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 2023–2024
(For the students admitted in 2022-23)**

**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-22)
BE (CIVIL ENGINEERING) III-SEMESTER ACADEMIC YEAR 2023 - 2024
(Students Admitted in 2022-23)

Course Code	Name of the Course	Scheme ofInstruction Hours per Week L	T	P/D	Duration in Hrs	Scheme of Examination Maximum Marks SEE	CIE	Credits
THEORY								
U22HS010EH	Human Values and Professional Ethics-II	1	-	-	2	40	30	1
U22HS320EH	Skill Development Course-I (Communication Skills-I)	1	-	-	2	40	30	1
U22HS340EH	Skill Development Course-II (Aptitude-I)	1	-	-	2	40	30	1
U22BS310MA	Transform Techniques and Partial Differential Equations	3	-	-	3	60	40	3
U22ES310CE	Programming for Civil Engineering	3	-	-	3	60	40	3
U22PC310CE	Strength of Materials – I	3	-	-	3	60	40	3
U22PC320CE	Surveying	3	-	-	3	60	40	3
U22PC330CE	Building Materials and construction	2	-	-	3	60	40	2
U22OE310CE	Open Elective-I (Green Buildings)	2	-	-	3	60	40	2
PRACTICALS								
U22ES311CE	Programming for Civil Engineering Lab	-	-	2	3	50	30	1
U22PC321CE	Surveying-I Lab	-	-	2	3	50	30	1
U22PC331CE	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		**19**	**-**	**6**		**630**	**420**	**22**
Grand Total		**25**				**1050**		
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), IBRAHIMBAGH, HYDERABAD-31

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 :U22HS010EH
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),
IBRAHIMBAGH, HYDERABAD-31

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 :U22HS320EH
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	- Online assignments
- Demonstration	- Individual and Group
- Presentations	
- Expert lectures	
- Writing and Audio-visual lessons	

Learning Resources:

1.   learn.talentsprint.com

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

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

Duration of Internal Tests   :   90   Minutes

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

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 :U22BS340EH
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.	1. Solve questions in the mentioned areas using shortcuts and smart methods.
2. Students will be introduced to higher order thinking and problem solving skills in the following areas - Arithmetic Ability, Numerical Ability and General Reasoning.	2. Understand the fundamentals concept of Aptitude skills.
3. Students will be trained to work systematically with speed and accuracy while problem solving.	3. Perform calculations with speed and accuracy.
4. Students will be trained to apply concepts like percentages and averages to solve complex problems.	4. Solve complex problems using basic concepts.
5. Students will be trained to use effective methods like elimination of options and shortcuts to solve problem accurately.	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

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

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

Duration of Internal Tests   :   90   Minutes

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

DEPARTMENT OF MATHEMATICS
TRANSFORM TECHNIQUES & PARTIAL DIFFERENTIAL EQUATIONS

SYLLABUS FOR B.E. III-SEMESTER

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

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 of Laplace and its Properties 2. Understand the Definition of inverse Laplace Transforms- Properties and it's applications. 3 Study the Fourier series, conditions for expansion of function and half range series 4 Formulate and understand linear and nonlinear partial differential equations. 5 Study the applications of Partial Differential equations	1. Evaluate Laplace transforms of functions. Apply Laplace transforms to evaluate integrals 2. Evaluate Inverse Laplace transforms of functions. Apply transforms to solve ordinary differential equations arising in engineering problems. 3 Expand any function which is continuous, Discontinuous, even or odd in terms of its Fourier series. 4 Formulate the Partial differential equations by eliminating arbitrary constants and functions and solve linear, non linear Partial differential equations. 5 Solve the one dimensional wave (Vibrations of a string), heat equations and two dimensional heat equations.

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 Coefficient

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. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.SGrewal 40th Edition, Khanna Publishers.
3. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
4. A text book of Engineering Mathematics by N.P.Bali& Manish Goyal, Laxmi Publication.
5. http://mathworld.wolfram.com/topics
6. http://www.nptel.ac.in/course.php

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	:	90 Minutes

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

DEPARTMENT OF CIVIL ENGINEERING
PROGRAMMING FOR CIVIL ENGINEERING
(Common to Mech. & Civil)

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U22ES310CE
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 flowchartsandalgorithms 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, 3rd Edition (2013), CengageLearning.
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition(2006),Prentice-Hall.
3. RajaramanV, The Fundamentals of Computer, 4th Edition(2006), Prentice-Hall of India
4. Steve Oualline, Practical C Programming, 3rd Edition (2006), O'Reilly Press.
5. Jeri R.Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, 5th Edition(2007), Pearson Education.

6. BalagurusamyE, Programming in ANSIC, 4[th]Edition (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

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

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:U22PC310CE
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, DhanpatRai 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

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

DEPARTMENT OF CIVIL ENGINEERING
SURVEYING

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):3:0:0	SEE Marks:60	Course Code: U22PC320CE
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 McGraw Hill, 2012.
7. Advanced Surveying: Total Station, GPS, GIS and Remote Sesnign, GopiSatheesh, 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
BUILDING MATERIALS AND CONSTRUCTION

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):2 : 0 : 0	SEE Marks:60	Course Code: U22PC330CE
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	At the end of the course, students will be able to:
1. Expose students to the concepts of building planning and various aspects of green buildings. 2. Acquire basic knowledge on conventional building materials and emerging building materials 3. Study construction practices like scaffolding and form work, Stair cases.	1. Apply the principles of planning and bylaws for planning of building 2. Explain the characteristics of stones, bricks and timber. 3. Describe properties of cement aggregate, mortar and illustrate the application of emerging building materials and paints, varnishes and water proofing materials in buildings. 4. Review construction practices like scaffolding, form work , brick bonds and design of dog legged of stair cases. 5. Understand sustainability and green building concepts.

UNIT-I: Building Planning : Types of buildings, Basic building elements, site selection for buildings, Principles of planning. Relevant Municipal building bylaws National Building Code (NBC) & orientation of buildings.Provision for physically handicapped facilities.

UNIT-II: Stones: Uses of stones as building materials, characteristics of good building stones.
Bricks: Composition of brick clay, Characteristics of good building bricks, Manufacturing of bricks, classification of bricks.
Timber: Timber as a building material and its uses. Various types of timber.Defects in timber, Seasoning and its importance.Preservation of wood. Wood based products used in building construction

UNIT-III: Cement: Chemical composition of cement, manufacturing process. Specifications for Ordinary Portland Cement.

Fine Aggregate: Characteristics of sand and its classifications, bulking of sand. Quarry sand.

Coarse Aggregate: Characteristics of coarse aggregates for preparation of concrete.

Cement Mortar: Proportions of Cement Mortar and uses.

Emerging Building Materials: Eco friendly and Sustainable building materials-Fly ash, GGBS, Bamboo. Recycled materials- Aggregates, Plastic

Other Materials: Paints, Varnishes and Distempers, Damp proofing materials, Light Weight building blocks.

UNIT-IV: Construction practices: Scaffolding and Form work, English and Flemish Brick Bonds, – Types and purposes. Plumbing services, Fire protection.

Stair Cases: Terminology, Types of stair cases – dog legged, open well, bifurcated and spiral stair case, Design of dog legged stair case.

Unit – V Introduction to Green Buildings: Definition of green buildings and sustainable development, typical features of green buildings, benefits of green buildings towards sustainable development. Green building rating systems – GRIHA, IGBC and LEED, overview of the criteria as per these rating systems, concepts of rainwater harvesting.

Learning Resources:
1. Kumara Swamy N., KameswaraRao A., Building Planning And Drawing, Charotar, Publications, 2019.
2. Arora S.P. and Bindra S.P., A Text Book of Building Construction, DhanpatRai& Sons Publications, 2019.
3. Sushil Kumar, Building Construction, Standard Publishers, 2020.
4. Varghese P.C., Building Materials, PHI Learning Pvt. Ltd., Delhi, 2015.
5. National Building Code of India, 2016.
6. IGBC Green Homes Rating System, Version 3.0., Abridged reference guide, 2019, Indian Green Building Council Publishers.
7. GRIHA version 2019, GRIHA rating system, Green Rating for Integrated Habitat Assessment.
8. Alternative building materials and technologies by K.S. Jagadish, B.V. Venkatarama Reddy and K.S. NanjundaRao; 2017, Newage International Pvt Ltd.

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. II-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code :U22ES311CE
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, 7th Edition, 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-I LAB

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):0:0:2	SEE Marks:50	Course Code: U22PC311CE
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, level, plane table and theodolite.	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, level, plane table and theodolite in the field of civil engineering applications such as structural plotting and highway profiling 3. Practice working as a team member and lead a team 4. Plan a survey appropriately with the skill to understand the surroundings 5. Demonstrate professional behaviour 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. Plane table surveying - Radiation and Intersection methods.
4. Plotting of the traverse for the given area using plane table.
5. Introduction to Levelling – Fly leveling using Auto Level
6. Profile leveling using auto level - Plotting Longitudinal section and Transverse sections

7. Measurement of horizontal angles by repetition & Reiteration method using Theodolite and calculate the area.
8. Traversing by using Theodilite – Distribution of errors using gales Traverse table
9. Measurement of vertical angle; Application to simple problems of height and distance by measuring angle of elevation.
10. Setting of simple curve by offset method
11. Setting of simple curve by Rankin's methods
12. Demonstration of minor surveying instruments and Total Station

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: U22PC331CE
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-22)
BE (CIVIL ENGINEERING) III-SEMESTER (BRIDGE COURSE)
ACADEMIC YEAR 2023 - 2024
(Students Admitted in 2022-23)

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								
UB22ES340CE	Mechanics for Engineers	2	-	-	3	50	-	-

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:UB22ES340CE
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, JaanKiusalaas., "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	Title	Code	credits
Civil	Green Buildings	U220E310CE	2
CSE	Mathematics For Artificial Intelligence	U220E310CS	2
CSE	Basics of Java Programming	U220E320CS	2
ECE	Introduction to Signals and Systems	U22OE310EC	2
ECE	Sensors for Engineering Applications	U22OE320EC	2
EEE	Non-Conventional Energy Sources	U22OE310EE	2
IT	Fundamentals of Data Structures	U22OE310IT	2
IT	Introduction to Linux	U22OE320IT	2
Mech.	Introduction to Unmanned Aerial Vehicles	U22OE310ME	2
Mech.	Introduction to Industrial Robotics	U22OE320ME	2
Mech.	Introduction to Automobile Engineering	U22OE330ME	2
Maths	Linear Algebra	U220E310MA	2
Chemistry	Battery science and Technology	U22OE310CH	2
Chemistry	Corrosion science and it'sapplication	U22OE320CH	2
Physics	Smart Materials & Applications	U22OE310PH	2
H&SS	Learning To Learn	U22OE310EH	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: U22OE310CE
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.KameswaraRao 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. MiliMajumdar, "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
MATHEMATICS FOR ARTIFICIAL INTELLIGENCE
(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 :U22OE310CS
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. Study the concept of Vector Spaces, Subspaces, basis, and dimension of vector Space. 2. Learn the concepts of Eigen values and Eigen vectors, Diagonalization of a matrix 3. Study the concepts of vector differentiation and Jacobian for multivariable function. 4. Understand various concepts of Random variables and standard Statistical Distributions.	1. Solve the problems on Vector Spaces and Subspaces. Also determine the Basis and Dimension of a Vector Space. 2. Apply the similarity transformation to diagonalize a matrix. 3. Find the gradient of a scalar point function, divergence and curl of vector field and Jacobian for change of variables. 4. Apply the various statistical distributions to solve practical problems.

UNIT-I: Vectors in Machine Learning: Vector, Vector arithmetic, dot product, scalar multiplication, vector space, sub-space, basis and dimensions.

UNIT-II:Matrices in Machine Learning: Basics of matrices, Eigen values and eigen vectors, Similarity transformation, Diagonalization.

UNIT-III:Calculus for Machine Learning: Basic of calculus, gradients, divergence, curl, Jacobian, chain rule and change of variable.

UNIT-IV:Probability for Machine Learning: Review of probability, bayes theorems, random variables, expectation and variance, discrete and continuous distribution functions.

Learning Resources:
1. Advanced Engineering Mathematics by R.K.Jain&S.R.K.Iyengar, Narosa publishing house.
2. Engineering Mathematicsby B S Grewal, Khanna Publications.
3. Introduction to Linear Algebra by Defranza, Daniel Gagliardi.
4. Advanced Engineering Mathematics, Kreyszig E, 8th Edition, John Wiley & Sons Ltd, 2006.
5. Fundamentals of Mathematical Statistics, Gupta &Kapoor, Sultan Chand & Sons, New Delhi.
6. A text book of Engineering Mathematics by N.P.Bali& Manish Goyal, Laxmi Publication.

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

7.

Duration of Internal Tests : 90 Minutes

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
BASICS OF JAVA PROGRAMMING
(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 :U22OE320CS
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. 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. SachinMalhotra, SaurabhChoudhary, 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 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

8.

Duration of Internal Tests   :   90 Minutes

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INTRODUCTION TO SIGNALS AND SYSTEMS

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U22OE310EC
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSEOBJECTIVES	COURSEOUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Define and classify continuous and discrete time signals and systems. 2. Determinefrequencydomaincharacteristics of continuous anddiscretetimesignals.	1. Analyze basic signals and systems in continuoustime domain. 2. Apply the properties of Fourier transformationtechniquestoanalyzecontinuoustimedomainsignalsandsystemsin frequencydomain. 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: classificationofsystems-staticanddynamic,linearandnonlinear,timeinvariantandtimevariant.
Lab Activity: Generation of elementary signals in MATLAB.

UNIT-II: Continuous time Fourier Series: Introduction, existence,properties,magnitude andphase spectrums
Continuous time Fourier transforms: Introduction, existence,properties,magnitude andphase 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 time signals: types of signals, representation of signals, basic elementary signals, operations on signals.
Discretetimesystems:classificationofsystems-staticanddynamic,linearand nonlinear, time invariant and timevariant.
Lab activity: Generation of elementary signals in MATLAB.

LearningResources:

1. P.RamakrishnaRao,SignalsandSystems, McGrawHill,2008.
2. AlanV.Oppenheim,AlanS.WilskyandS.HamidNawab,SignalsandSystems,2^{nd}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 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

9.

Duration of Internal Tests   :   90 Minutes

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

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SENSORS FOR ENGINEERING APPLICATIONS**
(Civil, CSE, EEE, IT & Mech.)

SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U22OE320EC
Credits : 2	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	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

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 – colorpyrometry. 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.

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. Study of acoustic sensor, to record audio signals and to monitor acoustic level using Chenyum CY-502 computer microphone.
7. 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	:	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 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:U22OE310EE
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
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 energy by biomass and fuel cells 4. Illustrate the ocean and geo thermal energy generation

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:Biomass Energy: 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
FUNDAMENTALS OF DATA STRUCTURES (Open Elective-I)

SYLLABUS FOR B.E. III-SEMESTER(for other Branches)

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:U22OE310IT
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES On completion of the course, students will be able to
Explore efficient storage mechanisms for easy access, design and implementation of various data structures.	1. Identify appropriate linear data structure to solve a problem. 2. Illustrate the usage of linked lists for various applications 3. Demonstrate the usage of non-linear data structures – graphs & trees

UNIT – I: Introduction to Data Structures: **Performance Analysis: Time andSpace complexity.**
Introduction to Data Structures: Stacks, Representation of a Stacks using Arrays, Applications.
Queues: Representation of a Queue using array ,Applications.

UNIT – II: Linked List: Introduction, Singly Linked list ,Operations on a Singlylinked list, Dynamically Linked Stacks and Queues.

UNIT – III:
Doubly linked list: Introduction, Doubly linked list, Operations on a doubly linked list.

UNIT – IV:
Introduction to Non-Linear Data Structures: Trees and Graphs

Learning Resources :

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2/e, Universities Press, 2008
2. Mark Allen Weiss, —Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 1996
3. Robert Kruse, C.L.Tondo, Bruce Leung, Shashi Mogalla , — Data Structures and Program Design in C, Second Edition, Pearson Education, 2007
4. Jean-Paul Tremblay, Paul G. Sorenson,'An Introduction to Data Structures with Application', TMH, 2nd Edition.
5. Richard F, Gilberg, B.A. Forouzan, "Data Structures, A Pseudocode Approach with C", Cengage, 2nd Edition
6. http://nptel.ac.in/courses/106106127/

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 Test: 90 minutes

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

DEPARTMENT OF INFORMATION TECHNOLOGY
INTRODUCTION TO LINUX (Open Elective – I)
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR –III SEMESTER

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:U22OE320IT
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to:
Acquire basic skills for using Linux operating system.	1. Install Linux operating system and use desktop environment. 2. Identify and use Linux utilities to create and manage simple file processing operations. 3. Organize directory structures with appropriate security. 4. Configure and use Linux shell.

UNIT – I: Introduction to Linux, Installing Linux, Running Linux from USB Drive, Understanding X Windows System and Desktop, Navigating through LinuxDesktop and Managing files. Understanding Linux file system, listing files and directory attributes, Making files and directories, Listing and changing permissions and ownership.

UNIT – II: Understanding the Linux Shell, Understanding aliases, Using the shell from console or terminals, using command history and tab completion, Connecting and expanding commands, Creating aliases, Making shell settings permanent, Using man pages and other documentation.

UNIT – III: Introduction to Shell Scripting: Reading input from the user, logical operators, Arithmetic operators, Environment variables, Read-only variables, command line arguments, working with arrays.

UNIT – IV: Decision Making: Conditional constructs, Functions: Introduction to functions, passing arguments, sharing of data, declaration of local variables, returning information from functions, running functions in the background, creating a library of functions

Learning resources:
1. Introduction to Linux – A Hands On Guide, MachteltGarrels.
2. Ganesh SanjivNaik, Learning Linux Shell Scripting, Packt Publishing,2015. Open Source Community
3. https://linuxjourney.com/
4. https://nptel.ac.in/courses/117106113/

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 Test: 90 minutes

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

DEPARTMENT OF MECHANICAL ENGINEERING
INTRODUCTION TO UNMANNED AERIAL VEHICLES

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U22OE310ME
Credits :02	CIE Marks:40	Duration of SEE:3Hours

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

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U21OE320ME
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The objective of the course is to	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:ROBOTBASICS: 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 McGraw-Hill Publishing Company Limited , 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw 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 McGraw-Hill Publishing Company Limited, 2008
5. R.K. Mittal and I. J. Nagrath"Robotics and Control", Tata McGraw-Hill Publishing Company Limited,2003.

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	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 AUTOMOBILE ENGINEERING

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U21OE330ME
Credits :02	CIE Marks:40	Duration of SEE:03Hours

Course objectives	Course Outcomes
The objectives of this course are to:	On completion of the course, the student will be able to:
1. familiarize the student with the different types of automobiles and engine components along with its working. 2. impart adequate knowledge in fuel supply, cooling, lubrication and ignition of IC engines. 3. understand the steering geometry, steering mechanism and types of suspension systems. 4. gain the knowledge about working of clutch, gear box mechanism, and brakes and make the student conversant with types of wheels, tyres	1. identify types of Automobiles and engine components and describe its working. 2. describe the engine fuel Supply system in petrol and Diesel engines, cooling system, and lubrication systems. 3. describe the steering mechanism, suspension systems 4. describe the working principle and operation of clutch, gear mechanism, brakes and identify the types of wheels, tyres

UNIT-I:Introduction: Types of automobiles, Lay out of transmission system, Engine components: cylinder block, cylinder head, crankcase, crank shaft and cam shaft. Types and working of IC Engines: SI and CI engines, two stroke and four stroke engines.

UNIT-II:Fuel system: Fuel supply system for SI engines and CI engines. Simple carburettor, Introduction to Multipoint fuel injection system (**MPFI**) of petrol engines, Introduction to **CRDI** system for diesel engines.
Cooling system: air cooling, water cooling: Thermo syphon, pump circulation system.
Lubrication system: Petroil System, splash system, pressure lubrication: Wet sump and Dry Sump.

Ignition system: Battery Ignition System, Magneto Ignition System and Electronic Ignition System.

UNIT-III: Suspension system: Rigid axle, Independent suspension system: Double wish bone type, Macpherson strut system.
Steering system: wheel alignment, Ackermann steering mechanism, steering geometry: camber, caster, toe-in, toe-out, steering linkage for vehicle with rigid axle front suspension, steering linkage for vehicle with independent front suspension.

UNIT –IV: Power Train: Single plate clutch, Multi plate clutch. Manual Gear Box: sliding mesh gear box, constant mesh gear box, synchromesh gear box. Working principle of differential.
Brakes: Types: Drum and Disc brakes, Hydraulic Braking system, **ABS** system.
Wheels and Tyres: Types of Wheels: wire wheels, disc wheels, alloy wheels. Types of tyres: Tube type, tubeless type.

Learning Resources:
1. Crouse &Anglin, "Automobile Engineering", 10th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi,. 2007.
2. Kirpal Singh, "Automobile Engineering", Vol.I& II, 13th Edition, Standard Publishers, New Delhi 2013.
3. R.B Gupta, "Automobile Engineering" 7th Edition, SatyaPrakashan, New Delhi, 2015.
4. Joseph Heitner, "Automotive Mechanics", 2nd Edition, Affiliated East West Pvt. Ltd., 2013.
5. C.P. Nakra, "Basic Automobile Engineering", 7th Edition, DhanpatRai Publishing C (P) Ltd., 2016.

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
LINEAR ALGEBRA (Open Elective)
(Common for Civil,EEE,ECE,Mech)

SYLLABUSFOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEEMarks:60	CourseCode:U22OE310MA
Credits: 2	CIEMarks:40	DurationofSEE:3 Hours

COURSEOBJECTIVES Thecoursewillenablethestudentsto:	COURSEOUTCOMES On completion of the course, studentswillbe able to
1. Study the concept of Vector Spaces and understand the meaning of Basis and Dimension of a vector Space and Co-ordinates. 2. Understand the meaning of Linear transformation, properties. 3. Understandthe Range and Kernel, Rank-Nullity and Matrix of Linear Transformation. 4. Understand theInner Product Spaces, Orthonormal sets, Gram-Schmidt's Orthogonalization process.	1. Solve theproblems on Vector Spaces and determine the Basis and Dimension of a Vector Space and find the Co-ordinates. 2. Determinethe Linear Transformation, Range and Kernel and Matrix of Linear Transformation. 3. Determinethe Range and Kernel, Rank-Nullity and Matrix of Linear Transformation. 4. Determine the distance, orthogonal, orthonormal sets and construct orthonormal basis based on Gram-Schmidt's Orthogonalization process.

UNIT–I: Vector Spaces-Definition of a Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis.

UNIT–II: Linear Transformation-I: Definition of Linear Transformation-Properties of Linear Transformations – Product of Linear Transformations – Algebra of Linear Operators- Linear sum- Scalar multiple-Composition of maps.

UNIT–III: Linear Transformation-II: Range and kernel of a linear map – Dimension of Range and Kernel - Rank and   nullity – Inverse of linear transformation - Rank nullity theorem (without Proof)- Matrix of Linear Transformation.

UNIT–IV: Inner Product Spaces-The Dot Product on R and Inner Product Spaces, Orthonormal Bases, Orthogonal Complements- Gram-Schmidt's Orthonormolization process.

Learning Resources:
1. Introduction to Linear Algebra with Application, Author : Jim Defranza, Daniel Gagliardi, Publisher : Tata McGraw-Hill
2. An Introduction to Linear Algebra, V.Krishna Murthy, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd
3. Elementary Linear Algebra, Author: Anton and Rorres, Publisher: Wiley India Edition.
4. Advanced Engineering Mathematics, Author : Erwin Kreysig, Publisher : Wiley Publication
5. Elementary Linear Algebra, Author : Ron Larson, Publisher : Cengage Learning
   http://mathworld.wolfram.com/topics
6. **http://www.nptel.ac.in/course.php**

Thebreak-upofCIE:InternalTests+Assignments +Quizzes

1.	No.ofInternalTests	:	2	Max.Marks foreachInternalTest	: 30
2.	No.ofAssignments	:	2	Max.Marks foreachAssignment	: 5
3.	No.ofQuizzes	:	2	Max.Marks foreachQuiz Test	: 5

DurationofInternal Test:90minutes

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

DEPARTMENT OF CHEMISTRY
BATTERY SCIENCE AND TECHNOLOGY (OPEN ELECTIVE)

SYLLABUS FOR B.E.III-SEMESTER

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:U22OE310CH
Credits: 2	CIE Marks: 40	Duration of SEE :1.5 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are	On completion of the course, students will be able to
1. Introduce the various terms to understand the efficiency of batteries. 2. Know the relevant materials required for the construction of primary and secondary batteries. 3. Familiarize with the reactions involved during charging and discharging processes. 4. Emphasise the need of fuel cells and the concept of their construction and functioning.	1. Discuss the construction, electrochemistry, technology and applications of selected primary batteries 2. Discuss the construction, electrochemistry, technology and applications of few secondary batteries 3. Explain the working principle, electrochemistry, technology and applications of prominent fuel cells 4. Evaluate different batteries or fuel cells in order to select a suitable battery or fuel cell for a given application

UNIT-I: BATTERIES – FUNDAMENTALS: Introduction and types of batteries: Primary and secondary. Battery characteristics: Free energy change, electromotive force of battery, ampere - hour, capacity, power, power density, energy density, efficiency, cycle life, tolerance to service conditions, performance characteristics.

UNIT-II: PRIMARY BATTERIES: Construction, chemistry and technology of Zinc - Air Battery, Zinc - HgO battery and their applications. Primary lithium batteries: Soluble cathode cells, solid cathode cells - Lithium manganese dioxide, solid electrolyte cells- Lithium polymer electrolyte battery - Applications. Reserve battery - Electrochemistry of perchloric acid cell - applications.

UNIT-III: SECONDARY BATTERIES: Construction, chemistry and technology of maintenance free lead acid battery (MFLA), valve regulated lead acid battery (VRLA), absorbed glass mat lead acid battery (AGMLA) - comparision between lead acid battery and VRLA along with advantages - Construction, electro chemistry and applications of Nickel - Cadmium battery, Nickel metalhydride battery.

Lithium ion batteries: Construction, chemistry and applications of liquid organic electrolyte cells, polymer electrolyte cells, lithium ion cells.

UNIT- IV: FUEL CELLS: Introduction, classification based on temperature and nature of electrolyte. Working principle, components, applications and environmental aspects of alkaline fuel cell (AFC) - Hydrogen - Oxygen alkaline fuel cell, Molten carbonate fuel cell (MCFC), Polymer electrolyte membrane fuel cell (PEMFC), Solid oxide fuel cell (SOFC).

Learning Resources:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai and Pub, Co., New Delhi (2002)

2. S. S. Dara "A text book of engineering chemistry" S. Chand and Co. Ltd. New Delhi (2006).

3. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.

4. Chemistry of Engineering Materials by R. P. Mani and K. N. Mishra, CENGAGE learning

5. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 2008.

1. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.

2. Derek Pletcher and Frank C. Walsh, "Industrial Electrochemistry", Chapman and Hall, New York, 1993.

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 Test: 90 minutes

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

DEPARTMENT OF CHEMISTRY
CORROSION SCIENCE AND ITS PREVENTION
(Open Elective)

SYLLABUS FOR B.E.III-SEMESTER

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:U22OE320CH
Credits: 2	CIE Marks: 40	Duration of SEE :1.5 Hours

COURSE OBJECTIVES The objectives of the course are	COURSE OUTCOMES On completion of the course, students will be able to
1. Acquaint with the causes and factors influencing the rate of corrosion 2. Understand the different types of corrosion like dry, wet and galvanic corrosion and their relative impact 3. Familiarize with various preventive methods of corrosion such as cathodic protection, use of inhibitors, coatings, etc. 4. Familiarize with industrial coating methods like electroplating, electrolessplating.	1. Explain different types of corrosion and factors that affect corrosion and passivation of metals. 2. Select a suitable metallic coating, organic coating and inhibitors for corrosion control of the equipment in a given application. 3. Discuss the principles and applications of cathodic protection and surface conversion coatings for corrosion control. 4. Apply the knowledge of various methods of corrosion control to suggest a solution for corrosion control of a given equipment in a given industrial application.

UNIT-I: CHEMICAL AND ELECTROCHEMICAL CORROSION
Introduction - gravity, cause, chemical and electrochemical corrosion, Pilling – Bed worth rule, effect of nature of oxide layer on rate of chemical corrosion. Galvanic corrosion, electrochemical series and galvanic series. Formation of anodic and cathodic areas, Differential aeration corrosion -pitting, waterline corrosion, crevice corrosion, stress corrosion andcorrosion fatigue. Passivation of metals, polarization curve of passivating metals, effect of pH and potential for iron (pourbaix diagram) and the polarization curve of iron.

Factors influencing corrosion
a. Nature of metal: Relative position of metal in galvanic series, over voltage, relative areas of anode and cathode and nature of corrosion product.
b. Nature of environment: Temperature, pH, humidity and dissolved oxygen.

UNIT-II: CORROSION CONTROL BY METALLIC COATINGS
Metallic coatings: Types - anodic and cathodic. Pre treatment of surface of base metal. Methods of application of metallic coatings: Hot dipping-galvanization - applications of galvanized RCC steel bars. Cladding, electro plating and electroless plating- Principle and their differences. Electroplating of Cu and Cr on Fe, electroless plating of Ni and Cu on insulators, Preparation of printed circuit board (PCB) by electrolessplating.

UNIT-III: CORROSION CONTROL BY ORGANIC COATINGS AND INHIBITORS
Organic Coatings: Paints – constituents and their functions. Vitreous enamel coatings. Varnishes. Super hydrophobic and self healing coatings. Epoxy coatings on RCC steel bars- impervious coatings.
Corrosion inhibitors: Anodic, cathodic and vapour phase inhibitors.

UNIT-IV: CORROSION CONTROL BY CATHODIC PROTECTION AND SURFACE MODIFICATION
Cathodic protection: Principle, sacrificial anodic protection (SAP), impressed current cathodic protection (ICCP). Application of cathodic protection for bridges, ship hulls and underground pipelines.
Surface conversion coatings: Carburizing, nitriding, cyaniding.

Learning Resoures:
1. P. C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub, Co., New Delhi (2002)
2. S. S. Dara "A text book of engineering chemistry" S. Chand and Co. Ltd., New Delhi (2006).
3. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi (2008).
4. Wiley Engineering chemistry, Wiley India pvt Ltd, II edition.
5. Chemistry in engineering and technology by J. C. Kuriacose and Rajaram.

Suggested Reading:
1. Principles and prevention of corrosion: Denny A. Jones, Prentice Hall, 1996.
2. Derek Pletcher and Frank C. Walsh, "Industrial Electrochemistry", Chapman and Hall, New York, 1993
3. Fundamentals of Corrosion: Michael Henthorne, Chemical Engineering
4. Corrosion Engineering: Mars G Fontana, Mc Graw Hill, 1987

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 Test: 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:U22OE310PH
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. Grasp the concepts of peizo and ferro electric materials 2. Learn fundamentals of pyro and thermo electric materials 3. Gain knowledge on shape memory alloys 4. Acquire fundamental knowledge on chromic materials	1. Summarize various properties and applications of peizo and ferro electric materials 2. Apply fundamental principles of pyro and thermo electricity in relevant fields of engineering 3. Explain types of shape memory alloys and their properties and applications 4. Outline the importance of chromic materials in engineering fields.

UNIT-I: Piezo and Ferro 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 ferro-electric materials, Curie-Weiss law, applications of Ferro electric materials

UNIT-II: 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-III: 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.

UNIT-IV Electro-chromaticity, Electro-chromic materials, Electro-chromic sensors and devices.
Photo-chromaticity, Photo-chromic materials, Photo-chromic sensors and devices.
Thermo-chromaticity, thermo-chromic materials, thermo-chromic sensors and devices.
Smart fluids: Magneto-rheological and Electro-rheological fluids.

Learning Resources:
1. K. Otsuka and C M Wayman, Shape memory materials, Cambridge university press, 1998.
2. TW Duerig, KN Melton, D Stockel, CM Wayman, Engineering aspects of shape memory alloys, Butterworth-Heinemann, 1990
3. A.K. Sawhney, A Course in Electronic Measurements and Instrumentation, Dhanpat Rai & Sons, 2015
4. D. Patranabis, Sensors and Transducers, PHI Learning Pvt. Ltd., 2013

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

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

Duration of Internal Test: 90 Minutes

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
LEARNING TO LEARN
(Open Elective)

SYLLABUSFOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEEMarks:60	CourseCode:U22OE310EH
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-22)
BE (CIVIL ENGINEERING) IV-SEMESTER ACADEMIC YEAR 2023 - 2024
(Students Admitted in 2022-23)

Course Code	Name of the Course	Scheme of Instruction Hours per Week L	T	P/D	Scheme of Examination Duration in Hrs	Maximum Marks SEE	CIE	Credits
THEORY								
U22HS430EH	Skill Development Course-III (Aptitude-II)	1	-	-	2	40	30	1
U22BS410MA	Numerical Methods, Probability and Statistics	3	-	-	3	60	40	3
U22ES410CE	Principles of Data Structures for Civil Engineering	3	-	-	3	60	40	3
U22PC410CE	Strength of Materials – II	3	-	-	3	60	40	3
U22PC420CE	Concrete technology	3	-	-	3	60	40	3
U22PC430CE	Fluid Mechanics	3	-	-	3	60	40	3
U22PE410CE	Skill Development Course-IV (Technical Skills-I)	1	-	-	2	40	30	1
U22OEXXXXX	Open Elective-II	3	-	-	3	60	40	3
PRACTICALS								
U22ES411CE	Principles of Data Structures for Civil Engineering Lab	-	-	2	3	50	30	1
U22PC411CE	Strength of Materials Lab	-	-	2	3	50	30	1
U22PC421CE	Surveying-II Lab	-	-	2	3	50	30	1
U22PC431CE	Fluid Mechanics 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**	**-**	**8**		**640**	**420**	**24**
Grand Total		**28**				**1060**		
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, 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:U22HS430EH
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   - Online assignments
- Presentations   - Individual and Group
- Expert lectures   - 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 MATHEMATICS
NUMERICAL METHODS, PROBABILITY & STATISTICS
SYLLABUS FOR B.E. IV-SEMESTER

L:T:P(Hrs./week):3:1:0	SEE Marks : 60	Course Code	: U22BS410MA
Credits : 3	CIE Marks : 40	Duration of SEE : 3Hrs	

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	At the end of the course students will be able to:
1. Study the methods of interpolation, apply numerical methods to interpolate. 2. Understand the numerical differentiation and integrate functions and to solve differential equations using numerical methods. 3. Understand the Random variables and Probability Distributions. 4. Understand the tests of hypothesis for small samples. 5. Study the method to fit different curves to a given data and measuring the Correlation between variables	1. Apply the numerical methods to interpolate. 2. Solve the problems using numerical differentiation using interpolation approach and differential equations using numerical methods. 3. Apply the various probability distributions to solve practical problems. 4. Estimate the unknown parameters of populations and apply the tests of hypotheses for small samples. 5. Solve problems to fit various curves to the given data using curve fitting, and also to find co-efficient of correlation between the variables.

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 4th order (without proofs)

UNIT-III: Probability Distribution: Random Variables - Discrete and Continuous Random variables-Properties- Distribution functions and densities - 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 – Introduction to Design of experiments.

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. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.SGrewal 40th Edition, Khanna Publishers.
3. Probability, Statistics and Random Processes, T. Veerarajan , Tata MCGraw Hill Education Private Ltd.
4. Advanced Engineering Mathematics, Kreyszig E, 8 th 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. http://mathworld.wolfram.com/topics
8. http://www.nptel.ac.in/course.php

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 :U22ES410CE
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 Basic linear and non-linear data structures and learn techniques of recursion 2. Understand concepts of Linked lists 3. Understand Concepts of Stacks and queues 4. Understand Concepts of Trees 5. Understand Concepts of Graphs and different sorting and searchingtechniques and their complexities.	1. Understand the basic concepts of data structures. 2. Understand the notations used to analyze the performance of algorithms. 3. Choose andapply an appropriate data structurefora specified application. 4. Understand the concepts of recursion and its applications in problem solving. 5. Demonstrate a thorough hunderstanding of searching and sorting algorithms.

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. NarasimhaKarumanchi, "Data Structures and Algorithms MadeEasy", Career Monk Publications, 2017
2. Horowitz E, Sahni S., and Susan Anderson-Freed," Fundamentals ofDatastructures in C", Silicon Pr; 2 edition (1 August 2007)
3. ReemaThareja, "Data Structures using C", Oxford, 2014.
4. Kushwaha D. S. and Misra A. K, "Data structures A ProgrammingApproach 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:U22PC410CE
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 and conjugate beam methods 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.

Shear Centre: Concept and importance of shear centre shear flow and determination of shear centre of simple sections such as T sections and Channel sections with one axis of symmetry.

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", DhanpatRai 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
CONCRETE TECHNOLOGY

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week):2 : 0 :0	SEE Marks:60	Course Code:U22PC420CE
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 , pearsonpaper 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
FLUID MECHANICS

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs./week):3:0:1	SEE Marks:60	Course Code:U22PC430CE
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 irrotationalflows.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 – Poiseuilleequation.Charateristics of turbulent flow.Head loss in pipes.Darcy – Weisbachequation.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 SrinivasaRaju and D Nageshkumar, " 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
SKILL DEVELOPMENT COURSE-IV (Technical Skills-I)

SYLLABUS FOR B.E. IV-SEMESTER

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

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
PRINCIPLES OF DATA STRUCTURES LAB

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : **U21ES411CS**
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 various abstractions like stacks, queues, linked lists. 2. Implement problems involving trees and graphs. 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)deleted) display
4. Menu driven program that implements Circular Queues for the following operations
   a)create b)Insert c)deleted) 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

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: U22PC411CE
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 - Demonstration

No. of Internal Tests: 01   Max. Marks for Internal Test: 12

Marks for day-to-day laboratory class work   18

Duration of Internal Test: 2 Hours

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

DEPARTMENT OF CIVIL ENGINEERING
SURVEYING-II LAB

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week): 0 : 0 : 2	SEE Marks:50	Course Code: U22PC421CE
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. Apply classroom knowledge in laboratory exercises and handling of Theodolite, GPS and Total station.	1. Determine the RL of a given point in different practical situations 2. Apply the principles of tacheometry in the field 3. Demonstrate usage of Total Station and GPS in field projects. 4. Practice working as a team member and make effective presentations. 5. Demonstrate professional behaviour in conducting the experiments and present the results effectively

LIST OF EXPERIMENTS
1. Single plane method: Determination of RL of an elevated object using 2 instrument station which are placed in same vertical plane when object is in accessible
2. Two plane method: Determination of R.L of an elevated object using two instrument stations which are not placed are not placed in the same vertical plane when base of the object inaccessible
3. Distance between two inaccessible points using principles of trigonometric surveying (Theodolite)
4. Determine the gradient of a line connecting two points using tangential and stadia tacheometry
5. Indirect contour surveying using Tacheometry
6. 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

7. Develop the contour map for a given area using Total Station downloading of data into the computer and plotting the map
8. Determination of area enclosed in closed traverse having minimum 5 station. Plot the measured values using a AUTOCADD
9. Setting out works using Total Station – Staking out
10. Geographic Position System (GPS), Geographical Information System (GIS) and their applications: Determination of Latitude and Longitude of any four stations and computation of the area. Check trust worthiness of the measured results.
11. Setting of simple curve by using Total Station
12. Demonstration of Digital micro optic Theodolite.

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: U22PC431CE
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. Experimental verification of Water Hammer Phenomenon

7. Determination of types of flows using Reynolds Apparatus

8. Determination of Darcy's coefficient of friction.

9. Verification of Bernoulli's Theorem.

10. Determination of C_d for Orifice Meter

11. 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

OPENELECTIVESOFFERED BY VARIOUSDEPARTMENTSIN B.E.IV SEMESTER

Dept	Title	Code	credits
Civil	Solid Waste Management	U22OE410CE	3
CSE	Principles of Python Programming	U22OE430CS	3
ECE	Mathematical Programming for Engineers	U22OE410EC	3
ECE	Principles of Communication Engineering	U22OE420EC	3
EEE	Solar Power and applications	U22OE410EE	3
IT	Introduction to Object Oriented Programming	U22OE410IT	3
IT	Introduction to Scripting Languages	U22OE420IT	3
Mech.	Design Principles of UAVs	U22OE410ME	3
Mech.	Kinematics and Dynamics of Robotics	U22OE420ME	3
Mech.	Optimization Methods	U22OE430ME	3
HSS	Critical Thinking	U22OE430EH	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:U22OE410CE
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
PRINCIPLES OF PYTHON PROGRAMMING
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code :U220E410CS
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

UNIT-V: Files and Exceptions: Text files, Writing variables, Directories, Pickling, Exceptions.

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 ELECTRONICS AND COMMUNICATION ENGINEERING
MATHEMATICAL PROGRAMMING FOR ENGINEERS
(Civil, CSE, EEE, IT, Mech)

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U22OE410EC
Credits : 3	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 5. Design GUI for basic mathematical 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, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration.

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

UNIT - IV : Nonlinear Equations: System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions ployval and polyfit, cubic fit using least square method. Finding roots of a polynomial -roots function, Newton-Raphson Method.

UNIT - V :Solution of Ordinary differential Equations (ODEs)-The 4th order Runge-kutta Method, ODE Solvers in MATLAB, Solving First –order equations using ODE23 and ODE45.
Structures and Graphical user interface using app Designer: Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes

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 AlexandreBayen,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 Test : 30
2. No. of Assignments : 3   Max. Marks for each Assignment : 5
3. No. of Quizzes : 3   Max. Marks for each Quiz Test : 5

Duration of Internal Tests: 90 Minutes

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
PRINCIPLES OF COMMUNICATION ENGINEERING
(EEE, CSE & IT)

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U22OE420EC
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 will be able to 1. Analyze the power and transmission bandwidth of Amplitude and Frequency Modulated signals. 2. Familiarize the process of reproduction of base band signal. 3. Analyze various pulseanalog and pulse digital Modulation Techniques. 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, Ordinary Amplitude Modulation – Modulation index, Side bands, AM Power, Double Side Band Suppressed Carrier Modulation, Single Side Band Modulation, Vestigial Side Band Modulation, AM demodulation, Applications of AM.

UNIT–II: Angle Modulation: Angle Modulation fundamentals, Frequency Modulation – Modulation index and sidebands, Narrowband FM, Wideband FM, Principles of Phase Modulation, Frequency Modulation verses Amplitude Modulation, FM demodulation, Frequency Division Multiplexing, Applications of FM.

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

Digital Communication Techniques: Quantization, Digital Transmission of Data, Parallel and Serial Transmission, Data Conversion, Time Division Multiplexing, Pulse Code Modulation, Delta Modulation.

UNIT–IV: Transmission of Binary Data in Communication Systems: Digital Codes, Principles of Digital Transmission, Transmission Efficiency, Modem Concepts and Methods – FSK, BPSK, Error Detection and Correction.

UNIT–V: Information Theory: Uncertainty, Information and entropy. Discrete memory less channels
Source Coding Techniques: Shannon-Fano coding, Huffman Coding

Learning Resources:

1. Louis E. Frenzel, Principles of Electronic Communication Systems, 3rd Edition. Tata Mcgraw Hill.
2. Wayne Tomasi, Electronic Communications Systems, 5th Edition, Pearson Education.

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

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

Duration of Internal Tests: 90 Minutes

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SOLAR POWER AND APPLICATIONS

SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U22OE410EE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
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. 4. Categorize and compare photovoltaic cells. 5. Apply the knowledge of solar energy.

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 OBJECT ORIENTED 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:U21OE410IT
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES On completion of the course, studentswill be able to
1. 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 and multi threading. 3. Demonstrate the usage of Java I/O streams to handle user input and output. 4. Design and develop GUI programs. 5. Develop Applets for web applications.

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 finallystatement, user-defined exceptions.

UNIT- III

Basic I/O Streams: Java I/O classes and interfaces, Files, Stream and Byte classes, Character Streams, Serialization.

Exploring java.lang: Object, Wrapper classes, String, StringBuffer, System

UNIT- IV

Introducing AWT working with Graphics: AWT Classes, Working withGraphics. Event Handling: The Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces.

Awt Controls: 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.

UNIT- V

Applet Programming: Introduction, how applets differ from applications, building applet code, applet life cycle, HTML-APPLET tag, passing parameters to applets.

Learning Resources:

1. Herbert Schildt, The Complete Reference Java, 7th Edition, TataMcGraw 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 withJava 5th edition, McGraw Hill Publishing, 2010.
4. Y. Daniel Liang , An Introduction to JAVA Programming, Tata McGrawHill, 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   : 3   Max. Marks for each Assignment : 5
3.   No. of Quizzes   : 3   Max. Marks for each Quiz Test   : 5

Duration of Internal Test: 90 minutes

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

DEPARTMENT OF INFORMATION TECHNOLOGY
INTRODUCTION TO SCRIPTING LANGUAGES
(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:U21OE420IT
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES On completion of the course, students will be able to
This course will enable the students to acquire basic skills for writing python scripts.	1. Write a python script to solve abasic problem using structured programming constructs 2. Write a python script to solve abasic problem using object oriented programmingconstructs 3. Create and use pythonmodules 4. Handle file related operations 5. Encode and decode strings

Unit – I
Introduction to Python, running a python script, writing comments, using variables, operators, strings and text, format specifiers , printing information. passing command line arguments, prompting users, parameters, unpacking variables.

Unit – II
Decision making : if and else if, repetition : while loops and for loops, lists, operations on list , tuples, operations on tuples, sets, operations on sets, dictionaries, operations on dictionaries.

Unit – III

Defining functions, passing arguments to functions , returning values from functions, Exception handling.

Unit – IV

Modules , Classes and Objects, is – a relationship : inheritance, has-a relationship : composition.

Unit – V

File handling, serialization using JSON and pickle, encoding and decoding.

Learning Resources
1. Allen B. Downey, Think Python, 2nd Edition, Green Tea Press
2. "Learning Python", 5th Edition, O'reilly
3. https://www.python.org
4. https://nptel.ac.in/courses/106106182/

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3.   No. of Quizzes   : 3   Max. Marks for each Quiz Test   : 5
Duration of Internal Test: 90 minutes

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

DEPARTMENT OF MECHANICAL ENGINEERING
DESIGN PRINCIPLES OF UAVS

SYLLABUS FOR B.E. IV-SEMESTER

| Instruction : 3Hours /week | SEE Marks : 60 | Course Code: 22OE410ME |
| Credits : 3 | CIE Marks : 40 | Duration of SEE: 3 Hours |

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 fundamentals of design and parameters, aerodynamic design, performance, weight estimation and stability of UAVs	1 Describe the design fundamentals of UAVs.
	2 Apply the fundamental parameters in the design of UAVs.
	3 Analyze the aerodynamic design of UAVs.
	4 Explore the design concepts for the performance of UAVs.
	5 Estimate the weight and stability of UAVs.

UNIT I: Design Fundamentals: Introduction, UAV Classifications, Design Criteria, Objectives, and Priorities, Feasibility Analysis, Design Groups, Design Disciplines, Design Process: UAV Life Cycle, Systems Engineering Approach, Conceptual Design, Preliminary Design, Detail Design, Design Review, Evaluation and Feedback.

UNIT II: Fundamental parameters: Various methods to measure flight velocity: using Pitot tube and Pitot static tube, with numerical problems, Variation of Pressure, density and temperature with altitude, Standard atmosphere with numerical problems. Anatomy of Airplane: Various control surfaces for an airplane: Airfoil Nomenclature: Design steps to construct an Airfoil.

UNIT III: Aerodynamic design: Lift and drag: Generation of Lift and drag: How lift is generated, Variation of lift with angle of attack, Sources of Drag. Aerodynamic center, Center of pressure, Various wing planforms, Mean aerodynamic cord. Lifting line theory, NACA airfoils, Drag generation and dear polar. Difference between Airfoil and Finite wing, Numerical problems on wing

planforms. Interpreting airfoil data, Lift curve slope of finite wing, Drag Polar, Numerical problems on selection of an airfoil.

UNIT IV: Design for performance: Thrust and power: Introduction to Airplane performance, Equation of motion in parallel and perpendicular direction of motion, Steady Level flight, Thrust required for steady level flight, thrust required curve, thrust available curve for reciprocating and Jet engine, Power Required and Power available curve. Numerical problems on calculation of performance parameters, Selection of power plant.Rate of climb and Climb angle, Climb performance, Engine sizing, Power Plant selection.

UNIT V: Weight estimation and stability: Weight estimation, Common propulsion systems, Electric Propulsion, Battery Sizing, Iterative weight estimation, Wing sizing, Wing Planform selection and sizing, Case study demonstration of Flight test, Effect of variation of CG location, Static Stability, Effects of C.G. location on static stability, Longitudinal Static stability, Contribution of tail in static stability, Neutral point.

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:	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

SYLLABUS FOR B.E. IV-SEMESTER

Instruction : 3Hours /week	SEE Marks : 60	Course Code : U22OE420ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The objective of the course is to	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 lagrangian and Newton-Euler mechanics 4 Develop motion and force control strategies for robotic systems using feedback control techniques 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.

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

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Duration of Internal Test: 90 Minutes

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

DEPARTMENT OF MECHANICAL ENGINEERING
OPTIMIZATION METHODS

SYLLABUS FOR B.E. IV-SEMESTER

Instruction : 3Hours /week	SEE Marks : 60	Course Code : U22OE430ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The objectives of this course are to: understand Linear & non-linear programming, transportation modeling , CPM & PERT for project scheduling and control, and application of various optimization techniques for respective field engineering (Inter disciplinary)	On completion of the course, the student will be able to: 1. Optimization of resources in multi disciplinary areas through linear programming under different conditions. 2. Understand revised simplex methods per customer requirements to suit for various Organizations. 3. Minimization of total cost to apply for transportation techniques for the transhipment of Goods and products and Implement techniques like project management 4. Optimization of resources in multi disciplinary areas through non-linear programming under different conditions.

UNIT-I: Optimization-An overview: Meaning of Optimization-Origin of Optimization-Introduction to Linear programming problems (LPP) -Formulation of LPP- Graphical method, simplex method.

UNIT-II: Advanced topics in Linear programming: Special cases in simplex method, Duality in LPP, Differences between primal and dual, shadow prices, Dual simplex method, Revised simplex method.

UNIT-III: Transportation Model: Introduction to Transportation model-Formulation and solution of transportation models- Methods for calculating Initial basic feasible solution-Optimization of transportation model using MODI method.

Project Scheduling: Introduction to network analysis, Rules to draw network diagram, Fulkerson rule for numbering events, Critical path method.

UNIT-IV: Introduction to PERT: Non linear programming problems Optimization methods for single variable, multivariable functions, Maxima-Minima

One Dimensional Minimization: Uni-modal Function, Unrestricted search, Exhaustive search, Dichtomous search, Interval Halving method, Fibonacci and golden bisection Method , Newton and Quasi Newton method.

UNIT-V: Non Linear - Unconstrained optimization: classification, Univariate search, pattern Directions, Hook Jeeves, Powel method, steepest decent method.

Learning Resources:
1. Singiresu S. Rao, "Engineering optimization- Theory and Practice",
   4thEdition, John Wiley and Sons, 2009.
2. NVS Raju, "Optimization Methods for Engineers ", PHI Learning Pvt. Ltd.,
   2014.
3. Prem Kumar Gupta and Dr. DS Hira, "Operations Research ", S.Chand&
   Company Pvt. Ltd., 2014.
4. R. Paneerselvam, "Operations Research", PHI Learning Pvt Ltd., 2009.
5. Kalyanmoy Deb, Optimization for Engineering Design- algorithms and
   examples, PHI Pvt. Ltd, 1st edition 2003, Delhi.

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)
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:U22OE430EH
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.	1. Analyse and compare techniques for comparing alternate solutions
2. Comprehend the various techniques of critical thinking	2. Demonstrate the difference between deductive and inductive reasoning and construct logically sound arguments
3. Evaluate data and draw insights from it to make the right decisions	3. Check for accuracy of data and use it as a tool for problem solving
4. Understand where to look for bias and assumptions in problem	4. Evaluate, identify and distinguish between relevant and irrelevant information to formulate a thesis or hypothesis.
5. Understand structure, standards and ethics of critical writing	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:-   ASSESSMENT:-
CaseStudies   Onlineassignments
Demonstration   Individual and   Group
Presentations
Expertlectures
WritingandAudio-visuallessons
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-22)
BE (CIVIL ENGINEERING) IV-SEMESTER (BRIDGE COURSE)
ACADEMIC YEAR 2023 - 2024
(Students Admitted in 2022-23)

Course Code	Name of the Course	Scheme of Instruction Hours per Week			Scheme of Examination			Credits
		L	T	P/D	Duration in Hrs	SEE	CIE	
THEORY								
UB22HS410EH	English Language and Communication Skills	2	-	-	3	50	-	-
UB22BS400MA	Matrix Theory and Vector Calculus	2	-	-	3	50	-	-
UB22HS411EH	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:UB22HS410EH
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.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF MATHEMATICS

MATRIX THEORY & VECTOR CALCULUS
BRIDGE COURSE B.E. IV-SEMESTER (CBCS)
(For CIVIL & MECH)

SYLLABUS FOR B.E. IV-SEMESTER

L: T: P (Hrs/Week) : 2	SEE Marks: 50	UB22BS400MA
Credits: -	CIE Marks: - - -	Duration of SEE:2

UNIT-I: DIFFERENTIATION & INTEGRATION
Differentiation of standard functions(Formulae) - Partial Derivatives – Derivative of Composite functions and Implicit functions - Chain Rule - Total DerivativeIntegration - Elementary Integration – Integration of standard functions- Methods of Integration-Integration by substitution- Integration by parts.

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 - Conservative vector field.

UNIT – III : VECTOR INTEGRATION
Line, Surface and Volume integrals- Green's Theorem – Gauss Divergence theorem - Stokes's Theorem. (all theorems without proof).

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. B.S. Grewal, Higher Engineering Mathematics

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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: UB22HS411EH |
| 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.