPS and Total station.	1. Locate the objects, measure the distances and area and transfer the same on to the drawings 2. Use conventional surveying tools such as chain, compass, autolevel, theodolite and Total station in the field of civil engineering. 3. Practice working as a team member and lead a team 4. Plan a survey appropriately with the skill to understand the surroundings using Total Station and Theodolite. 5. Demonstrate professional behavior in conducting the experiments and present the results effectively

LIST OF EXPERIMENTS:

1. Practice of direct and indirect ranging and measuring the distance using Chain.
2. Traversing by using Compass – plotting and adjustments.
3. Introduction to leveling- flyleveling using auto level
4. Profile leveling using auto level
5. Measurement of horizontal angles by repetition & Reiteration method using Theodolite.
6. Traversing by using Theodolite – Distribution of errors using gales Traverse table
7. Setting of simple curve by Theodolite.

8. Introduction to Total Station and Applications-The introduction includes setting up of Total Station over a station, input values: Measurement of Horizontal & Vertical distance using Total Station
9. Determination of area enclosed in closed traverse having minimum 5 station. Plot the measured values using a AUTOCADD
10. Setting out works using Total Station – Staking out.
11. Determining the RL of the point using Trigonometric levelling.

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 DRAFTING LAB

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):0:0:2	SEE Marks:50	Course Code: U23PC331CE
Credits : 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	*Upon the completion of this course students will be able to*
1. Develop skills to generate civil engineering drawings using a drafting software. 2. Learn various tools and functions of the drafting software.	1. Understand functional planning & orientation of the buildings. 2. Navigate the drafting software user interface. 3. Learn basic tools of the software. 4. Apply the fundamental features of drafting software in a practical situation. 5. Prepare civil engineering drawings in a detailed and visually impressive way.

LIST OF EXPERIMENTS

1. **Building Planning & Orientation:** Functional planning of buildings and Orientation of the building for ventilation.

2. **CAD:** Introduction to Computer Aided Drafting, Advantages and Disadvantages of CAD, List of CACED Software. Introduction and feature of drafting software.

3. **Environment of drafting software:** Workspace, Application Menu, Quick Access Toolbar, Ribbon, Search for information, Pull-down menu, Status bar, Function keys.
   Coordinate systems: absolute and relative, Cartesian and polar coordinate systems.

4. **Basic Managing/ Display control Tools:** New, Save, new, Open, Close, Quit/ Exit, Undo, Redo, Limits, Units, Zoom, Pan, Steering Wheel, View Cube etc.
   Basic Drafting Tools: Line, Polylines, Point, Circle, Arc, Spline, Ellipse, Rectangle, Polygons, Text, Hatch.

5. **Editing/ Inquiry Tools:** Erase, oops, Move, Copy, Mirror, Rotate, Scale, Fillet, Chamfer, Trim, Extend, Break, Join, Stretch, Offset, Array, Distance, Radius, Angle, Area, Volume.

6. **Dimensioning Tools:** Linear, Aligned, Radius, Diameter, Centre, Angular, Baseline, Continuous, Ordinate, Arc Length, Jogged Radius Dimension, Dimension Space, Dimension Break, Inspection Dimension, Multileader and its Style.

7. **Layer Tools:** Concepts and use of Layers in drafting software, drawing, Adding New layers, Editing and Managing Layers, List Properties, Use of Different Types of lines and their weightages.
   Block/W-block and Attributes: Concept and Significance of Blocks in drafting software Drawings, Creating Blocks, Editing and Managing Blocks
8. Drawing of Plans, Elevations and Sections of various types of single StoreyResidentialBuildings.

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)

DEPARTMENT OF CIVIL ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATION (R-23)

BE (CIVIL ENGINEERING) III-SEMESTER (BRIDGE COURSE) ACADEMIC YEAR 2024 - 2025

(Students Admitted in 2023-24)

INTERDISCIPLINARY COURSES OFFERED BY CIVIL ENGINEERING

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								
UB23BS300MA	Matrix Theory and Vector Calculus	2	-	-	3	50	-	-
UB23ES340CE	Mechanics for Engineers	2	-	-	3	50	-	-

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

DEPARTMENT OF MATHEMATICS

CALCULUS&MATRIX THEORY

(Civil, Mech., & EEE)

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:50	Course Code: UB23ES300MA
Credits : - - -	CIE Marks: - - -	Duration of SEE: 3 Hrs

UNIT-I: Calculus: Differentiation of standard functions(Formulae) -Taylor's Series – Maclaurin's Series for functions of one variable - Partial Derivatives – Total Derivative - Derivativeof Composite functions and Implicit functions - Chain Rule.

UNIT-II: Vector Differentiation: Scalar and Vector point functions -Vector Differentiation-Level Surfaces-Gradient of a scalar point function- Normal to a level surface- Directional Derivative – Divergence and Curl of a Vector field - Solenoidal and Irrotational vector- Conservative vector field.

UNIT-III: Multiple Integrals: Double integrals - Change of order of integration (Cartesian Coordinates) – Change of variables (Cartesian to polar coordinates in two dimensions) - Triple integrals (Cartesian).

UNIT-IV: Matrix Theory: Rank of matrix- Echelon form - -System of Linear Equations- Consistency of Homogeneous and Non-homogeneous system of equations- Eigen values and EigenVectors.

Learning Resources:

1 Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.

2 Higher Engineering Mathematics, Dr.B.S. S Grewal 40th Edition, Khanna Publishers.

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

DEPARTMENT OF CIVIL ENGINEERING

MECHANICS FOR ENGINEERS

(Civil, Mech., & EEE)

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:50	Course Code: UB23ES340CE
Credits : - - -	CIE Marks: - - -	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
In this subject the students will	Upon the completion of this course students will be able to
1. To learn the resolution of a system of spatial forces. 2. To assess the frictional forces on rigid body. 3. To understand the concepts of dynamics and its principles. 4. To explain kinetics and kinematics of particles, projectiles, curvilinear motion.	1. Analyse system of forces for their resultant. 2. Analyse equilibrium of a body subjected to a system of forces. 3. Analyse equilibrium of a body subjected to a system of forces including frictional forces. 4. Distinguish between statics and dynamics and differentiate between kinematics and kinetics. 5. Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear motion.

UNIT-I: Force Systems: Components of forces, moments in space and its applications.

UNIT-II: Equilibrium of Force Systems: Free body diagram, Equations of equilibrium, Equilibrium of planar and spatial system.

UNIT-III: Friction: Laws of friction, application to simple systems and wedge friction.

UNIT-IV: Kinematics: Rectilinear motion, curvilinear motion, velocity and acceleration of a particle.

UNIT-V: Kinetics: Analysis as a particle, analysis as a rigid body in translation.

Learning Resources:

1. Singer F.L., "Engineering Mechanics", Harpper & Collins, Singapore,2010.
2. Timoshenko S.P. and Young D.H., "Engineering Mechanics", McGraw Hill International Edition, 2014.
3. Andrew Pytel, Jaan Kiusalaas., "Engineering Mechanics", Cengage Learning, 2014.
4. Beer F.P. and Johnston E.R., "Jr. Vector Mechanics for Engineers", TMH, 2004.
5. Hibbeler R.C. & Ashok Gupta, "Engineering Mechanics", Pearson Education, 2010.
6. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", Umesh Publications, 2011.
7. Basudeb Bhattacharyya., "Engineering Mechanics", Oxford University Press, 2008.
8. Meriam. J. L., "Engineering Mechanics", Volume-I Statics, John Wiley & Sons, 2008.
9. NPTEL Course (www.nptel.ac.in)
10. Virtual labs (www.vlab.co.in)

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. III SEMESTER

Dept	Course Code	Name of the Course	Stream Type	Stream Name	credits
Civil	U23OE310CE	Green Buildings	General	-	2
CSE	U23OE310CS	Introduction to Python Programming	General	-	2
CSE	U230E320CS	Programming Essentials in Python	Stream	AI&ML	2
ECE	U23OE310EC	Mathematical Programming for Engineers	General	-	2
ECE	U23OE320EC	Introduction to Signals and Systems	General	-	2
EEE	U23OE310EE	Non Conventional Energy Sources	General	-	2
IT	U23OE310IT	Object Oriented Programming using Java	General	-	2
IT	U23OE320IT	Computing using Python	Stream	AI&ML	2
Mech.	U23OE320ME	Fundamentals of Unmanned Aerial Vehicles	General	-	2
Mech.	U23OE310ME	Introduction to Industrial Robotics	Stream	Robotics	2
Mathematics	U230E310MA	Complex Variables	General	-	2
Chemistry	U23OE310CH	Polymeric Materials	General	-	2
Physics	U23OE310PH	Smart Materials & Applications	General	-	2
H&SS	U22OE310EH	Learning To Learn	General	-	2

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

DEPARTMENT OF CIVIL ENGINEERING

GREEN BUILDINGS (Open Elective-I)

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:60	Course Code: U23OE310CE
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Learn the principles of planning and orientation of buildings. 2. Environmental implications of natural and building materials along with green cover 3. Acquire knowledge on various aspects of green buildings	1. Explain the principles of building planning, its bylaws and provide facilities for rainwater harvesting. 2. Analyse the aspects of energy, water and waste management in buildings. 3. Understand the concepts of green building technologies. 4. Understand rating systems of GRIHA IGBC and LEED.

UNIT-I: Planning of buildings: Principles of planning, Relevant building bylaws, site selection for buildings, orientation of buildings, Provision of rain water harvesting

UNIT-II: Building-Energy-Implications: Environmental implications of buildings energy, carbon emissions, water use, waste disposal; Building materials: sources, methods of production and environmental Implications. Green building materials and recycling, Green cover and built environment

UNIT-III: Green Building Technologies: Introduction- Necessity - Concept of Green building. Principles of green building – Site selection criteria for Green Buildings – effective cooling and heating systems – effective electrical systems-Passive solar architecture - effective water conservation systems

UNIT-IV: Certification Systems: Certification systems- Green Rating for Integrated Habitat Assessment (GRIHA), Indian Green Building Council (IGBC) and Leadership in Energy and Environmental Design (LEED), case studies

Learning Resources:

1. Kumara Swamy N.Kameswara Rao A., Building Planning And Drawing, Charotar, Publications, 2013.
2. Shahane, V. S, "Planning and Designing Building", Poona, Allies Book Stall, 2004.
3. Michael Bauer, Peter Mösle and Michael Schwarz "Green Building – Guidebook for Sustainable Architecture" Springer, 2010.
4. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison "Green Building Handbook" Volume I, Spon Press, 2001.
5. Mili Majumdar, "Energy-efficient buildings in India" Tata Energy Research Institute, 2002.
6. TERI "Sustainable Building Design Manual- Volume I & II" Tata Energy Research Institute, 2009.

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	:	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 COMPUTER SCIENCE & ENGINEERING

INTRODUCTION TO PYTHON PROGRAMMING
(OPEN ELECTIVE-I)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code : U23OE310CS
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Acquire problem solving skills	1 Design python programs using arithmetic expressions and decision making statements
2 Learn programming and solve problems using Python language	2 Design modular python programs using functions 3 Develop programs using strings and list 4 Develop programs using tuples and dictionaries

UNIT-I: **Introduction to Python**: Variables, expressions and statements, order of operations

Conditionals: Modulus operators, Boolean expressions, logical operators, conditional execution, alternative executions, chained conditional, nested conditional

Iteration: while statement

UNIT-II: Functions: Function calls, type conversion and coercion, mathematical functions, User-defined functions, parameters and arguments. Recursion

UNIT-III: Strings: string length, string traversal, string slices and string comparison with examples, strings are immutable, find function, string module

List: list values, accessing elements, list traversal, list length, list membership, list and for loop, list operations with examples

UNIT-IV: **Tuples**: Mutability, tuple assignment, tuple as return values

Dictionaries: dictionary operations, dictionary methods, aliasing and copying, counting letters using dictionaries

Learning Resources:

1. Downey A, How to think like a Computer Scientist :Learning with Python, 1st Edition(2015), John Wiley
2. Lambert K.A, Fundamentals of Python –First Programs, 1st Edition(2015), Cengage Learning India
3. Perkovic L, Introduction to Computing using Python,2/e, (2015), John Wiley
4. Stewart Venit and Elizabeth Drake, Prelude to Programming: Concepts and Design, 6th Edition(2015),Pearson India
5. Mark J Guzdial, Introduction to Computing and programming in Python, 3rdEdition(2013), Pearson India
6. Allen Downey, Think Python, 2nd Edition(2015),Shroff Publisher Orielly
7. http://nptel.ac.in/courses/117106113/34
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-01sc-introduction-to-electrical-engineering-and-computer-science-i-spring-2011/python-tutorial/
9. www.scipy-lectures.org/intro/language/python_language.html

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	:	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 COMPUTER SCIENCE & ENGINEERING

PROGRAMMING ESSENTIALS IN PYTHON

Stream - Artificial Intelligence & Machine Learning

(OPEN ELECTIVE-I)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code :U230E320CS
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Acquire problem solving skills 2 Learn programming and solve problems using Python language	1 Design python programs using arithmetic expressions and decision making statements 2 Design modular python programs using functions 3 Develop programs using strings and list 4 Develop programs using tuples and dictionaries

UNIT-I: **Introduction to Python**: Variables, expressions and statements, order of operations
Conditionals: Modulus operators, Boolean expressions, logical operators, conditional execution, chained conditional, nested conditional
Iteration: while statement

UNIT-II: Functions: Function calls, Type conversion and coercion, mathematical functions, User-defined functions, parameters and arguments. Recursion

UNIT-III: Strings: string length, string traversal, string slices and string comparison with examples, strings are immutable, find function, string module
List: list values, accessing elements, list traversal, list length, list membership, list and for loop, list operations with examples

UNIT-IV: **Tuples**: Mutability, tuple assignment, tuple as return values
Dictionaries: dictionary operations, dictionary methods, aliasing and copying, counting letters using dictionaries

Learning Resources:

1. Downey A, How to think like a Computer Scientist :Learning with Python, 1st Edition(2015), John Wiley
2. Lambert K.A, Fundamentals of Python–First Programs, 1st Edition (2015), Cengage Learning India
3. Perkovic L, Introduction to Computing using Python,2/e, (2015), John Wiley
4. Stewart Venit and Elizabeth Drake, Prelude to Programming: Concepts and Design, 6th Edition(2015),Pearson India
5. Mark J Guzdial, Introduction to Computing and programming in Python, 3rd Edition(2013), Pearson India
6. Allen Downey, Think Python, 2nd Edition(2015),Shroff Publisher Orielly
7. http://nptel.ac.in/courses/117106113/34
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-01sc-introduction-to-electrical-engineering-and-computer-science-i-spring-2011/python-tutorial/
9. www.scipy-lectures.org/intro/language/python_language.html

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	:	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 ELECTRONICS AND COMMUNICATION ENGINEERING

MATHEMATICAL PROGRAMMING FOR ENGINEERS

(General Pool: Open Elective - I)

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

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U23OE320EC
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide fundamental knowledge of programming language for solving problems.	On completion of the course, students will be able to 1. Generate arrays and matrices for numerical problems solving. 2. Represent data and solution in graphical display. 3. Write scripts and functions to easily execute series of tasks in problem solving. 4. Use arrays, matrices and functions in Engineering applications

UNIT - I : Introduction: Basics of MATLAB,MATLAB windows, Advantages of MATLAB,on-line help, file types.

MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating,Saving and Executing a Script File, Creating and Executing a function file.

Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions : Script Files, Function Files, Debugging methods in MATLAB.

Graphics: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options-Multiple plots-subplots-specialized 2D plots: stem-,bar, hist, pi, stairs, loglog, semilog,polar,comet 3D plots: Mesh,Contour,Surf,Stem3,ezplot.

UNIT III : Numerical Methods Using MATLAB: Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, MATLAB functions for integration.

Linear Equations-Linear algebra in MATLAB, Solving a linear system, Gauss Elimination, Finding eigen values and eigenvectors, Matrix factorizations.

UNIT - IV : Nonlinear Equations: System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation.

Solution of Ordinary differential Equations(ODEs)-ODE Solvers in MATLAB, Solving First-order equations using ODE23 and ODE45.

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by RudraPratap, Oxford publications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt. Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition-Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Math works.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siauw Alexandre Bayen,Elsevier-18th April 2014.
5. https://nptel.ac.in/courses/103106118/2
6. https://www.udemy.com/numerical-methods/

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	:	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 ELECTRONICS AND COMMUNICATION ENGINEERING

INTRODUCTION TO SIGNALS AND SYSTEMS

(General Pool: Open Elective-I)

(Common for CSE, AI&ML, EEE & IT branches)

SYLLABUSFORB.E.III–SEMESTER

L:T:P(Hrs./week):2:0:0	SEEMarks: 60	CourseCode:U23OE340EC
Credits:2	CIEMarks: 40	DurationofSEE:3Hours

COURSEOBJECTIVES	COURSEOUTCOMES
1. Define and classify continuous and discrete time signals and systems. 2. Determine frequency domain characteristics of continuous and discrete time signals.	On completion of the course, students will be able to 1. Analyze basic signals and systems in continuous time domain. 2. Apply the properties of Fourier transformationtechniquestoanalyze continuoustimedomainsignalsandsystemsin frequency domain. 3. Apply Laplace Transform, analyze the LTI systems. 4. Analyze basic signals and systems in discretetime domain

UNIT-I

Continuous time signals: types of signals, representation of signals, basic elementary signals, operations on signals.

Continuous time systems: classification of systems-static and dynamic, linear and nonlinear, time invariant and time variant.

Lab Activity: Generation of elementary signals in MATLAB

UNIT-II

Continuous time Fourier Series: Introduction, existence, properties, magnitude and phase spectrums

Continuous time Fourier transforms: Introduction, existence, properties, magnitude and phase spectrums.

Lab Activity: Verification of properties of Fourier Transform in MATLAB.

UNIT–III

Laplace transforms: Introduction, existence, Laplace transform of basic elementary signals, properties, inverse Laplace transforms, Analysis of LTI

systems using Laplace Transform.

Lab activity: Obtaining system response using Laplace transforms in MATLAB

UNIT-IV

Discrete timesignals: types of signals, representation of signals, basic elementary signals, operations on signals.

Discrete time systems: classification of systems-static and dynamic, linear and nonlinear, time invariant and time variant.

Lab activity: Generation of elementary signals in MATLAB.

Learning Resources:

1. P.RamakrishnaRao,SignalsandSystems, Mc GrawHill,2008.
2. AlanV.Oppenheim,AlanS.WilskyandS.HamidNawab,SignalsandSystems,2nd ed.,PHI,2009.
3. Nagoorkani,SignalsandSystemsMcGrawHill,2013
4. https://onlinecourses.nptel.ac.in/noc19_ee07/preview (PrincipleofSignalsandSystemsbyProf.AdityaK Jagannatham
5. https://www.edx.org/course/signals-and-systems-part-1-1
6. https://www.edx.org/course/signals-systems-part-2-iitbombayx-ee210-2x-3

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	:	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 ELECTRICAL AND ELECTRONICS ENGINEERING

NON CONVENTIONAL ENERGY SOURCES
(OPEN ELECTIVE-I)

SYLLABUS FOR B.E. III SEMESTER

L: T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:U23OE310EE
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To provide a survey of the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state- of -the-art energy systems.	1. Demonstrate the generation of electricity from various Non-Conventional sources of energy and solar power generation 2. Illustrate the generation of energy from wind and generation of energy from waste 3. Demonstrate the generation of

UNIT-I: Introduction and Solar Energy: Introduction: Need for Non-conventional energy sources, Types of Non-Conventional energy sources. Renewable energy across the Global and in India. Renewable energy for rural applications, Renewable energy for urban, industrial and commercial applications

Solar Energy: Solar cell fundamentals: Semiconductors, Photovoltaic effect, Solar PV cell, module, panel, array, Solar cell operating characteristics: Voltage-current characteristic, energy losses, maximising the performance. Applications of solar energy, Solar energy program in India, Case study

UNIT-II: Wind Energy and Waste to Energy: Wind Energy: Nature of wind, Basic components of Wind Energy Conversion System(WECS), Power extraction from the wind, Applications of wind energy. Wind energy program in India, Case Study

Waste to Energy: Key issues, Waste recovery management, Case study

UNIT-III: Biomass Energy and Fuel Cells: BiomassEnergy: Definition, Bio fuels, Biomass resources, Biomass conversion technologies: Incineration-Thermo chemical conversion- Bio- chemical conversion. Advantages and disadvantages of biomass energy, Case study

Fuel Cells: Definition-Classification of fuel cells, Principle of operation, Hydrogen-oxygen fuel cell, Alkaline fuel cell, Proton exchange membrane fuel cell, Molten carbonate fuel cell, Solid oxide electrolyte cells, Comparison of fuel cells- Advantages and Disadvantages of fuel cells-Applications of Fuel cells. Case study

UNIT-IV: Ocean Energy and Geothermal Energy: Ocean Energy: Ocean thermal electric conversion (OTEC) methods: Open cycle and Closed cycle- Principles of tidal power generation-Advantages and limitations of tidal power generation, Case study

Geothermal Energy: Geothermal resources- Vapour dominated geothermal plant- Liquid dominated geothermal plant- Applications of Geothermal Energy, Case study

Learning Resources:

1. B H KHAN, Non-Conventional Energy Resources, McGraw Hill, 2nd Edition, 2009.
2. G. S. Sawhney, Non-Conventional Energy Resources, PHI Learning Pvt Ltd, 2012
3. ShobhNath Singh, Non-Conventional Energy Resources, Pearson, 2016
4. G.D. Rai, Non-Conventional Energy Sources ,Khanna Publishers, New Delhi, 2011.
5. Ashok Desai V, Non-Conventional Energy, Wiley Eastern Ltd, 1990.
6. Mittal K.M, Non-Conventional Energy Systems, Wheeler Publishing Co. Ltd, 1997.
7. Ramesh R, Kurnar K.U, Renewable Energy Technologies, Narosa Publishing House, New Delhi, 1997.

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	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 INFORMATION TECHNOLOGY

OBJECT ORIENTED PROGRAMMING USING JAVA

(GENERALTRACK : OPEN ELECTIVE-I)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs/week):3:0:0	SEE Marks: 60	Course Code: U23OE310IT
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to*
Explain the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, building simple GUI applications.	1. Understand fundamental concepts in Object oriented approach. 2. Develop object-oriented programs using the concepts of exception handling. 3. Demonstrate the usage of Java I/O streams to handle user input and output. 4. Design and develop GUI programs.

UNIT- I: Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables-scope and lifetime, Operators, Control statements, Structure of a Java class, Classes, Methods, Inheritance, and Command Line Arguments.

Arrays: One-dimensional arrays, creating an array, declaration of arrays, initialization of arrays, two-dimensional arrays.

Packages: Creation, importing a package and user defined package.

Interfaces: Defining interfaces, extending interfaces, implementing interfaces.

UNIT- II: Exception Handling: Introduction, types of exceptions, syntax of exception handling code, multiple catch statements, using finally statement, user-defined exceptions.

UNIT- III: Basic I/O Streams: Java I/O classes and interfaces, Files, Stream and Byte classes, Character Streams. **Exploring java.lang:** Object, Wrapper classes, String, StringBuffer, System

UNIT- IV: Introducing Awt,Awt Controls: Event Handling: The Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces.

Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckboxGroup, Choice Controls, Using Lists, Managing Scroll Bars, Using TextField, Using TextArea, Understanding Layout Managers, Menu bars and Menus, Dialog Boxes, FileDialog, Exploring the controls, Menus ,and Layout Managers.

Learning Resources:

1. Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill, 2006.
2. James M Slack, Programming and Problem solving with JAVA, Thomson Learning, 2002.
3. C Thomas Wu, An Introduction to Object Oriented Programming with Java 5th edition, McGraw Hill Publishing, 2010.
4. Y. Daniel Liang , An Introduction to JAVA Programming, Tata McGraw Hill, 2009.
5. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.
6. https://docs.oracle.com/javase/tutorial/
7. https://nptel.ac.in/courses/106105191/

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	:	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, HYDERBAD-500031

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTING USING PYTHON

(AI&ML TRACK: OPEN ELECTIVE-I)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III SEMESTER

L:T:P(Hrs./week):2:0:0	SEE Marks :60	Course Code:U23OE320IT
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The Objectives of the course:	*On completion of the course, students will be able to*
Acquire problem solving skills for writing python scripts	1. Understand the fundamentals of python and implement control structures. 2. Understand string, lists and tuples and perform the key operations on these data containers. 3. Implement dictionaries and set operations in python. 4. Implement OOP concepts in python.

UNIT – I: Introduction to Python: Features of Python, variables and identifiers, operators and expressions.
Decision making and repetition: if, if else, nested if-else and else if, while loops and for loops, nested loops, break, continue, pass
Functions: Definition, function call, more on defining functions, recursive functions.

Unit – II: Strings: Introduction, accessing strings, basic operations, string slice, String function and methods, Regular Expressions.
Lists: Introduction, Operations on lists, nested list, list methods, list comprehension.
Tuples: Introduction, operations on tuples, packing and unpacking, nested tuples, tuple methods and functions.

UNIT – III: Set: Introduction, Set operations.

Dictionaries: Basic operations, sorting items, looping over dictionary, nested dictionaries, built-in dictionary functions.

UNIT – IV: OOPS Concepts: Introduction, classes and object, class method and self-argument, the __init__()method, class variables and object variables, public and private data members, Inheritance, Operator Overloading.
Files: Reading and writing files, serialization using JSON and pickle

Learning Resources:

1. Allen Downey, "Think Python: How to Think Like a Computer Scientist", O'Reilly publications,2nd Edition.
2. Reema Thareja, "Python programming using problem solving approach ", Oxford university press.
3. Mark J Guzdial, Introduction to Computing and programming in Python, 3rd Edition (2013), Pearson India
4. https://onlinecourses-archive.nptel.ac.in/noc19_cs09/
5. http://nptel.ac.in/courses/117106113/34
6. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-01sc-introduction-to-electricalengineering-and-computer-science-i-spring-2011/python-tutorial/

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

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

Duration of Internal Test: **90 Minutes**

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

DEPARTMENT OF MECHANICAL ENGINEERING

FUNDAMENTALS OF UNMANNED AERIAL VEHICLES

(**General Pool**) (Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U23OE320ME
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
The objective of this Course is to understand the features of UAV, elements, navigation and guidance of UAV and to design and silmulate UAV	1 Explain the types and characteristics of UAVs and their applications. 2 Illustrate the concepts of aerodynamics of flight vehicle. 3 Identify and explain the components, sensors and payload of UAVs, their navigation and guidance. 4 Design and perform structural, aerodynamic analysis of UAV components

Unit-I: Introduction to UAV: UAV: Definition, History; Difference between aircraft and UAV; DGCA Classification of UAVs; Types and Characteristics of Drones: Fixed, Multi-rotor, and Flapping Wing; Applications: Defense, Civil, Environmental monitoring.

Unit-II: Basics of Flight: Different types of flight vehicles; Components and functions of an airplane; Forces acting on Airplane; Physical properties and structure of the atmosphere; Aerodynamics – aerofoil nomenclature, aerofoil characteristics, Angle of attack, Mach number, Lift and Drag, Propulsion and airplane structures.

Unit-III: UAV Elements, Navigation and Guidance: Components: Arms, motors, propellers, electronic speed controller (ESC), flight controller; Propulsion; Data Link; Sensors and Payloads: GPS, IMU, Light Detection and Ranging (LiDAR), Imaging cameras, Classification of payload based on

applications; Hyper-spectral sensors; Laser Detection and Range (LADAR); Synthetic Aperture Radar (SAR); Thermal cameras; ultra-sonic detectors; Case study on payloads. Introduction to navigation systems and types of guidance; Mission Planning and Control.

Unit-IV: Design & Simulation of UAV: Introduction to CAD; Design of UAV components; Structural Analysis using CAE; Aerodynamic Analysis using CFD; Manufacturing of the components of UAVs: 3D printing; Case studies;

Learning Resources:

1. Andey Lennon, “Basics of R/C Model Aircraft Design” Model Airplane News Publication
2. John Baichtal, Building Your Own Drones: A Beginners’ Guide to Drones, UAVs, and ROVs.
3. K Valavanis, George J Vachtsevanos, Handbook of Unmanned Aerial Vehicles, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.
4. DGCA RPAS Guidance Manual, Revision 3 – 2020

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

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

Duration of Internal Test: 90 Minutes

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

DEPARTMENT OF MECHANICAL ENGINEERING

INTRODUCTION TO INDUSTRIAL ROBOTICS

(Stream: Robotics) (Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U23OE310ME
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

COURSE OBJECTIVE The objective of the course is to	COURSE OUTCOMES On completion of the course, students will be able to
study industrial robot components, configuration, sensors, drives, applications and programming through experiential learning.	1 explain configuration of industrial robots and summarize various applications. 2 interpret various elements of the industrial robots 3 Develop methodology to represent position and orientation of industrial robot links in spatial coordinate system. 4 classify various sensors used in industrial robots and interface between the human user and an industrial robot using various programming languages.

UNIT-I: Robot Basics: Robot-Basic concepts, Need, Law, History, Anatomy, specifications. Robot configurations-cartesian, cylindrical, polar, articulated and SCARA. Parallel robots

Robot Applications: Application in industry – material handling, loading & unloading, processing, welding & painting, assembly and inspection

UNIT-II: Robot Elements: End effectors-Classification, Types of Mechanical actuation, Gripper design, Robot joints types, Robot drive system types: Electrical, pneumatic and hydraulic. Position and velocity feedback devices

UNIT-III: Robot Coordinate Systems: Coordinate frames, Rotation matrix, Euler angles, Roll pitch and yaw angle representation, Composite rotations, Homogeneous Transformation matrix.

UNIT-IV: Robot Sensors: Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors

Robot programming

On line programming, teach pendant control, Lead through, Walk through, off line programming, Task programming.

Learning Resources:

1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel and Nicholas G Odrey, "Industrial Robotics Technology, Programming and Applications", Tata Mc Graw-Hill Publishing Company Limited , 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata Mc Graw Hill Publishing Company Limited, 2010.
3. Klafter R.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", Tata Mc Graw-Hill Publishing Company Limited, 2008
5. R.K. Mittal and I. J. Nagrath"Robotics and Control", Tata Mc Graw-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:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

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

DEPARTMENTOFMATHEMATICS

COMPLEX VARIABLES

(Common for Civil,EEE,ECE,Mech)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEEMarks:60	CourseCode:U23OE310MA
Credits: 2	CIEMarks:40	DurationofSEE:3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to :	*At the end of the course students should be able to:*
1. Understand the Analytic functions, conditions and harmonic functions. 2. Evaluate a line integral of a function of a complex variable using Cauchy's integral formula, and how to 3. Evaluate Taylor's and Laurent Series. 4. Understand the Cauchy's residue theorem	1. Apply the condition(s) for a complex variable function to be analytic and/or harmonic and to construct an Analytic function. 2. Evaluate complex integrals by Cauchy's theorem and Cauchy's Integral formula 3. Identify the singularities of a function and to expand a given function as a Taylor's / Laurent's series. 4. Evaluate complex integrals by Cauchy's Residue theorem

UNIT-I: Differentiation Of Complex Function: Introduction to complex function-Limits and Continuity of function - Differentiability and Analyticity - Necessary & Sufficient Condition for a Function to be Analytic(Cartesian) - Milne-Thompson's method -Harmonic Functions.

UNIT-II: Integration Of Complex Function: Complex Integration-Cauchy's Theorem(with proof) - Cauchy's Integral Formula(with proof) - Evaluation of integrals by Cauchy's Integral formula.

UNIT-III: Series of Complex Functions: Power series - Taylor's Series - Laurent's Series (without proofs) –Zero and singularities of complex function.

UNIT-IV: Residues: Introduction to Residues- Residues at singularities-Cauchy's Residue theorem (without proof) –Evaluation of integrals by Cauchy's Residue theorem.

Learning Resources:

1. Advanced Engineering Mathematics 3rd Edition, R.K.Jain & S.R.K.Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics 40thEdition Dr. B.S Grewal, Khanna Publishers.
3. A Text book of Engineering Mathematics, N.P. Bali& Manish Goyal, Laxmi Publications.
4. https://onlinecourses.nptel.ac.in/noc24_ma03/preview

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	:	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 CHEMISTRY

POLYMERIC MATERIALS

OPEN ELECTIVE (*General Pool*)

SYLLABUS FOR B E III SEMETER

L:T:P(Hrs/Week):2:0:0	SEEMarks:60	Course Code: U23OE310CH
Credits: 2	CIEMarks:40	DurationofSEE:3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students:	**At the end of the course students should be able to:**
1. To familiarize with various types of polymers 2. To acquaint with different methods of polymerization. 3. To converse the different polymerization techniques 4. To familiarize with various high performance/ specialty polymers.	1. Classify the polymers. 2. Analyze the different polymerization methods and their mechanisms. 3. Discuss the polymerization techniques used for the selected polymers. 4. Discuss the synthesis, properties and applications of selected polymers.

UNIT-I: Introduction to Polymers and Types: Introduction to various engineering materials, brief history of polymers, importance of polymers in engineering, terminology- ,classification of polymers- a) based on mechanism, b) based on chain topology, c) based on end use d) linear, branched and cross linked polymers e) based on physical state, Nomenclature based on source and based on IUPAC, applications of polymers.

UNIT-II: Polymerization: Initiators- Types of Initiators, Thermal Decomposition of Initiators, Redox Initiation, Photochemical Initiation, Initiation by Ionizing Radiation, Pure Thermal Initiation, Other Methods of Initiation, Initiator Efficiency, Definition -Mechanism - Cage Effect.Step-Reaction (Condensation) Polymerization, Polymerization Mechanisms-Mechanism of Stepwise Polymerization, Radical Chain (Addition) Polymerization, Chain Polymerization, Ionic and Coordination Chain (Addition) Polymerization, Cationic Polymerization, Anionic Polymerization,

Copolymerization - Mechanisms of Copolymerization, Block and Graft Copolymers

UNIT-III: Techniques of Polymerization: Living Radical Polymerization - General Considerations, Atom Transfer Radical Polymerization (ATRP) - Polymerization Mechanism, Stable Free-Radical Polymerization (SFRP), Radical Addition–Fragmentation

Transfer (RAFT) -and Other Living Radical Polymerizations.process conditions -bulk (mass) polymerization - solution polymerization- emulsion & suspension polymerization - heterogeneous polymerization - other processes; self-assembly and nanostructures.

UNIT-IV: Commercial & High-Performance Polymers: Synthesis, properties and applications of commercial polymers: polyvinyl chloride, polystyrene

Requirements for High-Temperature Polymers.

Synthesis, properties and applications of

1) Aromatic polyethers: Polyether sulfone,
2) Liquid crystal polymers: poly(oxy-1,4-phenylenecarbonyl),
3) Inorganic polymers – Minerals - Glasses – Ceramics,
4) Organometallic polymers – Polysilanes

Learning Resources:

1. George Odian, Principles of Polymerization Fourth Edition, University of New York.
2. Fred w. Billmeyer, Textbook of Polymer Science Third Edition, New York
3. P.C.Jain and Monica Jain, “Engineering Chemistry”, DhanpatRai Pub, Co., New Delhi (2002)
4. Shasi Chawla, “Text Book of Engineering Chemistry”, Dhanpat Rai Publishing Company, NewDelhi (2008).D. Dhara, NPTEL Polymer Chemistry Course, IIT Kharagpur.
5. Gowarikar R V, Polymer Chemistry.

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	: 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

DEPARTMENTOF PHYSICS
SMART MATERIALS & APPLICATIONS

SYLLABUSFOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEEMarks:60	CourseCode:U23OE310PH
Credits: 2	CIEMarks:40	DurationofSEE:3Hours

Course Objectives	Course Outcomes
The student will be able to 1. To introduce various types of smart materials used in engineering. 2. Grasp the concepts of piezo and ferroelectric materials. 3. Learn fundamentals of pyro and thermoelectric materials 4. Gain knowledge on shape memory alloys	**the student should at least be able:** 1. Identify various smart materials and their significant applications. 2. Summarize various properties and applications of peizo and ferroelectric materials. 3. Apply fundamental principles of pyro and thermoelectricity in relevant fields of engineering. 4. Explain types of shape memory alloys and their properties and applications

UNIT-I:Introduction to Smart Materials: Characteristics of metals, polymers and ceramics. Introduction to smart materials, need for smart materials, Classification of smart materials, Components of a smart System, Applications of smart material, role of smart materials in developing intelligent systems and adaptive structures.

UNIT II: Piezo and Ferro Electric Materials: Piezo electric effect and inverse piezoelectric effect, Piezo electric materials, Structure of Quartz crystal, piezoelectric oscillator, Magnetostriction, Magnetostriction oscillator, piezo-electric sensors, applications of Piezo-electric materials.Characteristics and properties of ferroelectric materials, Curie-Weiss law, applications of Ferro electric materials.

UNIT III: Pyro And Thermo-Electric Materials: Pyroelectricity: pyro electric effect, pyro electric materials, pyro-electric detector.

Thermoelectricity: thermoelectric effect, Seebeck effect, Peltier effect, thermocouple, Principle and working of thermoelectric generator and Thermoelectric cooler,applications of thermoelectric materials

UNIT IV: Shape Memory Materials: Introduction to shape memory alloys (SMA)- Shape Memory Effect (SME), Austenite, Martensite phases, Properties and characteristics SMAs**,** one-way and two-way shape memory effects, Properties of Ni-Ti shape memory alloy, Cu-based shape memory alloys, and their applications, Applications of SMAs.

Learning Resources:

1. Mukesh V. Gandhi, Brian S Smart Materials and Structures, Thompson, Springer, May- 1992
2. D. Patranabis, Sensors and Transducers, PHI Learning Pvt. Ltd., 2022 Nachiketa Tiwari, Bishakh Bhattacharya, Smart Material, Adaptive Structures& Intelligent Mechanical Systems

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	:	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 HUMANITIES & SOCIAL SCIENCES

LEARNING TO LEARN

(Open Elective)

SYLLABUSFOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEEMarks:60	CourseCode:U23OE310EH
Credits: 2	CIEMarks:40	DurationofSEE:3Hours

Course objectives	Course Outcomes
The objectives of this course are to:	On completion of the course, the student will be able to:
1. Develop effective study skills, and enable students to cut down on the number of hours spent studying. 2. Explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving. 3. Handle procrastination and learn for long term. 4. Plan, prioritise and carry out tasks based on goals and priority.	1. Get learners maximize their learning in a stipulated amount of time. 2. Become competent learners and learn creatively. 3. Meet deadlines, submit progress reports and recall what has been learnt for effective usage. 4. Set Performance Standards and take initiative based on set goals.

OVERVIEW:

No matter what your skill levels in topics you would like to master, you can change your thinking and change your life. If you are struggling to cope, you'll see a structured treasure trove of practical techniques that walk you through what you need to do to get on track. If you've ever wanted to become better at anything, this course will help serve as your guide.

UNIT-1:Study Skills: Good study skills can increase a student's confidence, competence, and self-esteem. They can also reduce anxiety about tests and deadlines. This module is designed to develop effective study skills, and enable students to cut down on the number of hours spent studying, leaving

more time for other important things in their life
1.1 Study Skills Checklist
1.2 Learning Styles
1.3 Habits of Effective Students
1.4 Using the Focused and Diffuse Modes
1.5 Introduction to memory and Memory Technique

UNIT-2: Chunking: In this module, we're going to be talking about chunks. Chunks are compact packages of information that your mind can easily access. We'll talk about how you can form chunks, how you can use them to improve your understanding and creativity with the material, and how chunks can help you to do better on tests. We'll also explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving.
2.1 Knowledge Chunking
2.2 Skill and Will
2.3 Sleep and Learning

UNIT-3: Procrastination and Memory: In this module, we talk about two intimately connected ideas—procrastination and memory. Building solid chunks in long term memory--chunks that are easily accessible by your short term memory—takes time. This is why learning to handle procrastination is so important. Finally, we talk about some of the best ways to access your brain's most powerful long term memory systems so that learning is long term and the learner has the ability to recall and use it as per need.
3.1 Controlling Procrastination
3.2 Ranking the importance of tasks with a to- do list
3.3 Finding their most productive time
3.4 Keeping track of time spent on different tasks
3.5 Introduction to Deep learning

UNIT-4: Renaissance Learning and Unlocking Your Potential: In this module we're going to talk more about important ideas and techniques that will enhance student's ability to learn. Students will also discover how to more profitably interact with fellow learners, how to recognize your own strengths, and how to avoid the "imposter syndrome." Fighter pilots and surgeons use checklists to help them with their critical duties—you can use a similar checklist to help you prepare for tests. Ultimately, you will learn more about the joys of living a life filled with learning!
4.1 Psychology of Goal Setting
4.2 Criteria for Goal Setting
4.3 Steps in Goal Setting
4.4 Visioning
4.5 Strategy & Action Plan
4.6 Goal Progress Review

Learning Resources:

1. learn.talentsprint.com

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)
BE (CIVIL ENGINEERING) IV-SEMESTER ACADEMIC YEAR 2024 - 2025
(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								
U23BS410MA	Numerical Methods, Probability and Statistics	3	-	-	3	60	40	3
U23BS430MA	Skill Development Course-III (Aptitude-II)	1	-	-	2	40	30	1
U23ES410CE	Principles of Data Structures for Civil Engineering	3	-	-	3	60	40	3
U23PC410CE	Strength of Materials – II	3	-	-	3	60	40	3
U23PC430CE	Fluid Mechanics	3	-	-	3	60	40	3
U23PC420CE	Concrete technology	3	-	-	3	60	40	3
U23PE410CE	Skill Development Course-IV (Technical Skills-I)	1	-	-	2	40	30	1
U23OEXXXXX	Open Elective-II	3	-	-	3	60	40	3
PRACTICALS								
U23PC411CE	Strength of Materials Lab	-	-	2	3	50	30	1
U23PC421CE	Fluid Mechanics Lab	-	-	2	3	50	30	1
U23ES411CE	Principles of Data Structures for Civil Engineering Lab	-	-	2	3	50	30	1
Student should complete one NPTEL (8 weeks) certificate course equivalent to 2 credits by the end of VI semester								
Total		**20**	**-**	**6**		**590**	**390**	**23**
Grand Total		**26**				**980**		
Note: The left over hours are to be allotted to CCA-II / Sports / Library / Mentor Interaction based on the requirement.								

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

DEPARTMENT OF CIVIL ENGINEERING

NUMERICAL METHODS, PROBABILITY AND STATISTICS

(Common to Civil, EEE & Mechanical Engineering)

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U23BS410MA
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to:	*At the end of the course students will be able to:*
1. Understand the concepts of interpolation and to learn various methods for interpolating data points and approximating functions. 2. Learn numerical techniques for approximating derivatives and solving first-order ordinary differential equations. 3. Understand random variables and its probability distributions 4. Study theconcept of hypothesis testing employed for small samples. 5. Understand the principles of curve fitting using the method of least squares and the concept of correlation.	1. Apply numerical methods to interpolate data points with equal and unequal intervals. 2. Use numerical techniques to approximate derivatives of functions at given points and solve first-order ordinary differential equations. 3. Differentiate between discrete and continuous random variables and apply various probability distributions to solve practical problems 4. Formulate Null and Alternative Hypotheses and apply the tests of hypothesis for small samples. 5. Apply the method of least squares to fit various curves to the given data and Calculate Karl Pearson's coefficient of correlation.

UNIT –I: Interpolation: Finite Differences- Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences – Newton's Divided difference formula.

UNIT –II: Numerical Solutions of ODE: Numerical Differentiation - Interpolation approach- Numerical Solutions of Ordinary Differential Equations of first order - Taylor's Series Method - Euler's Method - Runge-Kutta of 4^{th}order(without proofs)

UNIT-III: Probability Distribution: Random Variables - Discrete and Continuous Random Variables – Mass and density functions – Distribution functions - Definitions of Mean, Median, Mode and Variance – Continuous Distributions - Normal Distribution – Properties - Standard Normal variate.

UNIT-IV: Test of Hypothesis: Introduction -Testing of Hypothesis- Null and Alternative Hypothesis -Errors- -Level of Significance – Confidence Intervals- Tests of Significance for small samples - t-test for single mean - F- test for comparison of variances - Chi-square test for goodness of fit.

UNIT-V: Curve Fitting: Curve fitting by the Method of Least Squares - Fitting of Straight line-Second order curve (parabola)-Exponential curve-- Correlation – Karl Pearson's Co-efficient of Correlation.

Learning Resources:

1 Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2 Higher Engineering Mathematics, Dr.B.S. S Grewal 40^{th} Edition, Khanna Publishers.
3 Probability, Statistics and Random Processes, T. Veera Rajan, Tata McGraw Hill Education Private Ltd.
4 Advanced Engineering Mathematics, Kreyszig E, 8th Edition, John Wiley & Sons Ltd, 2006.
5 A text book of Engineering Mathematics by N.P.Bali& Manish Goyal, Laxmi Publication.
6 Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand& sons, New Delhi.
7 https://onlinecourses.swayam2.ac.in/cec24_ma19/preview
8 https://onlinecourses.nptel.ac.in/noc24_ma39/preview

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	:	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, HYDERBAD-500031

DEPARTMENT OF MATHEMATICS
SKILL DEVELOPMENT COURSE-III (APTITUDE-II)

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week):2 : 0 : 0	SEE Marks:40	Course Code: U23BS430MA
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
APTITUDE	**APTITUDE**
1. Build further on aptitude skills and enhance employability skills	1. Solve questions in the mentioned areas using shortcuts and smart methods
2. Enhance higher order thinking skills and problem solving in the following areas - Arithmetic ability, Numerical ability and General reasoning	2. Understand the fundamentals concept of Aptitude skills
3. Train to work systematically with speed and accuracy while problem solving	3. Perform calculations with speed and accuracy

UNIT 1: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED

- Time speed and distance
- Boats and Streams
- Problems on trains

UNIT 2: REASONING ABILITY- LOGICAL REASONING

- Seating Arrangements- Linear; Circular; Complex
- Venn diagrams
- Syllogism
- Cubes & Cuboids
- Dices

UNIT 3: REASONING ABILITY- NON VERBAL REASONING

- Figure Series
- Directions
- Clocks
- Calendars

UNIT 4: QUANTITATIVE APTITUDE -

- Mensuration Part -1
- Mensuration Part -2
- Logarithms

UNIT 5: QUANTITATIVE APTITUDE

- Permutations and combinations
- Probability

METHODOLOGY ASSESSMENTS

- Demonstration
- Presentations
- Expert lectures
- Online assignments
- Individual and Group
- 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 Test	:	30
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

PRINCIPLES OF DATA STRUCTURES FOR CIVIL ENGINEERING

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U23ES410CE
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	At the end of the course students will be able to:
1. Explain Basic linear and non-linear data structures and learn techniques of recursion 2. Explain concepts of Linked lists 3. Describe Concepts of Stacks and queues 4. Describe Concepts of Trees 5. Explain Concepts of Graphs and different sorting and searching techniques and their complexities.	1. Understand the basic concepts of data structures. 2. Understand the different types linked lists 3. Implements stacks and queries 4. Implements tree transversal 5. Understand search and sorting techniques.

UNIT-I : Introduction: Data Types, Data structures, Types of Data Structures, Operations, ADTs, Algorithms, Comparison of Algorithms, Complexity, Time- space tradeoff.
Recursion: Introduction, format of recursive functions, recursion Vs. Iteration, examples.

UNIT-II: Linked Lists: Introduction, Linked lists and types, Representation of linked list, operations on linked list, Comparison of Linked Lists with Arrays and Dynamic Arrays.

UNIT-III: Stacks and Queues: Introduction to stacks, applications of stacks, implementation, and comparison of stack implementations. Introduction to queues, applications of queues and implementations, Priority Queues and applications.

UNIT-IV: Trees: Definitions and Concepts, Operations on Binary Trees, Representation of binary tree, Conversion of General Trees to Binary Trees, Representations of Trees, Tree Traversals, Binary search Tree.

UNIT-V: Searching and Sorting: Linear searching, binary Searching, sorting algorithms: bubble sort, selection sort, quick sort, merge sort.

Learning Resources:

1. Narasimha Karumanchi, "Data Structures and Algorithms Made Easy", Career Monk Publications, 2017
2. Horowitz E, Sahni S., and Susan Anderson-Freed," Fundamentals of Data structures in C", Silicon Pr; 2 edition (1 August 2007)
3. Reema Thareja, "Data Structures using C", Oxford, 2014.
4. Kushwaha D. S. and Misra A. K, "Data structures A Programming Approach with C", PHI.
5. Seymour Lipschutz," Data Structures with C", McGraw Hill Education,2017.

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	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
STRENGTH OF MATERIALS – II

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week):2: 0 : 2	SEE Marks:60	Course Code: U23PC410CE
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
In this subject the students will be able to	Upon the completion of this course students will be able to
1. Examine and interpret the deflection of simply supported, cantilever and overhanging beams 2. Analyze propped cantilevers, fixed and continuous beams for deflection, shear and bending moment 3. Locate shear centre and draw shear flow in simple sections. 4. Analyse torsion of circular shafts and analyse helical and bending springs and examine the concept of strain energy 5. Investigate the behaviour of columns and struts.	1. Express understanding of methods of double integration, conjugate beam and Mohr's theorems to solve problems of deflection of beams and construct shear force and bending moment diagrams 2. Determine shear centre for simple sections. 3. Compute the torsional shear stress across the cross section of circular shafts. 4. Compute stresses in helical springs and compute strain energy in bars subjected to axial and flexural deformation 5. Compute the axial and bending stresses in columns using various formulae

UNIT-I:**Deflections:** Slope and deflection by the double integration method for cantilever and simply supported beams, and beams with overhangs carrying point loads, uniformly distributed and varying load over entire span. Moment area method for single beams having different moment of inertia.

UNIT-II: Propped Cantilevers: Cantilever beams on elastic and rigid props for point loads and uniformly distributed loads. Bending moment and shear force diagrams, and deflections.
Fixed Beams: Determination of shear force, bending moment, slope and

deflection in fixed beams with and without sinking of supports for point loads, uniformly distributed loads, and uniformly varying load over entire span. SFD, BMD - Elastic curve.

UNIT-III: Continuous Beams: Determination of moments in continuous beams with and without sinking of supports by the theorem of three-moments; bending moment and shear force diagrams. Elastic curve.

UNIT-IV: Torsion: Theory of torsion in solid and hollow circular shafts; shear stress, angle of twist, strength and stiffness of shafts. Transmission of power. Combined torsion and bending with and without end thrust. Determination of principal stresses and maximum shear stress.Equivalent Bending Moment and Twisting Moment.
Springs: Close and open coiled helical springs under axial load and axial twist.

UNIT-V: Strain Energy: Strain energy of resilience in determinate bars subjected to gradually applied loads and impact loads. Resilience of beams.Castigliano's theorem and its applications to beams.Theorem of reciprocal deflections.
Columns and struts: Euler's theory. Rankine – Gordan's formula, straight-line formula, effect of end conditions, slenderness ratio, eccentrically loaded columns, and Secant and Perry's formulae.

Learning Resources:

1. Ramamrutham S., Narayanan R., "Strength of Materials", Dhanpat Rai Publishing Company, New Delhi, 2011.
2. Bansal R.K., A text book of "Strength of Materials", Laxmi Publications, New Delhi, 2010.
3. Rajput R.K., "Strength of Materials" S.Chand Publications, New Delhi, 2006.
4. Junnarkar S.B., "Mechanics of Structures" (Vol-I & II), Charotar Publishing House, Anand, 2002.
5. Pytel and Singer F.L., "Strength of Materials", Harper & Row, New York, 1999.
6. Subramanian R., "Strength of Materials", Oxford University Press, 2010.
7. Ferdinand P. Beer, E. Russell Johnston Jr, John T. Dewolf, David F.Mazurek, "Mechanics of Materials", 2016.
8. NPTEL Course (www.nptel.ac.in)

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

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

Duration of Internal Tests : 90 Minutes

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

DEPARTMENT OF CIVIL ENGINEERING
FLUID MECHANICS

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs./week):3:0:1	SEE Marks:60	Course Code: U23PC430CE
Credits: 3	CIE Marks:40	Duration of SEE : 3Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
In this subject the students will	Upon the completion of this course students will be able to
1. Learn the properties of fluids 2. Apply the laws of conservation of mass, energy and momentum for fluid flow. 3. Assess the phenomenon of flow in pipes and boundary layer	1. Compute properties of fluid and discuss about fluid statics 2. Understand various aspects of Fluid kinematics 3. Formulate equations based on conservation of mass, energy and momentum. Analyse forces on nozzles and describe devices use for discharge. 4. Compute Reynolds number, formulate equations for laminar and turbulent flow through pipes and water hammer in pipes. 5. Explain growth and separation of boundary layer and evaluate drag & lift forces for various shapes of bodies in a medium

UNIT-I: **Fluid Properties:** Definition of fluid, properties of fluids, density, specific weight, specific volume, specific gravity, bulk modulus, vapour pressure, viscosity. Newton's law of viscosity and its applications.Capillarity and surface tension.

Measurement of Pressure: Piezometer and U tube Manometers. Bourdon Gauge.Absolute pressure and Gauge pressure.

Hydro Statics: Pascal law, buoyancy, metacentre and metacentric Height, Total pressure and centre of pressure on Horizontal plane and vertical plane surfaces.

UNIT-II: **Fluid Kinematics:** Classification of fluid flow; steady, unsteady, uniform, non- uniform, one, two and three-dimensional flows, Rotational and irrotational flows.Concepts of streamline, stream tube, path line and streak line.Law of mass conservation.Continuity equation from control volume and system analysis. Stream function and velocity potential function.Convective and local acceleration, flow net and its uses.

UNIT – III: Fluid Dynamics: Body forces and surface forces. Euler's equation of motion in three dimensions.
Law of Energy Conservation: Bernoulli's equation from integration of Euler's equation. Significance of the Bernoulli's equation, limitations, modifications and application to realfluid flows, venture meter and orifice meter.
Impulse Momentum Equation: Application of the impulse momentum equation to evaluate forces on nozzles and bends.Vortex flow; forced and free vortex.
Measure of Discharge in Free Surface Flows: Notches and weirs.

UNIT-IV: Flow through Pressure Conduits: Reynold's experiment and its significance. Upper and lower critical Reynold's Numbers. Critical velocity, Hydraulic gradient and Engergy gradient line.Laminar flow through circular pipes.Hagen – Poiseuille equation.Charateristics of turbulent flow.Head loss in pipes.Darcy – Weisbach equation.Friction factor. Moody's diagram. Minor losses. Pipes in series and pipes in parallel. Unsteady flow in pipes: Water hammer phenomenon, pressure rise due to gradual and sudden valve closure.

UNIT-V: Boundary layer: Boundary layer growth and separation, methods to control separation, drag and lift forces, drag on airfoil and sphere, Principle of streamlining. Displacement, energy & momentum thickness streamlined body and bluff body, Magnus effect.

Learning Resources:

1. Modi P.N. and Seth S.M., Hydraulics and Fluid Mechanics including Hydraulics Machines, Standard Book House, Delhi, 2019.
2. Bansal R.K., A Textbook Of Fluid Mechanics And Hydraulic Machines, Laxmi Publications, 2018.
3. Ojha C.S.P., Berndtsson R., Chandramouli P.N., Fluid Mechanics and Machinery, Oxford University Press, 2012.
4. Rajput R.K., Fluid Mechanics and Hydraulic Machines, S. Chand & Co., 2013.
5. K Srinivasa Raju and D Nagesh kumar, " Fluid Mechanics problem solving using MATLAB" Prentice Hall of India, 2020
6. NPTEL Course (www.nptel.ac.in)

7. MIT Open Course Ware: *Fluid Dynamics*, https://ocw.mit.edu/courses/2-06-fluid-dynamics-spring-2013/

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

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

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

DEPARTMENT OF CIVIL ENGINEERING
CONCRETE TECHNOLOGY

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week):2 : 0 :0	SEE Marks:60	Course Code: U23PC420CE
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

Course objectives	Course Outcomes
Objectives of this course are to	Upon completion of this course the students will be expected to:
1. Learn the properties of concrete in its fresh state and hardened state. 2. Design the concrete mixes using admixtures by different methods. 3. Learn the properties and applications of different types of special concretes.	1. Understand the properties of concrete in its fresh state 2. Understand the properties of concrete in its hardened state 3. Design the concrete mixes by I.S. and ACI methods. 4. Use chemical and mineral admixtures in making concrete of desired properties. 5. Identify different types of special concretes for specific use.

UNIT-I: Constituents of Concrete: Types of cements and their composition. Tests on various properties of aggregates.
Properties of fresh Concrete: Mixing and batching. Workability, factors effecting workability, various tests procedures. Segregation and bleeding. Vibration of concrete. Types of vibrators and their influence on composition. Analysis of fresh concrete.

UNIT-II: Properties of Hardened Concrete: Strength of concrete. Water cement ratio., Gelspaceratio. Effective water in the mix. Short term and long term properties of concrete Tests and procedure, Influence of various parameters on strength of concrete. Relationship between various mechanical strength of concrete. Non-destructive testing methods-codal provisions for NDT. Curing of concrete. Maturity concept. Stress-strain curves on concrete.

UNIT-III: Mix design of concrete: Basic considerations, Parameters of mix design. Factors in the choice of mix proportions and their influence. Quality control. Various methods of mix design. I.S. Code method and ACI methods.

UNIT-IV: Admixtures used in concrete: Classification of admixtures. Chemical and mineral admixtures. Influence of various admixtures on properties of concrete. Applications, Concept of ready mixed concrete. Fly ash concrete-properties and proportion of fly ash, applications; Recycled aggregates concrete.

UNIT-V: Special Concrete: High strength concrete, High performance concrete, Light weight concrete, High density concrete. Self-compacting concrete- their specialties and applications.
Fibre Reinforced Concrete: Need for Fibre reinforced concrete (FRC) Mechanism of FRC, types of fibres, fibre shot concrete.

Learning Resources:

1. Shetty M.S., and Jain.A.K, Concrete Technology, 8th edition,S.Chand& Company, 2019.
2. Neville A.M., and Brooks.J.J., Concrete technology, 2nd edition , pearson paper back, 2019
3. Mehta P.K., and Paulo J.M.M., Concrete-Microstructure-Properties and Material, 4th edition,McGraw Hill Education, 2017.
4. Krishnaraju N., Design of Concrete Mixes, 5th edition, CBS Publishers, 2018
5. Gambhhir M.L., Concrete Technology, 5th edition, McGraw Hill Education , 2017.
6. Santhakumar , A.R.,Concrete Technology, 2nd edition, Oxford University Press, 2018.
7. IS: 456-2000, Indian standard code of practice for plain and reinforced concrete, Bureau of Indian standards
8. IS:10262-2019, Indian standard code of practice for design of concrete mixes, Bureau of Indian standards

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

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

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

DEPARTMENT OF CIVIL ENGINEERING

SKILL DEVELOPMENT COURSE-IV (TECHNICAL SKILLS-I)

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week):1:0:0	SEE Marks:40	Course Code: U23PE410CE
Credits : 1	CIE Marks:30	Duration of SEE: 3 Hrs

A Software training related to Civil Engineering Core subject / Coding course will be taught in this Technical Skills - I

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

Introduction to BIM Concepts

1. Introduction to BIM
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

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

DEPARTMENT OF CIVIL ENGINEERING
STRENGTH OF MATERIALS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week): 0 : 0 : 2	SEE Marks:50	Course Code: U23PC411CE
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
Objectives of this course are to:	*Upon the completion of this course students will be able to*
1. Determine the properties of materials under the action of various loads.	1. Determine Young's Modulus of materials of beams by conducting deflection tests. 2. Assess the properties of materials by conducting hardness test, impact test, tension test and compression test. 3. Determine modulus of rigidity of materials by conducting torsion test and tests on springs. 4. Practise 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 Young's modulus by conducting deflection test on Cantilever beam
2. Determination of Young's modulus by conducting deflection test on Simply supported beam
3. Izod Impact test
4. Direct tension test on metal rods
5. Brinnell and Rockwell Hardness test
6. Compression test on brittle and ductile materials
7. Determination of modulus of rigidity by conducting tension test on a helical spring

8. Determination of modulus of rigidity by conducting compression test on a spring
9. Determination of modulus of rigidity by conducting torsion test
10. Determination of modulus of elasticity by conducting deflection test on fixed beam
11. Determination of modulus of elasticity by conducting deflection test on continuous beam
12. Bend test on metal rod – Virtural Mode experiment

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

FLUID MECHANICS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week):0 : 0 : 2	SEE Marks:50	Course Code: U23PC421CE
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
In this subject the students will	Upon the completion of this course students will be able to
1. Provide practical knowledge in verification of principles of fluid flow 2. Impart knowledge in measuring coefficient of discharge for various devices.	1. Determine coefficient of discharge for various measuring devices such as orifice, venturimeter, mouth piece, notches, weirs and hemi-spherical vessel and Validate Bernoulli's theorem. 2. Calculate Reynolds number and classify types of flows. 3. Estimate Darcy's friction factor for turbulent flow in pipes. 4. Practise 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 C_d, C_v and C_c for Circular Orifice
2. Determination of C_d for Mouthpiece
3. Determination of C_d for V-notch
4. Determination of C_d for Rectangular notch
5. Determination of C_d for Venturimeter
6. Determination of types of flows using Reynolds Apparatus
7. Determination of Darcy's coefficient of friction.
8. Verification of Bernoulli's Theorem (Virtual Mode)

https://eerc03-iiith.vlabs.ac.in/exp/bernoullis/

9. Determination of C_d for Orifice Meter
10. Determination of coefficient of sudden contraction (minor losses)

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 COMPUTER SCIENCE & ENGINEERING

PRINCIPLES OF DATA STRUCTURES IN CIVIL ENGINEERING LAB

SYLLABUS FOR B.E. IV-SEMESTER
(COMMON FOR CIVIL & MECH)

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : U23ES411CE
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	At the end of the course student will be able to:
Design and implement abstractions of various data structures and their practical applications.	1. Perform operations on vanous abstractions like stacks, queues, linked lists. 2. Implement problems involving trees. 3. Choose the right data structure based on the requirements of the problem.

1. Menu driven program that implements Stacks using arrays for the following operations
   a) create b)push c)pop d) peek
2. Implementation of Infix to Postfix Conversion and evaluation of postfix expresstion.
3. Menu driven program that implements Queues using arrays for the following operations
   a)create b)insert c)delete d) display
4. Menu driven program that implements Circular Queues for the following operations
   a)create b)Insert c)delete d) display
5. Implementation of Singly Linked List, Stack using Singly Linked List, Queue using Singly Linked List.
6. Implementation of polynomial operations using Linked List.
7. Implementation of Doubly Linked List, Circular linked list.

8. Implementation of Operations on Binary Tree (Insert, Delete, Level Order, Search)
9. Implementation of Recursive and Iterative Traversals on Binary Trees
10. Implementation of Operations on Binary Search Tree.
11. Implementation of Quick Sort.
12. Implementation of merge Sort.

Learning Resources:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2/e, Universities Press, 2008
2. Mark A Weiss, Data Structures and Algorithm Analysis In Second Edition (2002), Pearson
3. Richard F, Gilberg, B.A. Forouzan, "Data Structures, A Pseudocode Approach with C", Cengage, 2nd Edition
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stem 'Introduction to Algorithms' 2002.
5. Tanenbaum A. M , Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson
6. Data Structures through C in depth, S K Srivastava, Deepali Srivastava, BPB publications, 2nd Edition

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

Duration of Internal Test: 2 Hours

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E.IV SEMESTER

Dept	Course Code	Name of the Course	Stream Type	Stream Name	credits
Civil	U23OE410CE	Solid Waste Management	General	-	3
CSE	U23OE410CS	Basics of Java Programming	General	-	3
CSE	U23OE420CS	Mathematical Computing for AI & Ml With Python	Stream	AI&ML	3
ECE	U23OE410EC	Sensors for Engineering Applications	General	-	3
ECE	U23OE420EC	Introduction to Principles of Communication Engineering	General	-	3
EEE	U23OE410EE	Solar Power and applications	General	-	3
IT	U22OE410IT	Introduction to Database Management Systems	General	-	3
IT	U22OE420IT	Essentials of Mathematics for Machine learning using Python	Stream	AI&ML	3
Mech.	U23OE420ME	Operations Research	General	-	3
Mech.	U23OE410ME	Kinematics and Dynamics of Robotics	Stream	Robotics	3
H&SS	U22OE430EH	Critical Thinking	General	-	3

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

DEPARTMENT OF CIVIL ENGINEERING

SOLID WASTE MANAGEMENT (Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs./week):3:0:1	SEE Marks:60	Course Code:U23OE410CE
Credits: 3	CIE Marks:40	Duration of SEE : 3Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
In this subject the students will	Upon the completion of this course students will be able to
1. Understand characteristics of solid waste and legislation of solid waste management. 2. Understand processing, collection and transportation of solid wastes. 3. Gain insight into transformation, energy recovery and disposalof solid waste. 4. Grasp the fundamentals ofhazardous waste and its management. 5. Understand the solid waste management practices adoptedactual practical scenarios.	1. Understand types, characteristics, composition of solid waste and rules laid for its managementas per legislation. 2. Apply gained knowledge of waste reduction methods, collection techniques, resource recovery/recycling, energy recovery, transport & transfer options for solid waste management. 3. Identify appropriate technologies for transformation and disposal of solid waste. 4. Categorize solid waste as hazardous or non- hazardous based on solid waste toxicology principles. 5. Analyze and apply solid waste management techniques in actual practice.

UNIT- I: Solid waste generation and material flow, sources and types of solid waste,characterization of solid waste, physical and chemical properties of solid waste, Hierarchy of solid waste management, solid waste management rules-2016.

UNIT- II: Storage of solid waste, Collection of Solid Waste: Primary and secondary collection, type of waste collection systems- Hauled and Stationary collection system, Waste handling and Processing: unit operations used for separation and processing, materials recovery,Transfer and Transport of solid waste, transfer station.

UNIT-III: Solid waste transformation:aerobic and anaerobic composting,combustion,Thermal conversion- Incineration and pyrolysis system. Energy recovery systems, Solid waste disposal- Landfills: Site selection, method, drainage and leachate collection systems, requirements and technical solutions.

UNIT–IV: Definition and identification of hazardous wastes,toxicology principles, sources and characteristics, hazardous wastes in Municipal Waste, Hazardous waste management, Introduction of Biomedical waste and E-waste, Hazardous waste regulations.

UNIT –V: Integrated solid waste management, Overview of solid waste management practices- National and International- Case studies, solid waste management practices adopted in industries- overview and case studies. Technological advancements in solid waste management.

Learning Resources:

1. P. A. Vesilind, Worrell W and Reinhart, “Solid Waste Engineering”, Cengage Learning India Pvt. Ltd. 2nd Edition, 2016.
2. Tchobanoglous,” Integrated Solid Waste Management”, Mc-Graw Hill International, 1st Edition, New York, 2014.
3. Charles A. Wentz; “Hazardous Waste Management”, McGraw Hill Publication, 1995.
4. CPHEEO, “Manual on Municipal Solid waste management”, Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000.
5. https://archive.nptel.ac.in/courses/105/103/105103205/

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

BASICS OF JAVA PROGRAMMING

(OPEN ELECTIVE-II)

(Common for Civil, ECE, EEE & Mech)

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U23OE410CS
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 Apply object oriented principles for developing an application using Java constructs. 2 Design GUI using existing Java classes and interfaces.	1 Adopt the fundamentals of Object oriented system development for developing a application. 2 Apply basic features of OOP to design an application. 3 Employ runtime error handling, concurrent programming practices to develop a parallel processing application. 4 Perform string handling, read and write operations using console and files IO streams.

UNIT-I: Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Concepts, Benefits of Object Oriented Development.

Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables and Arrays, Operators, Control Statements.

UNIT-II: Building blocks of OOP: Classes and Methods, Constructor, Parameterized constructor, Garbage Collection, this, static, final keywords, Inheritance, types of inheritance, Method Overriding, Abstract class, Nested class, Interface, Package.

UNIT-III: Exception Handling: try, catch, throw, throws, finally, creating user defined exceptions

Multithreaded Programming: Types of Thread creation, multiple threads, isalive, join, thread priority, Thread Synchronization, Inter process communication.

UNIT-IV: String Handling: String constructors, operations, character extraction, comparison, search, modification. StringBuffer, methods, StringBuilder, StringTokenizer

Util: Date, Calendar, Random, Timer, Observable

IO: Files and Directories, I/O Classes and Interfaces, Byte Streams classes and Character Stream classes

Learning Resources:

1. Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill 2005.
2. P. Radha Krishna, Object Oriented Programming through Java, Universities Press, 2007.
3. Sachin Malhotra, Saurabh Choudhary, Programming in Java, 2nd Edition, Oxford Press, 2014.
4. https://docs.oracle.com/javase/tutorial/java

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

MATHEMATICAL COMPUTING FOR AI & ML WITH PYTHON

Stream- Artificial Intelligence & Machine Learning

(OPEN ELECTIVE-II)

(COMMON for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E IV SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:U23OE420CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course objective	Course outcomes
Students should be able to	At the end of the course, students will be able to
1. Implementation with Python for mathematical computation to deepen the knowledge.	1. Develop a deep understanding of array usage with Numpy 2. Understanding and Analysing the Pandas Dataframe. 3. Basic concepts of data visualization and its importance in data analysis 4. Solve real life problem using the Linear Regression technique 5. Data representation using Scikit-learn library in Python

UNIT-I: Numpy Fundamentals: Creating arrays, array indexing, Basic Array Operations, one dimensional and n dimensional array, Creating Matrices using Numpy arrays, Matrix multiplication.

UNIT-II: Introduction to Pandas: Importing Pandas, Read CSV Files, Analysing Data, Cleaning Data, Pandas Data Structures- Series and Dataframe, Data Correlation.

UNIT-III: Data Visualization: Introduction to matplotlib, Data exploration with matplotlib- Loading the data, Pie chart, Scatter plot, Box Plot, Bar Chart, 3D plot.

UNIT-IV: Regression: Introduction to Regression, Linear Regression, Multiple Linear Regression, Polynomial Regression, Logistic Regression

UNIT-V: Scikit Learn – Introduction, Import packages and classes, Dataset Loading, Splitting the Dataset, Train the Model, Simple Linear Regression With scikit-learn, Multiple Linear Regression With scikit-learn.

Learning Resources:

1. Python Packages By Tomas Beuzen, Tiffany Timbers, 1st edition in 2022 by Chapman & Hall
2. Lambert K.A, Fundamentals of Python –First Programs, 1st Edition(2015), Cengage Learning India
3. Python for Data Analysis: Data Wrangling with pandas, NumPy, and Jupyter, Third Edition by Wes McKinney in 2022 published by Oreilly.
4. Python Machine Learning: Machine Learning and Deep Learning with Python, scikit-learn, and TensorFlow 2 by by Sebastian Raschka (Author), Vahid Mirjalili by packt publication on December 2019.
5. https://www.udemy.com/course/machine-learning-basics-building-regression-model-in-python/
6. https://www.geeksforgeeks.org/data-visualization-with-python/

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	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: 1 Hour 30 Minutes

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SENSORS FOR ENGINEERING APPLICATIONS

(General Pool: Open Elective - II)

(Common for Civil, CSE, CSE (AI&ML) EEE, IT & Mech.)

SYLLABUS FOR B.E. IV - SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U23OE410EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Understand Sensor Principles and Classification 2. Analyzing Sensor Characteristics and Response 3. Exploring Different Types of Sensors 4. Understanding Environmental Factors and Sensor Reliability 5. Explore the applications of sensors in various engineering fields	Upon completion of the course, students will be able to 1. Understand the fundamental principles of sensors and transducers and their importance in various engineering applications. 2. Demonstrate various mechanical sensors used for measuring displacement, acceleration, force, fluid flow, level, pressure, and stress. 3. Explain the working principles and applications of thermal and optical sensors. 4. Comprehend the principles and applications of magnetic sensors and acoustic sensors. 5. Explore electrical sensors, and high-frequency sensors and their use in various engineering applications.

UNIT – I: Introduction to sensors and transducers: Need for sensors in the modern world. Different fields of sensors based on the stimuli - various schematics for active and passive sensors. Static and dynamic characteristics of sensors - zero, I, and II order sensors – Response to impulse, step, ramp, and sinusoidal inputs. Environmental factors and reliability of sensors.

UNIT – II: Mechanical Sensors: Displacement - acceleration and force – the flow of fluids - level indicators - pressure in fluids - stress in solids. Typical sensors - wire and film strain gauge, anemometers, piezoelectric and magneto strictive accelerometers, potential metric sensors, LVDT.

UNIT – III: Thermal and Optical Sensors: temperature – temperature difference – heat quantity. Thermometers for different situations – thermocouples thermistors – color pyrometry. light intensity - wavelength and color - light dependent resistors, photodiode, phototransistor, CCD, CMOS sensors. Radiation intensity, particle counter – Gieger Muller courter (gas based), Hallide radiation detectors.

UNIT – IV: Magnetic and Acoustic Sensors: magnetic field, magnetic flux density – magneto resistors, Hall sensors, superconducting squids. Intensity of sound, frequency of sound in various media, various forms of microphones, piezoelectric sensors.

UNIT – V: Electrical and High-Frequency Sensors: conventional volt and ammeters, high current sensors, (current transformers), high voltage sensors, High power sensors. High frequency sensors like microwave frequency sensors, wavelength measuring sensors. MEMs and MEM based sensors.

Lab Experiments:

1. Measurement of displacement, and velocity with Pmod ACL with 3-axis Digital Accelerometer.
2. Sense the temperature with Pmod TMP3 with Ambient Temperature sensor.
3. Sense the ambient light with Pmod ALS with an Ambient light sensor.
4. Characteristics of photocell using myRIO with Photocell, API PDV-P9203.
5. Study of IR range sensor to measure the distance between the sensor and reflective target using IR range finder GP2Y0A21YK0F
6. Working principle of Hall effect using US1881 Hall-effect latch.
7. Study of acoustic sensor, to record audio signals and to monitor acoustic level using Chenyum CY-502 computer microphone.
8. Estimate the range for a given IR and ultrasonic sensor using QRB1134 IR sensors and MAXSONAR ultrasonic sensor.

Learning Resources :

1. Doebelin, “Measurement Systems: Application and Design”, McGraw Hill Kogakusha Ltd.
2. Julian W. Gardner, Vijay K. Varadan, Osama O. Awadelkarim “Microsensors, MEMS and Smart Devices”, New York: Wiley, 2001.
3. Henry Bolte, “Sensors – A Comprehensive Sensors”, John Wiley.

4. JocobFraden," Handbook of Modern Sensors, Physics, Designs, and Applications", Springer.
5. ManabendraBhuyan," Intelligent Instrumentation Principles and Applications", CRC Press.
6. Randy Frank," Understanding Smart Sensors", Second edition, Artech House.

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

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

Duration of Internal Test: 90 Minutes

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

DEPARTMENTOFELECTRONICSANDCOMMUNICATIONENGINEERING

INTRODUCTION TO PRINCIPLES OF COMMUNICATION ENGINEERING

(General Pool: Open Elective-II)

(Common for CSE & IT branches)

SYLLABUSFORB.E.IV–SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks: 60	Course Code: U23OE420EC
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Distinguish analog and digital Modulation techniques used in various Communication systems.	On completion of the course, students willbe able to 1. Analyze the power and transmission band width of Amplitude and Frequency Modulate dsignals. 2. Familiarize the process of reproduction of base bandsignal. 3. Analyze various pulse analog and pulse digital ModulationTechniques. 4. Understand the transmission of binary data in communication systems. 5. Estimate information content in a system

UNIT-I: Amplitude Modulation: Introduction to Modulation, Need for Modulation, Modulation index, Sideb ands, AM Power, Double SideB and Suppressed Carrier Modulation, Single Side Band Modulation,Vestigial Side Band Modulation, AM demodulation, Frequency Division Multiplexing,
Lab Activity: Generation of AM using MATLAB and Simulink.

UNIT-II

Angle Modulation: Angle Modulation fundamentals, Frequency Modulation – Modulation index and sidebands, Narrowband FM, Wideband FM, Principles of Phase Modulation, FM demodulation
Lab Activity: Generation of FM signals using MATLAB and Simulink.

UNIT-III

Signal Sampling and Analog Pulse Communication: Ideal Sampling, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation.

Digital Communication Techniques: Quantization, Data Conversion, Time Division Multiplexing, Pulse Code Modulation, Delta Modulation.
Lab Activity: Demonstration of Sampling using MATLAB.

UNIT-IV

Transmission of Binary Data in Communication Systems: Digital Codes, Principles of Digital Transmission, ASK FSK,BPSK
Lab activity: Demonstration of ASK and BPSK using SIMULINK.

UNIT-V

Information Theory: Uncertainty, Information and entropy. Discrete memory less channels
Source Coding Techniques: Shannon-Fano coding, Huffman Coding
Lab activity: Entropy calculations using MATLAB

Learning Resources:

1. LouisE.Frenzel, Principles of Electronic Communication Systems, 3rdEdition. Tata Mcgraw Hill.
2. Wayne Tomasi, Electronic Communications Systems, 5thEdition, Pearson Education.

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

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

Duration of Internal Test: 90 Minutes

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SOLAR POWER AND APPLICATIONS (Open Elective-II)

SYLLABUS FOR B.E. V SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U23OE410EE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To impart the basics of solar energy harnessing and solar panel and array.	1. Compare different energy resources. 2. Identify and choose proper type of meter for solar radiation measurement. 3. Use proper solar thermal system according to the load requirements.

UNIT–I: Fundamentals of Energy Sources: Oil crisis of 1973, Classifications of Energy Resources, Importance of Non-conventional energy sources, Advantages-disadvantages and salient features of Non-conventional energy sources.

UNIT-II: Solar Energy Basics: Sun as a source of energy, the Earth, Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Depletion of solar Radiation, Pyranometer, Pyrheliometer, Sunshine Recorder.

UNIT-III: Solar Thermal Systems: Solar Collectors, Solar Water Heater, Solar Passive space – heating and cooling systems, Solar Cookers, Solar furnaces, Solar thermal water pump, Vapour compression refrigeration and Solar pond Electric power plant.

UNIT-IV: Solar Photovoltaic Systems: Solar Cell fundamentals, Cell characteristics, Cell classification, Module, Panel and Array, Maximizing the Solar PV output and load matching, MPPT.

UNIT-V:Solar PV systems & Applications: Solar PV system classification - Stand-Alone Solar PV system and Grid-Interactive Solar PV system.

Applications - Water Pumping, lighting, medical refrigeration, village power and Telecommunication.

Learning Resources:

1. B H Khan, Non-Conventional Energy Resources, 2nd Edition, Tata McGraw Hill.
2. G. D. Rai, Non-Conventional Energy Sources, 13th Reprint 2014, Khanna Publications.

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	:	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 INFORMATION TECHNOLOGY

INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS
(GENERAL TRACK: OPEN ELECTIVE-II)
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. IV SEMESTER

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code :U23OE410IT
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
Apply the concepts of database management systems and design relational databases.	1. Understand functional components of the DBMS and develop ER model for a given problem and map ER it to Relational model 2. Understand Relational model and basic relational algebra operations. 3. Devise queries using SQL. 4. Design a normalized database schema using different normal forms. 5. Understand transaction processing and concurrency control techniques.

UNIT – I:Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Architecture, Database Users and Administrators.
DatabaseDesign and the E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams

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

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

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

UNIT – V: Transactions: Transaction Concepts, Transaction State, Concurrent Executions, Serializability
Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols.

Learning Resources :

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

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	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, HYDERBAD-500031,

DEPARTMENT OF INFORMATION TECHNOLOGY

ESSENTIALS OF MATHEMATICS FOR MACHINE LEARNING USING PYTHON

(AI&ML TRACK : OPEN ELECTIVE-II)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. IV SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks :60	Course Code: U23OE420IT
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The Objectives of the course:	*On completion of the course, students will be able to*
Introduce essential math principles and Python programming techniques for understanding and applying machine learning to real-world problems.	1. Understand and apply linear algebra principles to solving system of linear equations using Python libraries. 2. Understand and apply statistical methods to various estimation problems. 3. Understand and apply probability theory to various problems like density estimation, sampling, and classification. 4. Understand and apply calculus principles to implement various learning problems using Neural networks. 5. Understand and apply optimization principles to solve various ML algorithms.

UNIT – I: Linear algebra: Vectors, arithmetic on vectors, norms, dot and cross products. Matrix, arithmetic on matrices, types of matrices, sparsity, tensor. Numpy arrays, indexing, slicing, reshape, broadcasting and setting axis. Intro. to Scipy linear algebra. System of linear equations: inverse, pseudo inverse, solving linear equations. Matrix decompositions: Eigen values, eigen vectors, Eigen decomposition, Singular value decomposition, Principal component analysis.

UNIT – II: Statistical methods: Intro, Scipy statistics, five-number summary, Sampling distribution, Law of large numbers and Central limit theorem. Correlation and covariance. Hypothesis testing basics, confidence intervals**.** Applications: Expected estimations using samples (Stochastic Gradient Descent).

UNIT-III: Probability: Intro**,** marginal, joint, conditional probabilities**,** random variables, probability distributions, Sampling data from distributions, Maximum likelihood estimations, Bayes theorem. Entropy, KL divergence, cross entropy, and Information gain. Applications in Machine learning: MLE classifier, Bayes classifier.

UNIT-IV: Calculus: Intro, Rate of change, Limits and continuity, derivatives on functions, continuous functions, Slopes and Tangents, maxima, minima, critical points, Multivariate calculus: partial derivatives, gradient vectors, chain rule. Higher order derivatives, Jacobian, and Hessian matrices**.** Applications in ML: calculus in neural networks learning.

UNIT V: Optimization: Curve fitting, function approximation, local optimization vs global optimization, univariate and multivariate optimization. Least square fitting with Scipy. Gradient Descent optimization**.** Applications in ML: Linear regression and Logistic regressor using Stochastic Gradient Descent. (1)

Learning Resources:

1. Deisenroth, Marc Peter, A. Aldo Faisal, and Cheng Soon Ong. *Mathematics for machine learning*. Cambridge University Press, 2020.
2. https://onlinecourses.nptel.ac.in/noc21_ma38/preview
3. https://machinelearningmastery.com/machine-learning-math-bundle/
4. Udemy - Essential maths for ML

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

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

Duration of Internal Test: **90 Minutes**

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

OPERATIONS RESEARCH

(General Pool : Open Elective-II)

SYLLABUS FOR B.E. IV-SEMESTER

Instruction : 3Hrs /week	SEE Marks : 60	Course Code : U23OE420ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The objectives of this course are to: understand the application of mathematics for real time problem solving to LPP, sensitivity analysis under set of constraints, applying mathematical techniques to solve transportation problem and assignment problems, applying time value money and ignoring the same to find the optimal replacement of machines, applying Johnsons rules to find the best sequence to minimize elapsed time and minimum no of servers to minimize waiting time of the customers and optimal utilisation of servers.	On completion of the course, the student will be able to: 1. Apply optimization in multi disciplinary areas through linear programming under different working conditions. 2. Analyze linear programming for a dynamic changes of a customer requirements to suit various Organizations. 3. Reduce total cost to apply for transportation techniques for the transshipment of Goods and products for a product based industry. 4. Estimate the time for replacement of a machine by considering or ignoring time value of money using individual/group replacement policy. 5. Estimate elapsed time for sequencing problem processed through different machines. Minimize waiting time of the customer and optimization of no. of servers.

UNIT–I:Introduction: Definition and scope of operations research.
Linear programming: Introduction, Formulation of linear programming problems, graphical method of solving LP problem, Simplex method, maximization and minimization, degeneracy in LPP, unbounded and infeasible solutions. Introduction of software to solve LPP.

UNIT–II: Duality: Definition, Relationship between optimal primal and dual solutions. Economic interpretation, Post optimal analysis (restricted to variation of resources i.e., RHS), Dual simplex method.

UNIT-III:Transportation model: Finding an initial feasible solution– north west corner method, least cost method, Vogel's approximation method, finding the optimal solution, optimal solution by stepping stone and MODI methods, special cases in transportation problems – Unbalanced transportation problem.
Assignment Problem: Hungarian method of assignment problem, maximization in assignment problem, unbalanced problem, problems with restrictions, travelling salesman problems.

UNIT-IV:Replacement models: Introduction, replacement of items that deteriorate ignoring change in money value, replacement of items that deteriorate considering change in money value with time, replacement of items that fail suddenly – individual replacement policy, group replacement policy.
Game theory: Introduction, 2 person zero sum games, maximin– minimax principle, principle of dominance, solution for mixed strategy problems graphical method for 2 x n and m x 2 games.

UNIT-V:Sequencing models: Introduction, general assumptions, processing n jobs through 2 machines, processing 'n' jobs through m machines processing 2 jobs through m machines.
Queuing theory: Introduction, single channel – poission arrivals – exponential service times with infinite population and finite population.

Learning Resources:

1. Hamady A. Taha, "Operations Research – An introduction", 6th Edition, PHI Pvt. Ltd., 1997.
2. S.D. Sharma, "Operations Research", Kedarnnath, Ramnath& Co., Meerut, 2009.
3. Harvey M. Wagner, "Principles of Operations Research", 2nd Edition, PHI Pvt. Ltd., 1980.
4. V.K. Kapoor, "Operations Research", S. Chand Publishers, New Delhi, 2004.
5. S.S. Rao, "Engineering Optimization – Theory and Practice", 4th Edition, John Wiley & Sons Inc., 2009.

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

KINEMATICS AND DYNAMICS OF ROBOTICS (Open Elective-II)

(Stream: Robotics)

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U23OE410ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE The objective of the course is to	**COURSE OUTCOMES** On completion of the course, students will be able to
To develop the fundamental knowledge and skills required to analyze, design and control robotic systems	1. Analyze the kinematics of robotic systems and apply them to solve real world problems 2 Apply differential kinematics and statics concepts to design and control robotic systems 3 Analyze the dynamics of serial manipulators using lagrangianmethod. 4 Analyze the dynamics of serial manipulators using lagrangian and Newton-Euler mechanics 5 Generate and analyze robot trajectories for various applications

UNIT-I: Robot Kinematics: Forward Kinematics: Forward/direct kinematic analysis of serial manipulators. Inverse Kinematics: General properties of inverse kinematic solution. Inverse kinematics of serial RR planar manipulators.

UNIT-II: Differential Kinematics: Linear and angular velocity of links, Velocity propagation, Manipulator Jacobian for serial manipulators, Jacobian Singularities.

UNIT-III: Static Analysis: Force and moment balance, Jacobian in statics.

Dynamics of serial manipulators

Lagrangian formulation for equations of motion for RP, RR serial manipulators,

Unit-IV: Dynamics of serial manipulators: Recursive dynamics using Newton-Euler formulation of RP and RR serial manipulator.

UNIT-V: Trajectory Generation: Joint-Space Techniques: Cubic Polynomial Trajectories, Linear Segments with Parabolic Blends-without and with via points

Cartesian-Space Techniques: Straight line path, Circular Path, Position Planning, Orientation Planning.

Learning Resources:

1. Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, "Robotics: Modelling, Planning and Control", Springer Science & Business Media, 2010.
2. M.W.Spong and M.Vidyasagar,"Robot Dynamics and Control", 1st Edition, John Wiley and sons,1990.
3. R.K.Mittal and I.J.Nagrath, "Robotics and Control", Tata McGraw-Hill, 2003.
4. Subir Kumar Saha, "Introduction to Robotics", Tata McGraw-Hill Education, 2014.
5. Howie M. Choset, Seth Hutchinson, Kevin M. Lynch, "Principles of Robot Motion: Theory, Algorithms, and Implementation", MIT Press, 2005.

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2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

CRITICAL THINKING

SYLLABUSFORB.E.IV-SEMESTER

L:T:P(Hrs/Week):3:0:0	SEEMarks:60	CourseCode:U23OE430EH
Credits: 3	CIEMarks:40	DurationofSEE:3Hours

COURSEOBJECTIVES	COURSEOUTCOMES
The course will enable the learners to:	At the end of the course the learners will be able to:
1. Identify the core skills associated with critical thinking. 2. Comprehend the various techniques of critical thinking 3. Evaluate data and draw insights from it to make the right decisions 4. Understand where to look for bias and assumptions in problem 5. Understand structure, standards and ethics of critical writing	1. Analyse and compare techniques for comparing alternate solutions 2. Demonstrate the difference between deductive and inductive reasoning and construct logically sound arguments 3. Check for accuracy of data and use it as a tool for problem solving 4. Evaluate, identify and distinguish between relevant and irrelevant information to formulate a thesis or hypothesis. 5. Employ evidence and information effectively

UNIT-1: COMPONENTSOFCRITICALTHINKING

1.1 Applying Reason
1.2 Open Mindedness
1.3 Analysis
1.4 Logic

UNIT 2: NON-LINEAR THINKING

2.1 Step out of your Comfort Zone
2.2 Don't Jump to Conclusions
2.3 Expect and Initiate Change
2.4 Being Ready to Adapt

UNIT-3: LOGICAL THINKING

3.1 Ask the Right Questions
3.2 Organize Data
3.3 Evaluate Information
3.4 Draw Conclusions

UNIT 4: INFER MEANING FROM INFORMATIVE TEXTS

4.1 Making Assumptions
4.2 Watch out for Bias
4.3 Ask Clarifying Questions
4.4 SWOT Analysis

UNIT 5: PROBLEM SOLVING

5.1 Identifying Inconsistencies
5.2 Trust your Instincts
5.3 Asking Ask?

METHODOLOGY:-
Case Studies
Demonstration
Presentations
Expert lectures
Writing and Audio-visuallessons

ASSESSMENT:-
Online assignments
Individual and Group

Learning Resources:

1. learn.talentsprint.com

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

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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) IV-SEMESTER (BRIDGE COURSE) ACADEMIC YEAR 2024 - 2025
(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								
UB23HS2230EH	English Language and Communication Skills	2	-	-	3	50	-	-
UB23HS2231EH	English Language and Communication Skills Lab	-	-	2	3	50	-	-

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

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
ENGLISH LANGUAGE COMMUNICATION (Theory)
Bridge Course for Lateral Entry Students

SYLLABUS FOR B.E. IV-SEMESTER

L: T: P (Hrs/Week) : 2	SEE Marks: 50	CourseCode:UB23HS410EH
Credits: nil	CIE Marks: - - -	Duration of SEE: Hours : 2

COURSE OBJECTIVES	**COURSE OUTCOMES**
The Course will enable the Learners to:	**At the end of the course the students will be able to :**
1. Converse effectively in various context.	1. Use language verbally and nonverbally in appropriate contexts
2. Listen for general and specific comprehension and write paragraphs.	2. Listen for global comprehension and to infer meaning from spoken discourses. Write paragraphs coherently.
3. Understand the elements of a good paragraph	3. Write paragraphs coherently.
4. Speak appropriately in daily conversations	4. Use phrases, essential vocabulary and polite expressions in every day conversations.

UNIT-1 1.0: Communication & Functional English

1.1 Role and Importance of Communication, Process of Communication, Non-verbal communication, barriers to Communication.

Conversational phrases: greetings, introductions, apology, compliments, agreeing and disagreeing, polite forms in everyday conversations.

UNIT 2 2.0: Listening

2.1 Importance of listening, Active listening

Unit 3. 3.0: Writing

1.1 Paragraph writing, coherence and cohesion.

Unit 4 4.0: Grammar and Vocabulary

4.1 Common Errors, one word substitutes, Phrasal-verbs, collocations.

Unit-5 5.0: Reading

5.1 Prose text- On shaking hands

Prescribed textbook for theory:

Technical communication - Principles and Practice (2nd Edition 2014) - Meenakshi Raman and Sangeeta Sharma- Oxford University Press.

Suggested Reading

1. E.Sureshkumar, P. Sreehari and J. Savithri - Essential English
2. Reading comprehension - Nuttal.J.C - Orient Blackswan
3. SunithaMishra,C. Murali Krishna, Communication Skills for Engineers, Pearson, 2004.
4. M. Ashraf Rizvi. Effective Technical Communication. Tata Mcgraw Hill, 2005.
5. Allen and Waters., How English Works.
6. Willis Jane., English through English.

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCE
ENGLISH LANGUAGE COMMUNICATION SKILLS LAB (ELCS)
Bridge Course for Lateral Entry Students
(Common to all branches)

SYLLABUS FOR B.E. IV-SEMESTER

L: T: P (Hrs/Week) : 2	SEE Marks: 50	Course Code: UB23HS411EH
Credits: -	CIE Marks: - -	Duration of SEE:3

COURSE OBJECTIVES	**COURSE OUTCOMES**
The Course will enable the Learners to:	**At the end of the course the students will be able to :**
1. Converse in various situations.	1. Research and sift information to make presentations.
2. Make paper and power point presentations.	2. Listen for gist and make inferences from various speeches.
3. Speak effectively using discourse markers.	3. Use connectives and make transitions effectively while speaking.

ELCS – Component - INTERACTIVE COMMUNICATION SKILLS LAB

1 **Group discussion:** Objectives of GD, Types of GDs; Initiating, Continuing, and concluding a GD.

2 **Debate:** Understanding thedifferences between a debate and a group discussion, essentials of debate, concluding a debate.

3 **Public Speaking:** Advantages of public speaking, essentials of an effective speech, types of delivery, rehearsal techniques, planning and delivering a speech.

4 **Presentation Skills :**Making effective presentations, using non-verbal communication , coping with stage fright , use of Audio visual aids researching on various topics.