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

SYLLABI UNDER CBCS FOR
B.E III & IV SEMESTERS OF MECHANICAL ENGINEERING
(R-25)
WITH EFFECT FROM 2026-27
(For the students admitted in 2025-26)

DEPARTMENT OF MECHANICAL ENGINEERING

+91-40-23146060, 23146061
Fax: +91-40-23146090
Website: www.vce.ac.in

VISION OF THE INSTITUTE

Striving for a symbiosis of technological excellence and human values.

MISSION OF THE INSTITUTE

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

VISION OF THE DEPARTMENT

To establish global leadership in the field of mechanical engineering and develop competent human resources with values and ethics

MISSION OF THE DEPARTMENT

To nurture an environment of research, innovation and knowledge through the latest teaching-learning practices in mechanical engineering

PROGRAM OUTCOMES (POs)	
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	Analyse and evaluate societal and environmental aspects while solving complex engineering problems, considering their impact on sustainability with reference to economy, health, safety, legal frameworks, culture, and the environment.
7	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
8	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
9	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.
10	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.
11	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 EDUCATIONAL OBJECTIVES (PEOs)

The mechanical engineering graduates will

PEO1 possess the required foundation and knowledge in the field of mechanical engineering.

PEO2 advance professionally as a result of their ability to solve technical problems and work in multidisciplinary teams leading to significant contribution to the industry

PEO3 acquire life long learning through training programs and higher qualifications.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1 Apply principles of basic sciences and engineering to mechanical systems

PSO2 Model, analyze, design, and realize mechanical components and processes

PSO3 Be prepared to work professionally and ethically in thermal, design and manufacturing areas of mechanical engineering

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

SCHEME OF INSTRUCTION AND EXAMINATION (R-25)

B.E. – MECH : THIRD SEMESTER (2026-2027)

B.E (MECH) III Semester								
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								
U25BS310MA	Transform Techniques & Partial Differential Equations	3	-	-	3	60	40	3
U25PC310ME	Mechanics of Materials	3	-	-	3	60	40	3
U25PC320ME	Applied Thermodynamics	3	1	-	3	60	40	4
U25ES310ME	Programming for Engineers	3	-	-	3	60	40	3
U25OE3XXXX	Open Elective-I	2	-	-	3	60	40	2
U25HS030EH	Human Values and Professional Ethics-II	1	-	-	2	40	30	1
U25HS320EH	Skill Development Course I - Communication Skills in English I	1	-	-	2	40	30	1
U25BS330MA	Skill Development Course II - Aptitude-I	1	-	-	2	40	30	1
U25HS310EH	Critical Thinking	1	-	-	2	40	30	1
PRACTICALS								
U25PC311ME	Mechanics of Materials Lab	-	-	2	3	50	30	1
U25PC321ME	Applied Thermodynamics Lab	-	-	2	3	50	30	1
U25ES311ME	Programming for Engineers Lab	-	-	2	3	50	30	1
TOTAL		**18**	**1**	**6**		**610**	**410**	**22**
GRAND TOTAL		**25**				**1020**		**22**

1) Students are required to complete one NPTEL certification course of 8 weeks or 12 weeks duration (equivalent to 2 credits) by the end of the VI semester as part of their academic curriculum. However, students who wish to pursue a B.E. Honours or B.E. Minors program must complete one 8-week or 12-week NPTEL certification course related to Mechanical Engineering or its allied fields by the end of the IV semester.
2) Left over hours allotted to Sports / Library / PDC / Mentor Interaction / CC / RC / TC / CCA / ECA.

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	SEE Marks:60	Course Code: U25BS310MA
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 and properties of the Laplace transforms. 2. Understand the definition and properties of the inverse Laplace transforms and its applications to Initial Value Problems. 3. Study the concept of Fourier series and its applications. 4. Learn the formation Partial Differential Equations and solution of linear and non-linear first order partial differential equations. 5. Study the applications of Partial Differential equations.	1. Evaluate Laplace transform of functions and apply Laplace transforms to evaluate integrals. 2. Find Inverse Laplace transforms of functions and apply the Laplace transform to solve linear differential equations. 3. Compute Fourier coefficients and find Fourier series of a function. 4. Formulate the Partial differential equations and solve the linear and non-linear first order Partial differential equations. 5. Solve the one-dimensional wave equation, one-dimensional heat equation.

UNIT-I
Laplace Transforms:
Introduction to Laplace transforms - 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.

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 - Division by s –Convolution Theorem

(without proof)- Applications- Solving Linear Ordinary Differential Equations with constant coefficients upto 2nd order.

UNIT –III

Fourier series:

Introduction to Fourier series – Conditions for existence of Fourier expansion – Functions having points of discontinuity – Change of Interval - Fourier series expansions of even and odd functions-Half-Range Sine and Cosine series.

UNIT –IV (08 Hours)

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 (07 Hours)

Applications of Partial Differential Equations:

Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation (Homogeneous condition).

Text Books:

1 Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2 Higher Engineering Mathematics, Dr.B.S.Grewal 40th Edition, Khanna Publishers.

Reference Books:

1 Advanced Engineering Mathematics, Kreyszig E, 8th Edition, John Wiley & Sons Ltd, 2006.
2 A text book of Engineering Mathematics by N.P. Bali & Manish Goyal, Laxmi Publication.

Online Resources:

1. https://onlinecourses.nptel.ac.in/noc24_ma17/preview
2. https://onlinecourses.nptel.ac.in/noc24_ma37/preview

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

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

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering

MECHANICS OF MATERIALS
SYLLABUS FOR B.E III – SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: U25PC310ME
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
In this course, the students will	Upon the completion of this course students will be able to
1. Learn the analysis of members subjected to axial and transverse loads. 2. Assess the behavior of columns subjected to axial loads and compute stresses in beams due to bending. 3. Analyse the stresses developed in shafts, springs due to torsion and internal pressure in cylinders.	1. Analyse members subjected to axial loads including thermal effects using basic concepts of Mechanics of materials. 2. Draw shear force and bending moment diagrams in statically determinate beams. 3. Compute stresses and strains in bending, shear and principal stresses. 4. Determine the deflection of statically determinate beams subjected to UDL and point loads using double integration method and apply Euler's theory for long columns. 5. Compute stresses in circular shafts for torsion, springs subjected to axial load and stresses induced in cylinders.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	2		2						3	3	3	2
CO2	3	3	2	2	2						2	3	2	2
CO3	3	2	2	2	2						2	3	3	2
CO4	3	3	2		2						3	3	2	2
CO5	3	2	2	2	2						2	3	2	2

UNIT-I: **Stresses and Strains:** Definitions, types of stresses and strains. Elasticity and plasticity. Hooke's law. stress-strain diagrams for engineering materials. Modulus of elasticity. Poisson's ratio. Relationship between elastic constants. Linear and volumetric strains in rectangular bar, cylinder and sphere.

UNIT-II: Shear Force and Bending Moment: Bending moment and shear force diagrams for cantilever, simply supported beams and beams with overhangs carrying point and uniformly distributed loads. Relationship between intensity of loading, shear force and bending moment.

UNIT-III: Stresses in Beams: Simple theory of bending. Moment of resistance. Modulus of section. Distribution of shear stresses in rectangular and circular sections. Principal stresses and strains. Mohr's circle of stress.

UNIT-IV: Deflections: Slope and deflections by the method of double integration in cantilever, simply supported beams and beams with over hangs subjected to point loads and uniformly distributed loads.
Columns: Euler's theory of long columns with axial load.

Application of linear regression in deflection of beams;

UNIT-V: Torsion: Derivation of torsion formula for circular sections. Torsional stresses, angle of twist, power transmission.
Cylinders: Stresses in thin cylinders with internal pressure. Hoop and longitudinal stresses.

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, 2011.
3. Bansal R.K., A text book of Strength of Materials, Laxmi Publications, 2010.
4. Rajput R.K., Strength of Materials, S.Chand Publications, 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

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 Mechanical Engineering

APPLIED THERMODYNAMICS
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week): 3:1:0	SEE Marks: 60	Course Code: U25PC320ME
Credits : 4	CIE Marks: 40	Duration of SEE: 3 Hours

Course Objectives	Course Outcomes
The prime objective of the course is to get acquaintance with the applications in air compressors, internal combustion engines and components of steam power plants.	On completion of the course, the student will be able to 1. analyze the performance of reciprocating air compressors. 2. describe the working of IC engines and evaluate the performance parameters. 3. explain the various stages of combustion phenomena in IC engines. 4. analyze the performance of vapour power cycles and steam boilers. 5. explain the working principles of nozzles and condensers.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	2	2	1	1	1						1	3	2	2
CO2	3	2	2	2	1						1	3	2	2
CO3	2	2	1	1	1						1	3	2	2
CO4	3	3	2	2	1						1	3	2	2
CO5	3	2	3	2	1						1	3	2	2

Unit-I: Reciprocating Air Compressors
Applications of compressed air; classification of compressors–single and multi-stage compressors, work of compression with and without clearance volume, Volumetric Efficiency, Isothermal Efficiency and Mechanical Efficiency, Inter cooling and After cooling.

Unit-II: Internal Combustion Engines
Classification of IC engines, working principles of 2-stroke, 4-stroke, SI and CI engines; valve- and port-timing diagrams; Performance of IC engines: indicated power, brake power, frictional power, mechanical efficiency, brake thermal efficiency, indicated thermal efficiency, relative efficiency, volumetric efficiency, specific fuel consumption (SFC), Morse test, heat balance sheet.

Unit-III: Combustion in IC Engines
Normal and abnormal combustion phenomena in SI engines and CI engines; effect of engine variables on stages of combustion and knocking; Fuel requirements and fuel rating; anti-knock additives:

Unit-IV: Steam Power Plant and Steam Boilers
Working of Carnot and Rankine cycles; cycle efficiency improvement methods: concepts of reheating and regeneration;
Classification of boilers - Cochran boiler; Babcock and Wilcox boiler; Benson boiler; boiler mountings and accessories; boiler performance.

Unit-V: Steam Nozzles and Condensers
Steam nozzles: Types of nozzles; nozzle efficiency; steam velocity; mass of steam discharged; condition for maximum discharge; critical pressure ratio; throat and exit diameters for maximum discharge.
Types of condensers: jet and surface condensers; atmospheric cooling tower.

Role of AI in Applied Thermodynamics – case study.

Learning Resources:
1. Ballaney P.L, "Thermal Engineering", 25th edition, Khanna Publishers, New Delhi, 2010.
2. Ganesan V, "Internal Combustion Engines", 4th edition, Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 2010.
3. Rajput R.K, "Thermal Engineering", 10th edition, Laxmi Publishers, New Delhi, 2016.
4. Mathur & R.P. Sharma, Internal Combustion Engines, Dhanpat Rai & Sons, 2013.
5. Nag P.K, "Basic and Applied Thermodynamics", 2nd Edition, Tata McGraw Hill, 2017.

Data book: S.C. Jain, "Steam Tables", 15th Edition, Birla publications Pvt. Ltd., New Delhi 2006.

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

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

Duration of Internal Test: 90 Minutes

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

PROGRAMMING FOR ENGINEERS
SYLLABUSFORB.E.III-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks: 60	Course Code:U25ES310ME
Credits:3	CIE Marks: 40	Duration of SEE:3 Hours

COURSEOBJECTIVES In this course, the students will	**COURSEOUTCOMES** On completion of the course, students will be able to
1. acquire problem solving skills. 2 develop flow charts. 3 understand structured programmingconcepts. 4 write programs in C Language.	1 design flow charts and algorithms for solving a given problem using the fundamentals of programming. 2 apply decision making, looping constructs and functions to develop programs for a given problem. 3 stored at a using arrays and perform searching and sorting operations on the data. 4 design programs on pointers and strings. 5 develop programs to store data and perform operations using structures and files.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	2	2		1							2	2	1	1
CO2	2	2		1							2	2	2	1
CO3	2	2	2	2	2						2	2	1	1
CO4	2	2	2	2	2						2	2	2	1
CO5	2	2	1	2	1						2	2	1	1

UNIT-I:
Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Flowcharts. Number Systems (Binary, Octal, Decimal and Hexadecimal)
Introduction to C Language: Background, C Programs, Identifiers, Data types, Variables, Constants, Input/Output, Expressions, Precedence and Associativity, 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, 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), Cengage Learning.
2. Brian W. Kernighan and Dennis M. Ritchie, the C ProgrammingLanguage, 2nd Edition (2006), Prentice-Hall.
3. Rajaraman V, The Fundamentals of Computer, 4th Edition(2006), Prentice-Hallof India
4. Steve Oualline, Practical C Programming, 3rdEdition (2006), O'Reilly Press.
5. Jeri R. Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, 5th Edition (2007), Pearson Education.
6. Balagurusamy E, Programming in ANSIC, 4th Edition (2008), TMG.
7. Gottfried, Programming with C, 3rdEdition (2010),TMH.
8. RG Dromey, How to Solve it by Computer, 1st Edition (2006), 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

B.E- III SEM OPEN ELECTIVE-I COURSES			
Dept.	**Title**	**Code**	**Credits**
MECH	Introduction to Industrial Robotics (Stream: Robotics)	U25OE310ME	2
	Fundamentals of Unmanned Aerial Vehicles (General Pool)	U25OE320ME	2
CIVIL	Green Buildings	U25OE310CE	2
CSE	Programming Essentials in Python (Stream - Artificial Intelligence & Machine Learning)	U25OE320CS	2
	Introduction to Python Programming (General Pool)	U25OE310CS	2
ECE	Mathematical Programming for Engineers (General Pool)	U25OE310EC	2
	Sensors for Engineering Applications (General Pool)	U25OE320EC	2
IT	Computing using Python (Stream - Artificial Intelligence & Machine Learning)	U25OE320IT	2
	Fundamentals of Python Programming (General Pool)	U25OE310IT	2
Chemistry	Corrosion Science and Technology (General Pool)	U25OE310CH	2
HSS	Financial Services (Stream: Banking Financial, Securities and Investments)	U25OE350EH	2
	Human Resource Management for Engineers (Stream: Management Courses for Engineers)	U25OE310EH	2
	Political Science (General Pool)	U25OE370EH	2
	Constitution of India (General Pool)	U25OE360EH	2

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering
INTRODUCTION TO INDUSTRIAL ROBOTICS
(Stream: Robotics)
(Open Elective-I)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U25OE310ME
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

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

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2			1	2					2	3	1	2
CO2	3	2			1	2					2	3	1	2
CO3	3	2			1	2					2	3	1	2
CO4	3	2			1	2					2	3	1	2

UNIT-I
ROBOT BASICS
Robot-Basic concepts, Need, Law, History, Anatomy, specifications.
Robot configurations-cartesian, cylindrical, polar, articulated and SCARA. Parallel robots
ROBOT APPLICATIONS
Application in industry – material handling, loading & unloading, processing, welding & painting, assembly and inspection

UNIT-II
ROBOT ELEMENTS
End effectors-Classification, Types of Mechanical actuation, Gripper design, Robot joints types, Robot drive system types: Electrical, pneumatic and hydraulic.

UNIT-III
ROBOT COORDINATE SYSTEMS
Coordinate frames, Rotation matrix, Euler angles, Roll pitch and yaw angle representation, Composite rotations, Homogeneous Transformation matrix.

UNIT-IV
ROBOT SENSORS
Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors
Robot programming
On line programming, teach pendant control, Lead through, Walk through, off line programming, Task programming.

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

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering
FUNDAMENTALS OF UNMANNED AERIAL VEHICLES
(**General Pool**)
(Open Elective-I)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U25OE320ME
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES**
	On completion of the course, students will be able to
The objective of this Course is to understand the features, basics of flight, manufacturing and analysis of UAV and Artificial Intelligence in UAV systems.	1 classify various types of UAVs, describe their characteristics, and analyze their applications. 2 illustrate, explain and interpret the fundamental concepts of aerodynamics relevant to flight vehicles. 3 fabricate, and analyse UAV components using appropriate tools and techniques. 4 identify, explain, and evaluate the role of Artificial Intelligence in UAV systems for autonomous operations.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2				3	3				3	3	2	3
CO2	3	3				3	2				3	3	2	3
CO3	3	2				3	2				3	3	2	3
CO4	3	2				3	2				3	3	2	3

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:
Manufacturing and Analysis of UAV
Drone Manufacturing, Additive Manufacturing, Health Evaluation and Failsafe, 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;

Unit-IV:
Artificial Intelligence in UAV Systems
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.

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 Civil Engineering

GREEN BUILDINGS

(General Pool : Open Elective-I)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week): 2:0:0	SEE Marks:60	Course Code: U25OE310CE
Credits : 02	CIE Marks:40	Duration of SEE: 03 Hours

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

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

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

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

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

Learning Resources:

1. Kumara Swamy N.Kameswara Rao A., Building Planning and Drawing, Charotar, Publications, 9th Edition 2023.
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, 2nd Edition, 2013.
4. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison "Green Building Handbook" Volume I, Spon Press, 2001.
5. Mili Majumdar, "Energy-efficient buildings in India" Tata Energy Research Institute, 2002.
6. TERI "Sustainable Building Design Manual- Volume I & II" Tata Energy Research Institute, 2009.

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

1	No. of Internal Tests:	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 COMPUTER SCIENCE ENGINEERING

PROGRAMMING ESSENTIALS IN PYTHON
(Stream - Artificial Intelligence & Machine Learning)
Open Elective-I
SYLLABUS FOR B.E. III SEMESTER

L: T: P (Hrs/Week): 2:0:0	SEE Marks: 60	Course Code: U25OE320CS
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

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

CO-PO and CO-PSO mapping														
CO	**PO**											**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	1		1	1								1		2
CO2	1	1	1	1	2							1		2
CO3	1	1	1	1	2							2		2
CO4	1	1	1	1	2							2		2

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

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

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

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

Learning Resources:

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

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

1	No. of Internal Tests:	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 COMPUTER SCIENCE ENGINEERING

INTRODUCTION TO PYTHON PROGRAMMING

(General Pool : Open Elective-I)
SYLLABUS FOR B.E. III SEMESTER

L: T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:U25OE310CS
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES Objectives of this course are to:	**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. Design modular python programs using functions 3. Develop programs using strings and list 4. Develop programs using tuples and dictionaries.
2 Learn programming and solve problems using Python language	

CO-PO and CO-PSO mapping														
CO	**PO**											**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	1		1	1								1		2
CO2	1	1	1	1	2							1		2
CO3	1	1	1	1	2							2		2
CO4	1	1	1	1	2							2		2

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

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

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

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

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

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

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

Learning Resources:

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

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

1	No. of Internal Tests:	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 ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers

(General Pool: Open Elective I)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U25OE310EC
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To introduce the basic environment and interface of MATLAB, including its windows, file types, and built-in help system. 2. To develop proficiency in MATLAB basics such as variables, arrays, vectors, matrices, and script/function file creation and execution. 3. To build programming skills using MATLAB, including understanding data types, control structures, loops, and debugging techniques. 4. To enable students to generate 2D and 3D plots and visualizations, using MATLAB's wide range of graphic functions and solving mathematical and engineering problems such as numerical integration, linear algebra, interpolation, and root finding.	On completion of the course, students will be able to 1. Demonstrate familiarity with the MATLAB environment, file handling, and basic operations including help utilities. 2. Create and manipulate matrices, vectors, and arrays using built-in functions and scripts in MATLAB. 3. Write and debug MATLAB programs using control structures, loops, and logical operations. 4. Generate and customize 2D and 3D plots for data visualization and analysis and solve mathematical problems using MATLAB, including linear and nonlinear equations, interpolation, differentiation, and numerical integration.

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	-	-	3	-	-	-	-	-	-	-	2	3
CO2	-	2	-	-	3	-	-	-	-	-	-	-	2	3
CO3	1	1	2	2	3	-	-	-	-	-	-	-	2	3
CO4	1	2	-	-	3	-	-	-	-	-	-	-	2	3

UNIT - I : Introduction:
Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on-line help, file types.
MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file.
Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break

and continue commands.

UNIT - II : Scripts and Functions

Script Files, Function Files, Debugging methods in MATLAB.

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

UNIT - III : Numerical Methods Using MATLAB

Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, MATLAB functions for integration.

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

UNIT - IV : Nonlinear Equations

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

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

Learning Resources:

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

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

1. No. of Internal Tests	:	2	Max. Marks for each Internal 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 ELECTRONICS AND COMMUNICATION ENGINEERING

Sensors for Engineering Applications

(General Pool: Open Elective - I)

SYLLABUS FOR B.E. III - SEMESTER (Civil, CSE, CSE (AI&ML) EEE, IT & Mech.)

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U25OE320EC
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.

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	1		1							1	1	
CO2	3	2	1		2							2	2	
CO3	2	2	2		2							2	2	
CO4	2	2	2		2							2	2	

UNIT - I

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

UNIT – II

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

UNIT – III

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

UNIT – IV

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

Lab Experiments:

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

Learning Resources :

1. Doebelin, "Measurement Systems: Application and Design", McGraw Hill Kogakusha Ltd.
2. Julian W. Gardner, Vijay K. Varadan, Osama O. Awadelkarim "Microsensors, MEMS and Smart Devices", New York: Wiley, 2001.
3. Henry Bolte, "Sensors – A Comprehensive Sensors", John Wiley.
4. Jocob Fraden," Handbook of Modern Sensors, Physics, Designs, and Applications", Springer.
5. Manabendra Bhuyan," 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 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

COMPUTING USING PYTHON

(Stream: Artificial Intelligence and Machine Learning)
(Open Elective-I)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U25OE320IT
Credits : 2	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:
Acquire problem solving skills for writing python scripts	1. Understand the fundamentals of python and implement control structures. 2. Understand string, lists and tuples and perform the key operations on these data containers. 3. Implement dictionaries and set operations in python. 4. Implement OOP concepts in python.

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

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

UNIT – III:

Set: Introduction, Set operations.

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

UNIT – IV:

OOPS Concepts: Introduction, classes and object, class method and self-argument, the __init__()method, class variables and object variables, public and private data members, Inheritance, Operator Overloading.

Files: Reading and writing files, serialization using JSON and pickle

Learning Resources:

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

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

1	No. of Internal Tests	: 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 OFINFORMATION TECHNOLOGY

Fundamentals of Python Programming

(General Pool: Open Elective-I)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U25OE310IT
Credits : 2	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:
Acquire problem solving skills for writing python scripts	1. Understand the fundamentals of python and implement control structures. 2. Understand basic knowledge on strings, lists and tuples. 3. Implement programs using dictionaries, and sets. 4. Implement OOP concepts in python.

UNIT – I:
Basics of Python Programming: Features of Python, variables and identifiers, operators and expressions.
Decision control statements: Selection/Conditional branching statements, basic loop structures/iterative statements, nested loops, break, continue and pass statements.
Functions: Definition, function call, more on defining functions, recursive functions.

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

UNIT – III:
Set: Introduction, Set operations.
Dictionaries: Basic operations, sorting items, looping over dictionary, nested dictionaries, built-in dictionary functions.

UNIT – IV:

OOPS Concepts: Introduction, classes and object, class method and self-argument, the _init__()method, class variables and object variables, public and private data members, Inheritance, Operator Overloading.

Files: Reading and writing files.

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

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

CORROSION SCIENCE AND TECHNOLOGY

(Open Elective-I) (General Pool)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U25OE310CH
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

OBJECTIVES	OUTCOMES
The course will enable the students:	At the end of the course students should be able to:
1. To acquaint with the causes of corrosion and different types of corrosion. 2. To understand the factors influencing corrosion and Controlling Corrosion by Inhibitors and Organic Coatings. 3. To know different corrosion control coatings like electroplating and electrolessplating. 4. To familiarize with various preventive methods of corrosion such as cathodic protection and surface conversion.	1. Explain different types of corrosion with suitable examples. 2. Discuss different factors that affect corrosion and protection by organic coatings and inhibitors. 3. Select a suitable metallic coating for corrosion control 4. Discuss the principles and application of cathodic protection and surface conversion coatings for corrosion control.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
1	2	1	-	-	-	1	-	-	-	-	1
2	2	1	-	-	-	1	-	-	-	-	1
3	2	1	-	-	-	1	-	-	-	-	1
4	2	1	-	-	-	1	-	-	-	-	2

UNIT-I:
CHEMICAL AND ELECTROCHEMICAL CORROSION

Introduction - gravity, cause**,** Chemical and Electrochemical corrosion - Mechanism, Pilling – Bed worth rule, effect of nature of oxide layer on rate of chemical corrosion, electrochemical series and galvanic series. Formation of anodic and cathodic areas, Galvanic corrosion, Differential aeration corrosion -pitting, water line corrosion & crevice corrosion, stress corrosion, corrosion fatigue.

UNIT-II:
CORROSION CONTROL METHODS
INHIBITORS AND ORGANIC COATINGS
A. Factors influencing corrosion
Nature of metal: Relative position of metal in galvanic series, over voltage, relative areas of anode & cathode and nature of corrosion product.
Nature of environment: temperature, pH and humidity.
B. Corrosion Control by Inhibitors and Organic Coatings
Corrosion Inhibitors: Anodic, Cathodic and vapor phase inhibitors.
Organic Coatings: Paints – constituents and their functions, vitreous enamel coatings, varnishes and lacquers.

UNIT-III:
METALLIC COATINGS
Passivation of metals, polarization curve of passivating metals, effect of pH and potential-pH diagram for iron (Pourbaix Diagram) and polarization curve of iron, application of Pourbaix diagram for corrosion mitigation.
Metallic coatings: Types - anodic & cathodic. Surface pre-treatment of base metal.
Methods of application of metallic coatings: Hot dipping- galvanization - applications of galvanized RCC steel bars. Cladding, electro plating & electroless plating- principle and their differences.
Electroplating of Cu coating on Fe, Electroless plating of Ni coating on Insulators, Preparation of PCB using Electroless plating.

UNIT-IV:
CATHODIC PROTECTION AND SURFACE CONVERSION
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.

Text Books:
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&Co.Ltd., New Delhi (2006).
3. O.G. PALANNA, Engineering Chemistry, TMH Edition.
3. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning
4. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).

Learning Resources:

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

FINANCIAL SERVICES

(Stream: Banking, Financial, Securities and Investments)
(Open Elective-I)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U25OE350EH
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. To gain understanding of working of banking companies 2. To gain understanding of Risk in Banking and Insurance Companies 3. To understand the concepts and applications of Financial instruments 4. To gain understanding of Financial Markets infrastructure	At the end of the course the learners will be able to: - 1. Comprehend working of Banking and Insurance companies 2. Understand the Risks involved in Banking and Insurance Business 3. Comprehend the different financial assets available in the market 4. Comprehend the working of financial markets

Unit I: Banking: (8 hours)
Nature and Functions of commercial banks –Banking Assets and Liabilities - distribution channels in Wholesale and Retail banking –KYC and its importance in Banking – Role of Banks in Anti Money Laundering – Automated processing of payments – NEFT, RTGS, IMPS, SWIFT- Risks in Banking – Credit Risk, Interest Rate Risk, Liquidity risk and Frauds.

Unit II: Insurance (6 hours)
Concept- Principles – Functions of Insurance - Life Insurance – Products - Health and General Insurance - Products and Services - Eco system of Insurance– Insurance companies- Advisors- underwriters – TPAs - Actuaries - Reinsurance – Overview of IRDA

Unit III: Finance (8 hours)
Nature and concept of Equities – Common Shares – Preference equity - Primary Market and Secondary Market – Nature and Functions- Bonds – characteristics – Valuation – Hybrid Financial instruments.

Unit IV: Securities (5 hours)
Derivatives – Meaning - Uses – Types of Derivatives – Forwards – Futures- Options – Recent Trends in Derivative Trading, Financial Market Infrastructure Institutions – Nature and Functions of Stock Exchanges , Depositories and Clearing Houses – Role and Functions of Regulators in Financial Markets – RBI – SEBI – IRDAI.

Learning Resources for students:
M Y Khan, Financial Services, 10th Edition, Tata Mcgraw Hill

References:
www.sebi.gov.in
www.rbi.org.in

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Human Resource Management for Engineers
(Stream: Management Courses for Engineers)
(Open Elective-I)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U25OE310EH
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to: 1. Understand the scope, evolution, and strategic importance of Human Resource Management. 2. Develop knowledge of human resource planning, job analysis techniques, recruitment and selection. 3. Explore training, development, and career growth practices in organizations. 4. Gain insights into performance management, compensation practices, and contemporary HR issues.	At the end of the course the learners will be able to: - 1. Explain the scope, evolution, and strategic importance of HRM in organizational effectiveness. 2. Apply HR planning, job analysis, recruitment, and selection methods in organizational contexts. 3. Design and evaluate training, development, and career planning initiatives to enhance employee growth. 4. Implement and assess performance appraisal and compensation practices while addressing contemporary HR issues.

Unit 1 – Introduction Human Resources Management
Introduction – Nature and Objectives of HRM – Scope of HRM – Evolution of HRM- Importance of HRM - Environment of HRM -External and Internal forces acting – Strategic HRM

Unit 2 – Human Resources Planning
Human Resource Planning - Nature and Importance of Human Resource Planning - Factors Affecting HR Planning - Requisites for Successful HR Planning - Nature of Job Analysis - Process of Job Analysis- Methods of Collecting Data for Job Analysis - Recruitment - Sources of Recruitment - Selection Process - Induction and Onboarding.

Unit 3 - Training and Development

Nature and Importance of Training and Development- Inputs in Training and Development - Training Needs Assessment - Training Process - Impediments to Effective Training - Career Development.

Unit 4 – Performance Management and Contemporary Issues in HRM

Performance Management - Performance Appraisal Process - Methods and Challenges of Performance Appraisal - Compensation and Reward Management - Performance-Based Incentives - Ethical Issues in HRM - Employee Privacy Issues and Surveillance - Workplace Harassment - Employer Branding - Green HRM - Managing Global Workforce.

Learning resources:-

1. Human Resource Management – Gary Dessler.
2. Human Resources Management, V Edition, K Ashwatappa, McGraw Hill Publication
3. P. Subba Rao, Human Resource Management, Himalaya Publishing House.

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

POLITICAL SCIENCE
(General Pool) (Open Elective-I)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U25OE370EH
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. introduce students to the foundations of Political Science. 2. understand Indian political ideas, institutions, and ideologies. 3. familiarize students with political thinkers and constitutional values. 4. develop analytical understanding of Indian politics and governance.	At the end of the course the learners will be able to: - 1. Explain core political concepts such as state, sovereignty, rights, justice, liberty, and duties. 2. Describe contributions of key Western and Eastern political thinkers. 3. Compare political ideas across civilizations. 4. Understand major currents in modern Indian political philosophy. 5. Demonstrate basic analytical skills in interpreting political ideas.

Unit –I: **Introduction to Political Science**
Meaning, scope, and relevance of Political Science

- **Key concepts**: state, sovereignty, power, authority, legitimacy
- **Forms of government**: monarchy, aristocracy, democracy

Unit –II: **Political Thought**

a) **Classical and Medieval political Theory:** Plato & Aristotle; St.Augustine & Thomas Aquinas; Machiavelli
b) **Modern Political Theory:** Hobbes; Locke; Rousseau; JS Mill &Karl Marx

Unit –III: **Political Ideologies**
Introduction: Role of ideas, Features of ideology, Left/Right divide

a) **Classical Ideologies**: Liberalism/Capitalism, Socialism/Communism, Nationalism, Gandhism, Fascism
b) **New ideologies**: Feminism, Ecologism, Religious Fundamentalism

Unit –IV: **Indian Political Thought**

a) **Classical Indian Political Thought**: Dharmashastra, Arthashastra, and Buddhist traditions
b) **Modern Indian Political Thought**: Sir Syed Ahmed Khan, Swami Vivekananda, Bal Gangadhar Tilak, Sri Aurabindo, Dr. B.R. Ambedkar and M.S. Gowalkar
c) **Comparative perspective:** Western and Eastern

Suggested Readings:

- Andrew Heywood, *Political Theory: An Introduction*
- O.P. Gauba, *Introduction to Political Theory*
- Brian R.Nelson, Western Political Thoughts
- Andrew Heywood, Political Ideologies, An introduction
- V.R. Mehta, *Foundations of Indian Political Thought*

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

CONSTITUTION OF INDIA
(General Pool) (Open Elective-I)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U25OE360EH
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. To acquaint the students with legacies of constitutional development in India and help them to understand the most diversified legal document of India and philosophy behind it. 2. To make students aware of the theoretical and functional aspects of the Indian Parliamentary System. 3. To channelize students' thinking towards basic understanding of the constitutional principles and statutory institutions.	At the end of the course the learners will be able to: - 1. Identify and explore the basic features and modalities about Indian constitution. 2. Understand the administrative structure of various branches of government. 3. Differentiate and relate the functioning of Indian parliamentary system at the center and state level. 4. Examine different aspects of Indian Legal System and its related bodies.

Unit –I: Constitution: Meaning & Constitutionalism, Historical perspective: 1909 Act, 1919 Act & 1935 Act, Salient features & nature of the Constitution.

Unit –II: Fundamental Rights: Introduction & its scheme, Right to Equality (Art.14), Right to Fundamental Freedoms (Art. 19), Right to Life (Art. 21), Directive Principles of State Policy: importance and implementation, Fundamental Duties and its legal status.

Unit –III: Government: Union & State – Executive & Legislature, composition, powers and functions, Local Self Governments – Panchayat Raj Institutions & Urban Local Bodies (Municipalities). Statutory Institutions: Elections-Election Commission of India, National Human Rights Commission, National Commission for Women.

Unit –IV : Federal structure & distribution of legislative and financial powers between the Union and the States.

Suggested Readings:

1. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, New Delhi.
2. Indian Constitution by Subhash C. Kashyap, National Book Trust,New Delhi.
3. Constitution of India and Professional Ethics, Dr. G. B. Reddy &Mohd. Suhaib, Dreamtech Press.
4. B.Z. Fadia & Kuldeep Fadia, Indian Government &Politics, Lexis Nexis, New Delhi.
5. Indian Polity by Laxmikanth 5th Edition, McGraw Hill

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

HUMAN VALUES AND PROFESSIONAL ETHICS-II

SYLLABUS FOR B E III Semester

L:T:P(Hrs/week):1:0:0	SEE Marks:40	Course Code: U25HS030EH
Credits :01	CIE Marks:30	Duration of SEE: 02Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to: 1. Create an awareness on the interrelation between Society, Ethics and Human Values 2. Understand how ethical dilemmas apply to real life scenarios 3. Develop ethical human conduct and professional competence 4. Understand the role of good ethical practices and apply it in a project	At the end of the course the learners will be able to: 1. Identify ethical risks in everyday life and in societies that can lead to unethical choices, such as structures that diffuse responsibility or a group that has collectively de-stigmatized unethical behaviour 2. Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, and the objective presentation of data. 3. Assess their own ethical values and the social context of problems and articulate what makes a particular course of action ethically defensible 4. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

UNIT1 - 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 Decision-Making Frameworks
1.2 Emerging Ethical Challenges
1.3 Building a Just Society

UNIT 2 - 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 The Importance of Ethical Conduct
2.2 Personal & Professional Accountability
2.3 Maintaining Public Confidence
2.4 Understanding Ethical Codes

UNIT 3 - PRIVACY

This unit covers "Cyber ethics" - the code of responsible behavior 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 Defining Privacy
3.2 Privacy in the Digital Age
3.3 The Ethics of Surveillance

UNIT 4- Engineering Ethics for Future Innovators

This unit equips students, the future innovators of tomorrow, with a foundation in engineering ethics. Students will explore the ethical responsibilities engineers hold regarding safety, public well-being, and sustainability. Real-world scenarios and case studies will be examined to understand how ethical considerations impact engineering decisions.
4.1 Safety and Public Welfare
4.2 Sustainability and Environmental Impact
4.3 The Ethics of New Technologies

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 • Project

Relevant Websites, CD's and Documentaries

- https://plato.stanford.edu/

Learning Resources:

1. Moral Machines: Ethical Robotics and Artificial Intelligence by Wendell Wallach
2. Thinking Like an Engineer: Studies in the Ethics of a Profession by Paul Dufour
3. Engineering Ethics: Contemporary and Enduring Debates by Deborah G. Johnson
4. Engineering Ethics: Concepts and Cases by Charles E. Harris, Michael S. Pritchard, Michael J. Rabins, Ray James, and Elaine Englehardt

Web resources:
learn.talentsprint.com

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

1	No. of Internal Tests:	01	Max. Marks for each Internal Test:	20
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

SKILL DEVELOPMENT COURSE I - COMMUNICATION SKILLS IN ENGLISH I

SYLLABUS FOR BE III Semester

L:T:P(Hrs/week): 2:0:0	SEE Marks: 40	Course Code: U25HS320EH
Credits : 1	CIE Marks: 30	Duration of SEE: 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. Get students proficient in both receptive and productive skills especially 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.	At the end of the course the learners will be able to: 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 and Summarise in Spoken and written formats

Unit 1: Delightful Descriptions

Participants learn to introduce themselves confidently, make detailed observations, express opinions, and describe past experiences effectively in various contexts.

1.1 Introductions on an Online Forum

1.2 Making Observations and Giving Opinion

1.3 Recalling and Describing

Unit 2: Formal Conversation Skills

Focuses on essential professional communication skills such as seeking and providing information, giving constructive feedback, and politely requesting permissions in formal settings.

2.1 Ask for Information

2.2 Give Information

2.3 Give Feedback

2.4 Seek Permission

Unit 3: Technical Expositions and Discussions

Develops skills to present and discuss technical content logically using structures like classification, sequencing, comparison, cause-effect relationships, and problem-solution formats.

Classification

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

Unit 4: Rational Recap

Enhances clarity in communication through accurate paraphrasing and summarizing, both in spoken and written forms, ensuring message retention and understanding.

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

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

Learning Resources:

They Say / I Say: The Moves That Matter in Academic Writing" – Gerald Graff & Cathy Birkenstein
HBR Guide to Persuasive Presentations" – Harvard Business Review
Technical Communication" – Mike Markel & Stuart Selber
The Only Academic Phrasebook You'll Ever Need" – Luiz Otávio Barros
learn.talentsprint.com

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	20
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

SKILL DEVELOPMENT COURSE II – APTITUDE I

SYLLABUS FOR BE III Semester

L:T:P(Hrs/week): 2:0:0	SEE Marks: 40	Course Code: U25BS330MA
Credits : 1	CIE Marks: 30	Duration of SEE: 3Hours

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

UNIT 1: QUANTITATIVE APTITUDE – NUMERICAL ABILITY

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

UNIT 2: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY FOUNDATION

2.1 Ratio proportions
2.2 Partnership
2.3 Ages
2.4 Allegations and mixtures
2.5 Averages

UNIT 3: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 1

3.1 Percentages
3.2 Profit and loss

UNIT 4: REASONING ABILITY- GENERAL REASONING PART 1

4.1 Blood Relations
4.2 Number Series
4.3 Coding and decoding

UNIT 5: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 2

5.1 Time and Work
5.2 Chain Rule
5.3 Pipes and Cisterns

Prescribed textbook for theory:

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

Suggested Reading

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

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	20
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

CRITICAL THINKING

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week): 1:0:0	SEE Marks: 40	Course Code: U25HS310EH
Credits : 1	CIE Marks: 30	Duration of SEE: 2 Hours

COURSE OBJECTIVES **The course will enable the learners to:**	**COURSE OUTCOMES** **At the end of the course the learners will be able to:**
1. Understand the basics of logic, reasoning, and identifying biases. 2. Learn to evaluate evidence and differentiate between facts and opinions. 3. Introduce frameworks like SWOT and root cause analysis for problem-solving. 4. Develop critical thinking skills through case studies and ethical debates.	1. Students will identify assumptions, biases, and logical fallacies in real-world scenarios. 2. Learn to evaluate evidence and differentiate between facts and opinions. 3. Students will apply structured methods to analyze problems and propose actionable solutions. 4. Students will demonstrate critical thinking through group discussions and case study analyses.

OVERVIEW:

In a world where automation and AI are rapidly transforming the workforce, critical thinking has become a vital human skill that sets professionals apart. This course empowers engineering students to think independently, evaluate information logically, and make well-reasoned decisions. Through engaging with real-world problems, ethical dilemmas, and structured problem-solving tools, students will develop the ability to question intelligently, respond thoughtfully, and contribute meaningfully in AI-assisted environments.

UNIT 1: Fundamentals of Critical Thinking

Introduces the foundations of logical thinking and the importance of recognizing faulty reasoning.

1.1 Logic and Reasoning

1.2 Identifying Assumptions

1.3 Bias and Fallacies

Learning Outcomes:

- Understand and apply the basics of logical thinking and structured reasoning
- Identify personal and systemic assumptions in real-world and technical contexts
- Detect common biases and fallacies in digital content and AI-generated outputs

UNIT 2: Analytical Thinking

Equips students to analyze information critically and draw conclusions based on solid evidence.

2.1 Evaluating Evidence
2.2 Drawing Logical Conclusions
2.3 Differentiating Facts from Opinions

Learning Outcomes:

- Evaluate the reliability and relevance of data from human and AI sources
- Draw logical conclusions from complex and sometimes incomplete datasets
- Differentiate between subjective opinions and objective, verifiable information

UNIT 3: Problem-Solving Frameworks

Builds practical decision-making skills using structured, human-driven analytical tools.

3.1 Root Cause Analysis (5 Whys)
3.2 Decision Trees
3.3 SWOT Analysis

Learning Outcomes:

- Break down problems systematically to identify core issues beyond surface symptoms
- Use structured tools to support decision-making in multidisciplinary and tech-enabled environments
- Integrate strategic thinking with ethical judgment when proposing solutions

UNIT 4: Applications of Critical Thinking

Applies critical thinking to real-life contexts through discussions, debates, and case studies.

4.1 Case Studies
4.2 Group Discussions on Ethical Dilemmas
4.3 Critical Thinking in Action: Debating Complex Engineering Issues

Learning Outcomes:

- Apply critical thinking to analyze real-world problems in engineering, business, and society
- Collaborate effectively and respectfully in group settings, including diverse viewpoints
- Demonstrate ethical reasoning and informed argumentation in AI-influenced scenarios

Suggested Reading:

- Martha Nussbaum Not for Profit: Why Democracy Needs the Humanities (2010).
- The Invisible Man : Ralph Ellison
- Thinking, Fast and Slow by Daniel Kahneman
- The McKinsey Mind: Understanding and Implementing the Problem-Solving Tools and Management Techniques of the World's Top Strategic Consulting Firm by Ethan M. Rasiel and Paul N. Friga

LEARNING RESOURCES

learn.talentsprint.com

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

1	No. of Internal Tests:	01	Max. Marks for each Internal Test:	20
2	No. of Assignments:	01	Max. Marks for each Assignment:	05
3	No. of Quizzes:	01	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

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

MECHANICS OF MATERIALS LAB
SYLLABUS FOR B.E. III SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks: 50	Course Code: U25PC311ME
Credits : 1	CIE Marks: 30	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
In this course, the students will	Upon the completion of this course students will be able to
1. determine the properties of materials under the action of various loads. 2. learn the ability to work in a team and make effective presentations.	1. determine Young's Modulus of materials of beams by conducting deflection test. 2. assess the quality of materials by conducing hardness test and impact test and also learn the operation of universal testing machine (UTM). 3. determining modulus of rigidity of materials by conducting torsion test and spring test. 4. Practice working as a team member and lead a team. 5. demonstrate professional venture in conducting the experiments and presenting the results effectively.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	2	2		3			3		3	3	2	3
CO2	2	2	2	3		2			3		3	3	3	2
CO3	3	2	2	2		2			3		2	3	2	2
CO4	3	2	2	2		3			3		3	3	2	2
CO5	2	3	2	2		3			3		3	3	3	2

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 helical 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.
13. Strain measurement using Split Hopkinson Pressure Bar.

From the above experiments, each student should perform at least 12 (Twelve) experiments.

No. of Internal Tests:	02	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 Mechanical Engineering

APPLIED THERMODYNAMICS LAB
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week): 0:0:2	SEE Marks: 50	Course Code: U25PC321ME
Credits : 1	CIE Marks: 30	Duration of SEE: 3 Hours

COURSE OBJECTIVES *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
perform experiments on various types of I.C Engines, Two-stage reciprocating air compressor and also to conduct experiments on Viscometer and flash and fire point apparatus.	1 determine the volumetric efficiency and isothermal efficiency of a two-stage reciprocating air compressor. 2 draw the port timing diagram of two stroke petrol engine and valve timing diagram of four stroke diesel engine. 3 evaluate the performance of internal combustion engines and to prepare a heat balance sheet. 4 determine absolute and kinematic viscosities of a given lubricating oil using Redwood Viscometer-I. 5 determine the flash and fire points of a given fuel using Cleveland's Apparatus.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	1						2		1	3	1	2
CO2	3	2	1						2		1	3	1	2
CO3	3	2	1						2		1	3	1	2
CO4	3	2	1						2		1	3	1	2
CO5	3	2	1						2		1	3	1	2

List of Experiments:

1. To determine volumetric efficiency, isothermal efficiency and mass flow rate of a two stage reciprocating air compressor.
2. To study the constructional details of four stroke petrol and diesel engines.

3. To draw port timing diagram of a two stroke Petrol engine.
4. To draw valve timing diagram of a four stroke Diesel engine.
5. To conduct performance test on single cylinder Diesel engine.
6. To conduct heat balance test on a single cylinder Diesel engine.
7. To conduct performance test on multi-cylinder Petrol engine.
8. To conduct performance test on twin-cylinder Diesel engine.
9. To study the performance of a Petrol engine under different compression ratios.
10. To conduct Morse test on multi cylinder Petrol engine.
11. To study Exhaust gas analysis of Diesel engine for carbon deposits using smoke meter.
12. To determine the viscosity of a given lubricating oil.
13. To determine the flash and fire points of diesel.

From the above experiments, each student should perform at least 12 (Twelve) experiments.

No. of Internal Tests:	02	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 MECHANICALENGINEERING

PROGRAMMING FOR ENGINEERS LAB
SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks: 50	Course Code: U25ES311ME
Credits: 1	CIE Marks: 30	Duration of SEE: 3 Hours

COURSEOBJECTIVES In this subject the students will	**COURSEOUTCOMES** On completion of the course, students will be able to
1. understand the fundamentals of programming in C Language 2. write, compile and debug programs in C. 3. formulate solution to problems and implementing C. 4. effectively choose programming components to solve computing problems.	1. Choose appropriate datatype for implementing programs using Clanguage. 2. Design and implement modular programs involving input output operations, decision making and looping constructs. 3. Implement search and sort operations on arrays. 4. apply the concept of pointers for implementing programs on dynamic memory management and string handling. 5. design and implement programs to stored at a instructuresand files.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	2	2	1	1	1						2	2	1	1
CO2	2	2	1	1	1						2	2	2	1
CO3	2	2	2	2	2						2	2	1	1
CO4	2	2	2	2	2						2	2	2	1
CO5	2	2	1	2	1						2	2	1	1

Programming Exercise:
1. Programs to illustrate operators
2. Programs to illustrate selection control statements
3. Programs to illustrate loop control statements

4. Programs to illustrate nested loop control statements.

5. Programs to illustrate functions and recursion
6. Programs to illustrate one dimensional arrays, searching and sorting.
7. Programs to illustrate two dimensional arrays
8. Programs on pointers
9. Functions for string manipulations.
10. Programs on structures and unions.
11. Finding the number of characters, words and lines of given text file.
12. File handling programs.

Learning Resources:

1. Forouzan B. A & Richard F. Gilberg, A Structured Programming Approach using C, 3rd Edition (2013), Cengage Learning.
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition (2006), Prentice-Hall.
3. Steve Oualline, Practical C programming, 3rd Edition (2006), O'Reilly Press.
4. Balagurusamy E, Programming in ANSI C, 4th Edition (2008),TMG.

No. of Internal Test:	02	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory classwork			18
DurationofInternalTest:2 hours			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-25)
B.E. – MECH : FOURTH SEMESTER (2026-2027)

B.E (MECH) IV Semester								
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								
U25BS410MA	Numerical Methods, Probability & Statistics	3	-	-	3	60	40	3
U25PC410ME	Machine Drawing	2	-	2	3	60	40	3
U25PC420ME	Fluid Mechanics and Hydraulic Machines	3	1	-	3	60	40	4
U25PC430ME	Kinematics of Machines	3	-	-	3	60	40	3
U25ES410ME	Programming through Data Structures	3	-	-	3	60	40	3
U25OE4XXXX	Open Elective II	3	-	-	3	60	40	3
U25BS430MA	Skill Development Course III– Aptitude II	1	-	-	2	40	30	1
U25PE430ME	Skill Development Course IV- Technical Skills I (CADD and Introduction to Solid Modelling)	1	-	-	2	40	30	1
PRACTICALS								
U25PC421ME	Fluid Mechanics and Hydraulic Machines Lab	-	-	2	3	50	30	1
U24ES411ME	Programming through Data Structures Lab	-	-	2	3	50	30	1
	TOTAL	**19**	**1**	**6**		**540**	**360**	**23**
	GRAND TOTAL	**26**				**900**		**23**

1) Students are required to complete one NPTEL certification course of 8 weeks or 12 weeks duration (equivalent to 2 credits) by the end of the VI semester as part of their academic curriculum. However, students who wish to pursue a B.E. Honours or B.E. Minors program must complete one 8-week or 12-week NPTEL certification course related to Mechanical Engineering or its allied fields by the end of the IV semester.
2) Left over hours allotted to Sports / Library / PDC / Mentor Interaction / CC / RC / TC / CCA / ECA.

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

NUMERICAL METHODS, PROBABILITY & STATISTICS
SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week): 3	SEE Marks:60	Course Code: U25BS410MA
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 concepts of interpolation and to learn various methods for interpolating data points and approximating functions. 2. Learn Numerical techniques for solving first-order ordinary differential equations. 3. Understand random variables and its probability distributions 4. Study the concept of hypothesis testing employed for small samples. 5. Understand the principles of curve fitting using the method of least squares and the concept of correlation.	1. Apply numerical methods to interpolate data points with equal and unequal intervals. 2. Use Numerical techniques to solve first-order ordinary differential equations. 3. Differentiate between discrete and continuous random variables and apply various probability distributions to solve practical problems 4. Formulate Null and Alternative Hypotheses and apply the tests of hypothesis for small samples. 5. Apply the method of least squares to fit various curves to the given data and Calculate Karl Pearson's coefficient of correlation.

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

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

UNIT-III

Probability Distributions:

Random Variables - Discrete and Continuous Random Variables – Mass and density functions – Cumulative distribution functions - Definitions of Mean, Median, Mode and Variance of Probability distributions – Continuous Distributions - Normal Distribution – Properties.

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.

UNIT-V

Curve Fitting & Correlation:

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

Text Books:

1 Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2 Higher Engineering Mathematics, Dr.B.S. S Grewal 40th Edition, Khanna Publishers.
3 Probability, Statistics and Random Processes, T. Veera Rajan, Tata McGraw Hill Education Private Ltd.

Reference Books:

1 Advanced Engineering Mathematics, Kreyszig E, 8th Edition, John Wiley & Sons Ltd, 2006.
2 A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.
3 Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan Chand & Sons, New Delhi.

Online Resources:

1 https://onlinecourses.swayam2.ac.in/cec24_ma19/preview
2 https://onlinecourses.nptel.ac.in/noc24_ma39/preview

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal 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 Mechanical Engineering

MACHINE DRAWING
SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week): 2:0:2	SEE Marks: 60	Course Code: U25PC410ME
Credits : 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVE The objective of the course is to	**COURSE OUTCOMES** On completion of the course, students will be able to
Learn drawing fundamentals, orthographic projections of machine components, and their dimensional proportions and prepare assembly drawings.	1 conversion of pictorial views into orthographic views by interpreting the conventions used in machine drawing using first angle projection method. 2 sketch the fasteners and riveted joints with suitable proportions to learn their details. 3 sketch the rod joints, keys, shaft couplings and bearings with suitable proportions. 4 prepare the assembly drawings of steam engine parts from the detailed drawings. 5 Prepare the assembly drawings of tail stock and tool post etc from the detailed drawings.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	3		2					3			3	2	2
CO2	3	2		2					3			3	3	2
CO3	3	3		2					3			3	2	2
CO4	3	3		2					3			3	3	2

Unit-I: Introduction
Format of drawing sheet, title block and part list, conventions of drawing lines and dimensions, First and third angle projection methods, scales as per ISO standards, convention for sectional views. Orthographic projections including sectional views of simple machine elements.

Unit-II: Drawing/Sketching of Various views of
Screwed Fasteners: Screw thread nomenclature, forms of threads, thread series, thread designation, multi- start threads, right and left-hand threads, representation of threads and thread parts in assembly.

Fasteners: Bolted joint, hexagonal nut, square nut, hexagonal and square headed bolts, washer.
Other Bolts: Square headed bolt with square neck, T-headed bolt with square neck, stud bolt.
Other nuts: Flanged nut, Cap nut, Dome nut, Capstan nut, Ring nut and Wing nut.
Locking arrangement for nuts: Using lock nut, split pin, castle nut, Wile's lock nut,set screw, grooved nut, Locking by screw, by plate and by spring washer.
Riveted Joints: Rivets and Riveting, Caulking and Fullering, rivet heads, Definition of terms. Classification of riveted joints: Lap joints and butt joints with proportions.

Unit-III: Drawing/Sketching of various views of
Keys: Saddle keys, sunk keys, Splines, Woodruff key and round keys
Cotter joints: Cotter joint with sleeve, cotter joint with socket and spigot ends, cotter joint with a gib.
Pin Joint: Knuckle joint
Shaft couplings: Rigid Couplings: Sleeve (muff), Butt muff, Half-lap muff, Split-muff.
Flanged Couplings: Flanged Coupling, Protected type flanged coupling, Solid flanged coupling.
Flexible Couplings: Bushed pin type flanged coupling.
Non-aligned couplings: Universal coupling and Oldham's coupling.
Shaft bearings: Journal bearings: Solid journal bearing, bushed journal bearing, Pedestal bearing and Pivot bearing.

Unit-IV:
Assembly Drawings of Engine parts: stuffing box, steam engine cross head (horizontal), vertical cross head, connecting rod end and eccentric.

Unit-V:
Assembly Drawings of Machine tool parts: Single tool post and Lathe tail stock.
Accessories: Screw jack and Pipe vice.

Learning Resources:
1. N.D. Bhatt, "Machine Drawing, 28th Edition, Charotar Publishing house, Anand, New Delhi, 1994.
2. N. Siddeshwar, "" Machine Drawing", 5th Edition, Tata Mc Graw Hill Publishing Co. Ltd., 1994
3. K.L. Narayana, P.Kannaiah, K.Venkat Reddy, "Machine Drawing", 2nd Edition, New Age International (P) Ltd., 1999.
4. K.C. John, "Text book of Machine Drawing", PHI Learning, 2010.

5. Ajeet Singh, "Machine Drawing includes Autocad", 2nd Edition, Mc Graw Hill Education, 2014.

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering

FLUID MECHANICS AND HYDRAULIC MACHINES
SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week): 3:1:0	SEE Marks: 60	Course Code: U25PC420ME
Credits : 04	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES The objectives of the course are to	**COURSE OUTCOMES** On completion of the course, students will be able to
understand properties of fluids, fluid flows, conservation equations, flow through pipes, boundary layer flows, flow separation, hydrodynamic forces on vanes / blades, performance of fluid machines.	1 identify importance of various fluid properties at rest and in transit and solve problems involving fluid properties and shear forces resulting from Newtonian fluids. 2 derive and analyze typical fluid systems using the continuity, momentum and energy equation for various fluid flows. 3 distinguish laminar and turbulent flows through pipes and understand the concept of boundary layer theory. 4 estimate force on vanes and efficiencies of turbine under different operating conditions. 5 describe working of pumps and evaluate their performance characteristics.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	2	1	1						1	3	2	2
CO2	3	3	2	2	1						1	3	2	2
CO3	3	3	2	1	1						1	3	2	2
CO4	3	3	2	2	1						1	3	2	2
CO5	3	3	2	2	1						1	3	2	2

UNIT-I

Properties and types of Fluids: fluid properties; definition of fluid and flow, continuum fluid, Newtonian and non-Newtonian fluids, ideal and real fluids; compressibility, surface tension;

Fluid Statics: pressure at a point, Pascal's law, atmospheric pressure, absolute, gauge and vacuum pressures, simple and differential manometers.

UNIT-II

Fluid Kinematics: Lagrangian and Eulerian approach for fluid flow; Classification of fluid flows: steady and unsteady flows, uniform and non-uniform flows; velocity and acceleration in a flow; stream line, path line, streak line, rotational and irrotational flows.

Fluid Dynamics: Continuity equation in Cartesian coordinate system, forces acting in fluid flows, Euler equation and Bernoullie equation, venturimeter, orificemeter.

UNIT-III

Laminar Flow in Pipes: Reynolds experiment, steady flow in circular pipes, Hagen–Poiseuille equation.

Turbulent Flow in pipes: head loss – major (Darcy–Weisbach equation) and minor losses. Introduction to Boundary Layer Theory.

UNIT-IV

Impact of Jets: Principle of impulse momentum, Hydrodynamic force on stationary and moving blades (flat and curved), velocity triangles, work done and efficiency.

Hydraulic Turbines: layout of hydraulic power plant, working principle of Pelton, Francis and Kaplan turbines, velocity triangles, work done, efficiencies, specific speed, unit quantities, draft tube, functions, cavitation.

UNIT-V

Centrifugal Pumps: Classification, working principle, velocity triangles, types of head, work done, efficiencies, minimum starting speed, specific speed.

Reciprocating pumps: working principle, single and double acting pumps, discharge, work done and power, slip, indicator diagrams.

Role of AI in Hydraulic Systems – case study.

Learning Resources:

1. Frank M White, "Fluid Mechanics", Tata McGraw-Hill, 7th Edition, 2012
2. Modi P.N. and Seth S.M., "Hydraulics and Fluid Mechanics including Hydraulics Machines", Standard Book House, Delhi, 2015.
3. D.S. Kumar, "Fluid Mechanics and Fluid Power Engineering" S.K. Kataria & Sons, Re-print 2014
4. Robert W. Fax, Philip J. Pritchard, Alan T. McDonald "Introduction to Fluid Mechanics", Wiley India Edition. (Wiley Student Edition Seventh 2011).

5. R.K. Bansal, "Fluid Mechanics and Hydraulic Machines", Lakshmi Publications, 2010.

Web Resources:

1. http://nptel.ac.in/courses/112105171/
2. http://nptel.ac.in/courses/112106190/
3. http://nptel.ac.in/video.php?subjectId=105101082
4. http://web.mit.edu/hml/ncfmf.html
5. http://ocw.uci.edu/courses/engineering_mae_130a_intro_to_fluid_mechanics.html.

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

ASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

KINEMATICS OF MACHINES

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week): 3:0:0	SEE Marks: 60	Course Code: U25PC430ME
Credits : 03	CIE Marks: 40	Duration of SEE: 03Hours

COURSE OBJECTIVES *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
perform kinematic analysis of planar mechanisms and to analyze the transmission of motion using lower and higher kinematic pairs.	1 identify the various elements of a mechanism and calculate the degrees of freedom of a mechanism. Understand the various inversions of different kinematic chains. 2 perform kinematic analysis of various planar mechanisms, using graphical method. 3 understand the steering gear mechanisms and analyze the motion transmission characteristics by using belt drive. 4 design the cam profile for various types of followers under the given required motion of the followers. 5 analyze the motion transmission characteristics by using gear drive.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	2	2	1	2	1							3	2	1
CO2	1	3	2	1	2							3	2	1
CO3	2	2	2	2	1							3	2	1
CO4	3	2	3	3	2							3	2	1
CO5	1	1	3	2	1							3	2	1

UNIT-I:

Definitions: Kinematic link, pair, chain, mechanism and machine. Classification of links, pairs.

Degrees of freedom of mechanisms using Kutzbach and Grubler's criterion.

Inversions: Quadric cycle chain, single and double slider crank chains.

UNIT-II

Analysis of Mechanisms

Velocity analysis: Graphical Relative velocity and Instantaneous center methods.

Acceleration Analysis: Graphical method for planar mechanisms, Acceleration analysis of planar mechanisms involving tangential and radial acceleration components. Analytical method for kinematic analysis of slider crank mechanism.

Applications of AI in kinematic synthesis.

UNIT-III

Special Mechanisms: Steering gear mechanisms Davis and Ackerman.

Belt Drives: Open and cross belt drives, Length of belt, Ratio of tensions, Effect of Centrifugal tension and initial tension over power transmission, Conditions for maximum power.

UNIT-IV: CAMS

Types of Cams and followers, Nomenclature of cam. Displacement diagrams for followers: uniform velocity, parabolic, simple Harmonic and cycloidal motions. Layout of cam profiles for translating motion - knife edge, flat and roller followers.

UNIT-V

Gears: Classification of gears, Nomenclature, Law of gear tooth action, Cycloidal and involute tooth profiles. Expressions for velocity of sliding between teeth, path of contact, arc of contact and contact ratio. Interference of involute gears, minimum number of teeth to avoid interference.

Introduction to Gear Trains.

Learning Resources:

1. S.S. Ratan, "Theory of Machines", 4th Edition, McGraw-Hill, 2014.
2. Thomas Bevan, "Theory of Machines", 3rd Edition, CBS Publishers, 2005.
3. R.L. Norton, "Kinematics and Dynamics of machinery", 1st Edition, McGraw - Hill, 2009
4. J.E. Shigley, "Theory of Machines", 4th Edition, Oxford University press, 2015.
5. Amitabha Ghosh and Asok Kumar Mallik, "Theory of Machines", 3rd Edition, East West Press, 2006

Web resources:

1. www.journals.elsevier.com/mechanism-and-machine-theory
2. www.nptel.ac.in

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

PROGRAMMING THROUGH DATA STRUCTURES
SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U25ES410ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objective of the course is to	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Identify and use appropriate data structure for a given problem. 2 Describe the linear and nonlinear data structures.	1 choose appropriate searching and sorting techniques for a given set of data. Analyze the complexities of Algorithms. 2 design a solution to a given problem using arrays and linked list. 3 develop an application using stacks and queues. 4 choose the appropriate nonlinear data structure and perform various operations on trees. 5 Explain the various operations on graphs.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	3	1	1		1	2	2		2			
CO2	3	2	3	1	1		1	2	2		2			
CO3	3	2	1	1	1		1	2	2		2			
CO4	3	2	1	1	1		1	2	2		2			
CO5	3	2	1	1	1		1	2	2		2			

UNIT-I:
Searching and Sorting: Linear search, binary search, bubble sort, selection sort, insertion sort, quick sort and merge sort.
Performance analysis: Time complexity and space complexity, Asymptotic.

UNIT – II
Introduction: Data Structures, Types of Data Structures.
Linked Lists: Singly Linked Lists, circularly linked lists, Doubly Linked Lists.

UNIT – III

Stacks: Array Representation, Linked Representation, Operations &Applications**.**

Queues: Array Representation, Linked Representation.

UNIT – IV

Trees: Introduction-terminology, representation of Trees Definitions, Binary trees-Properties of Binary trees, Binary Tree Representations, Binary Tree Traversals-Inorder Traversal, Preorder Traversal and Postorder Traversal

UNIT-V

Graphs: Introduction, Definitions, Graph Representations, Elementary Graph Traversals-Depth first search, Breadth first search

Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition (2002), Pearson
3. Kushwaha D. S and Misra A.K, Data structures A Programming Approach with C, Second Edition(2014), PHI.,
4. Gilberg R. F and Forouzan B. A, Data structures: A Pseudocode Approach with C, Second Edition(2007), Cengage Learning
5. Tanenbaum A. M, Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.

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

B.E- IV SEM OPEN ELECTIVE-II COURSES			
Dept.	**Title**	**Code**	**Credits**
MECH	Kinematics and Dynamics of Robotics (Stream: Robotics)	U25OE410ME	3
	Operations Research (General Pool)	U25OE420ME	3
CIVIL	Solid Waste Management	U25OE410CE	3
CSE	Mathematical Computing for AI & ML with Python (Streams: Artificial Intelligence & Machine Learning)	U25OE420CS	3
	Basics of Java Programming (General Pool)	U25OE410CS	3
EEE	Mathematical Programming for Numerical Computation (General Pool)	U25OE410EE	3
ECE	Sensors for Engineering Applications (General Pool)	U25OE410EC	3
IT	Essentials of Mathematics for Machine Learning using Python (Stream: Artificial Intelligence & Machine Learning)	U25OE420IT	3
	Object Oriented Programming using Java	U25OE410IT	3
HSS	Fintech (Stream: Banking Financial, Securities and Investments)	U25OE450EH	3
	Finance Management for Engineers (Stream: Management courses for Engineers)	U25OE410EH	3
	Sociology (General Pool)	U25OE480EH	3

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OFMECHANICAL ENGINEERING
Kinematics and Dynamics of Robotics (Open Elective-II)
(Stream: Robotics)
SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U25OE410ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	2	2	2			2		2	2		2	3	2	1
CO2	2	2	2			2		2	2		2	3	2	1
CO3	3	3	3			3		3	3		2	3	2	1
CO4	3	2	2		3	3	3	2	2	3	3	3	2	1
CO5	2	2	2		2	2	2	2	2	2	2	3	2	1

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 manipulators.

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

UNIT-III

Static Analysis: Force and moment balance.

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

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

OPERATIONS RESEARCH

(General Pool : Open Elective-II)
SYLLABUS FOR B.E. IV-SEMESTER

Instruction : 3Hrs /week	SEE Marks : 60	Course Code : U25OE420ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	1	3	2	1	2			1	2		2	1	2	1
CO2	1	3	2	1				1	2		2	1	2	1
CO3	1	3	2	2	1			1	2		2	1	2	1
CO4	1	3	2	1				1	2		2	1	2	1
CO5	1	3	2	2	1			1	2		2	1	2	1

UNIT – I

Introduction: Definition and scope of operations research.

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

UNIT – II

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

Transportation model: Finding an initial feasible solution– north west corner method, least cost method, Vogel's approximation method, finding the optimal solution, optimal solution by stepping stone and MODI method, special cases in transportation problems – Unbalanced transportation problem.

UNIT-III

Assignment Problem: Hungarian method of assignment problem, maximization in assignment problem, unbalanced problem, problems with restrictions, travelling salesman problem.

Replacement models: Introduction, Replacement of items that deteriorate ignoring change in money value, replacement of items that deteriorate considering change in money value with time, replacement of items that fail suddenly – individual replacement policy, group replacement policy.

UNIT-IV

Game theory: Introduction, 2 person zero sum games, maximin– minimax principle, principle of dominance, solution for mixed strategy problems graphical method for 2 x n and m x 2 games.

UNIT-V

Sequencing models: Introduction, General assumptions, processing n jobs through 2 machines, processing n jobs through m machines processing 2 jobs through n machines.

Queuing theory: Introduction, Single channel – Poisson arrivals – exponential service times with infinite population and finite population.

Learning Resources:

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

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

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

Duration of Internal Test: **90 Minutes**

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

SOLID WASTE MANAGEMENT

(General Pool: Open Elective - II)
SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs./week):3:0:1	SEE Marks:60	Course Code: U25OE410CE
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 disposal of solid waste. 4. Grasp the fundamentals of hazardous waste and its management. 5. Understand the solid waste management practices adopted actual practical scenarios.	1. Understand types, characteristics, composition of solid waste and rules laid for its management as 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. A. D. Bhide and B. B. Sundaresan, "Solid Waste Management, Collection, Processing and Disposal", Nagpur. 2001.
6. https://archive.nptel.ac.in/courses/105/103/105103205/

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 COMPUTER SCIENCE ENGINEERING

MATHEMATICAL COMPUTING FOR AI & ML WITH PYTHON

(Streams: Artificial Intelligence & Machine Learning)
Open Elective-II
SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week): 3:0:0	SEE Marks: 60	Course Code: U25OE420CS
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

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

CO-PO and CO-PSO mapping														
CO	**PO**											**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	2	1	2	1	1							2		2
CO2	2	2	2	2	2							2		3
CO3	3	2	3	2	2							2		3
CO4	3	2	2	2	1							2		3
CO5	3	2	2	2	2							2		3

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

Regression: Introduction to Regression, Linear Regression, Multiple Linear Regression, Polynomial Regression, Logistic Regression

UNIT-V

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

Learning Resources:

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

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

1	No. of Internal Tests:	02	Max.Marks for each Internal 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 COMPUTER SCIENCE ENGINEERING

BASICS OF JAVA PROGRAMMING

(General Pool: Open Elective - II)
SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week): 3:0:0	SEE Marks: 60	Course Code: U25OE410CS
Credits: 3	CIE Marks: 40	Duration of SEE: 3Hours

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 operations 5 Implement read and write operations using console and files IO streams.

CO-PO and CO-PSO mapping															
CO	**PO**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2	3	2	3									3		
CO2	2	3	3	3									3		
CO3	2	3	3	3	1								3	1	
CO4	2	3	3	3	1								3	1	
CO5	2	3	2	3									3		

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. String Buffer, methods, String Builder, String Tokenizer
Util: Date, Calendar, Random, Timer, Observable
IO: Files and Directories, I/O Classes and Interfaces, Byte Streams classes and Character Stream classes

Learning Resources:

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

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

1	No. of Internal Tests:	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 ELECTRICAL AND ELECTRONICS ENGINEERING

Mathematical Programming for Numerical Computation

(General Pool: Open Elective - II)
SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week): 3:0:0	SEE Marks: 60	Course Code: U25OE410EE
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES The course will enable the students to:	COURSE OUTCOMES On completion of the course, students will be able to
To provide fundamental knowledge of programming language for solving problems.	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.

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2								1
CO2	3	2	2								1
CO3	3	2	2								1
CO4	3	2	2								1
CO5	3	2	2								1

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 , semi log ,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(GUI): Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

Suggested Reading:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by RudraPratap, Oxfordpublications.
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 Mathworks.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siauw Alexandre Bayen, Elsevier-18th April2014.
5. https://nptel.ac.in/courses/103106118/2

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 ELECTRONICS AND COMMUNICATION ENGINEERING

Sensors for Engineering Applications

(General Pool: Open Elective - II)
SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U25OE410EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1		1								1	1	
CO2	3	2	1		2								2	2	
CO3	2	2	2		2								2	2	
CO4	2	2	2		2								2	2	
CO5	2	2	2		2								2	2	

UNIT - I

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

UNIT – II

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

UNIT – III

Thermal and Optical Sensors temperature – temperature difference – heat quantity. Thermometers for different situations – thermocouples thermistors – color

pyrometry. light intensity - wavelength and color - light dependent resistors, photodiode, phototransistor, CCD, CMOS sensors. Radiation intensity, particle counter – Gieger Muller courter (gas based), Hallide radiation detectors.

UNIT – IV

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

UNIT – V

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

Lab Experiments:

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

Learning Resources :

1. Doebelin, "Measurement Systems: Application and Design", McGraw Hill Kogakusha Ltd.
2. Julian W. Gardner, Vijay K. Varadan, Osama O. Awadelkarim "Microsensors, MEMS and Smart Devices", New York: Wiley, 2001.
3. Henry Bolte, "Sensors – A Comprehensive Sensors", John Wiley.
4. Jocob Fraden," Handbook of Modern Sensors, Physics, Designs, and Applications", Springer.
5. Manabendra Bhuyan," 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 Tests	:	30
2. No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

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

Essentials of Mathematics for Machine Learning using Python

(Stream: Artificial Intelligence and Machine Learning)
(Open Elective-II)
SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U25OE420IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
Introduce the essential maths principles of linear algebra, vector calculus, probability theory and statistical methods along with exposure to Python libraries for understanding and applying machine learning to real-world problems.	1. Understand the fundamentals of linear algebra – vectors and matrices. 2. Understand and apply various matrix norms, Eigenvectors and PCA techniques. 3. Understand basics of derivatives, integrals and optimization. 4. Understand various data distributions and apply probabilistic techniques to handle uncertainty. 5. Define basic descriptive and inferential statistical measures.

Unit-1 Basics of Linear Algebra

- Scalars, Vectors, Matrices, Tensors for Data Representation and Analysis
- Matrix Analysis (Rank, Determinant, Trace, Orthogonal basis & Inverse)
- Operations: Addition, Subtraction, Scalar Multiplication, Matrix Multiplication, Dot Product, Cross Product Feature Interactions for Data Manipulation
- Python experiments

Unit-2 Matrix

- Matrix Norms: L0 Norm, L1 Norm, L2 Norm; Linear Regression & Regularization
- Eigenvalues and Eigenvectors, Principal Component Analysis
- Python experiments

Unit-3 Vector Calculus

- Derivatives and Gradients
- Differential Operators - Laplacian operator, Gradient operator: for Gradient Descent in Optimization
- Integrals for cumulative distribution function
- Python Experimentation

Unit 4 Probability Theory

- Define Random Variables, Probability Distributions – Gaussian, Bernoulli, Binomial, and Poisson distributions model specific types of events
- Bayes' theorem, uncertainty modelling - updating beliefs based on observed evidence
- Python Experiments

Unit -5 Statistical Methods

- Descriptive Statistics - Expectation, Variance and Covariance
- Central Limit Theorem – Sampling distribution
- Inferential Statistics - Hypothesis Testing – Chi square test, T-Test
- Python Experiments

Learning Resources:

1. Mathematics for Machine Learning, by Marc Peter Deisenroth, A. Aldo Faisal, and Cheng Soon Ong, Cambridge University Press, 2020.
2. Mathematical Foundation for Machine Learning and AI, https://www.udemy.com/course/mathematical-foundation-for-machine-learning-and-ai/
3. Essential Mathematics for Machine Learning: https://onlinecourses.nptel.ac.in/noc21_ma38/preview

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 INFORMATION TECHNOLOGY

OBJECT ORIENTED PROGRAMMING USING JAVA
(General Pool: Open Elective - II)
SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U25OE410IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

UNIT- III

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

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

UNIT- IV

Introducing Awt, Awt Controls:

Event Handling: The Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces.

Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, Checkbox Group, Choice Controls, Using Lists, Managing Scroll Bars, Using Text Field, Using Text Area, Understanding Layout Managers, Menu bars and Menus, Dialog Boxes, File Dialog, 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, Tata McGraw Hill, 2006.
2. James M Slack, Programming and Problem solving with JAVA, Thomson Learning, 2002.
3. C Thomas Wu, An Introduction to Object Oriented Programming with Java 5th edition, McGraw Hill Publishing, 2010.
4. Y. Daniel Liang, An Introduction to JAVA Programming, Tata McGraw Hill, 2009.
5. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.
6. https://docs.oracle.com/javase/tutorial/
7. https://nptel.ac.in/courses/106105191/

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

1	No. of Internal Tests:	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

FINTECH

(Stream: Banking Financial, Securities and Investments)

(Open Elective - II)

SYLLABUS FOR B.E. IV SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U25OE450EH
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to: 1. Provides exposure to students regarding financial markets integrating Technology and financial services. 2. Creates awareness about Fintech (focus areas of leading technology companies)	At the end of the course the learners will be able to: 1. Apply the traditional methods and adopt to the digital methods now used in banks. 2. Use digital wallets and digital currency more dexterously. 3. Access bank accounts through chatbots in banking sector.

Unit-I

Overview of Fintech: Concept – Meaning – Evolution of Fintech - Significance – Drivers of fintech – Areas of Fintech – Fintech Opportunities and Challenges – Keyplayers in the Fintech ecosystem - Recent Developments in Fintech

Unit-II

Fintech in Banks – Traditional Vs Digital Banks- Neo Banks – Use of technology for banking operations like KYC, lending, real time access to bank accounts- fraud detection - Chatbots in Banking – Benefits of Fintech in Banking- RBI guidelines on Fintech in Banking.

Unit-III

Open Banking: Definition- Difference between Open banking and conventional banking – Evolution of Open Banking Technology – Driving forces of Open banking – Benefits of Open Banking – Challenges of Open Banking - Key players – Components – Role of APIs - Working framework of Open Banking – Standards in Open Banking - Use cases in Open Banking

Unit-IV

Payment Systems- concept and importance – Technology adoption in payment systems- Settlement Systems – Concept – Technology in Settlement systems – Players in Payments and Settlement Systems- Study of RBIs UPI and IMPS – Regtech Ecosystem.

Unit-V

Digital Currencies – Concept of Crypto currency - Use of Blockchain and other technologies in Digital currency- Central Bank Digital Currencies – Concept – Use cases – Advantages and Disadvantages of CBDCs- Digital wallets Vs.Digital currencies. Use cases like AmazonPay, Whatsapp Pay etc

Assignments

Students to do a study on various players in the Fintech Ecosystem
Student to take up one UPI platform and present a report linking Open banking and the eco system

SUGGESTED RESOURCES

1. Rajiv Shrivastava and Anil Misra, 'Financial Management', Oxford Higher Education (Units 1&2)
2. Sofie Blakstad, 'Fintech Revolution', Palgrave Macmilan.

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

FINANCE MANAGEMENT FOR ENGINEERS

(Stream: Management Courses for Engineers)

(Open Elective – II)

SYLLABUS FOR B.E. IV SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U25OE410EH
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. To introduce basic principles of finance and accounting relevant to engineering. 2. To develop the ability to interpret financial statements and assess financial performance. 3. To equip students with tools for cost estimation, budgeting, and financial planning in projects. 4. To familiarize students with concepts of investment analysis and capital budgeting. 5. To enable understanding of economic feasibility and risk analysis in engineering decisions.	At the end of the course the learners will be able to: 1. Understand and apply basic financial terminology, concepts, and statements. 2. Analyze and interpret balance sheets, income statements, and cash flow reports. 3. Estimate project costs, prepare budgets, and conduct break-even analysis. 4. Evaluate investment options using NPV, IRR, and payback period methods. 5. Assess the financial viability and risks of engineering projects and make informed decisions.

Unit -1: **Introduction**

Why Finance – Difference between finance and accounts – Role of finance in contemporary business – Goals of financial management – Risk Return Trade off – Time Value of Money (Simple numerical problems on PV and FV) - BS, P&L, CF (Only structure) – Components and importance – diff between capex and opex.

Unit -2: **Sources of Finance**

Sources of fin Information – Company Annual Reports, Government (Budget highlights), Analysts and Regulators (RBI and SEBI only) - Debt Vs Equity – Effect of Leverage – Measurement of Cost of Debt and Equity – WACC – Bond Valuation (Simple Numerical Problems)

Unit-3: **Financial performance assessment (MS Excel Based)**
Ratio Analysis – Activity, Liquidity and Profitability Ratios – Comparing with Industry average and interpret the results - Financial Modelling – Concept, Types. Creating Capital Structure Model Using MS Excel with given data.

Unit -4: **Project Finance**
Importance of Project Finance - Project Cost and Means of Finance - Contents of a Project Report – Technical and Environmental Aspects – Commercial and Financial Viability - Projected Financials, Sensitivity Analysis – Replacement Projects.

Unit-5: International Finance (Only Theory)
Difference between Domestic and International Finance - Currency exchange Rates regimes- Factors affecting currency exchange rates-Spot and Forward Rates - Currency Forwards, Futures and Swaps - Components of Balance of Payments.

LEARNING RESOURCES:-

1. Financial Management, I M Pandey, Pearson Ed, ISBN 9789390577255
2. Financial Management – Theory, Concepts and Problems, R P Rustagi, Taxmann Publications.

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

SOCIOLOGY

(General Pool: Open Elective - II)

SYLLABUS FOR B.E. IV SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U25OE480EH
Credits : 3	CIE Marks : 40	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. To introduce students to the origin, development, nature, scope, and significance of Sociology as a social science. 2. To familiarize students with basic sociological concepts such as social structure, social stratification, social groups, institutions, culture, family, caste, polity, and economy. 3. To develop an understanding of the process of socialization, agencies of socialization, social control, and the role of digital media in shaping social behaviour. 4. To examine the nature, factors, and types of social change with special reference to globalization, digitalization, sustainability, and social movements. 5. To provide foundational knowledge of Digital Sociology, including the impact of artificial intelligence, digital platforms, social bias, and digital activism on contemporary society.	1. Explain the historical development, scope, significance, and major concepts of Sociology. 2. Analyze the relationship between individual and society and understand the structure and functioning of social institutions. 3. Describe the process of socialization and evaluate the influence of family, education, media, and digital technologies on social behaviour. 4. Examine the causes and consequences of social change, including the role of digital media, technology, and social movements in contemporary society. 5. Understand the emergence of Digital Sociology and critically assess issues related to AI, digital inequality, social bias, and online social movements.

UNIT-1 Defining Sociology

1: Genesis of Sociology: History, Context and Evolution
2: Nature, Scope and Significance of Sociology
3: Relationship between Individual and Society

4: Meaning and Characteristics of Social Structure, Social Stratification, Social Interaction, Social Inequalities

UNIT-II: Basic Concepts

5: Social Groups, Community, Society, Associations, and Institutions, Status and Role
6: Family, Marriage, Culture, Religion and Kinship
7: Caste, Polity, State, Education and Economy

UNIT-III: Socialization

8: Meaning and Significance of Socialization
9: Agencies of Socialization
10: Social Control
11: Digital Socialization

UNIT-V: Social Change

12: Meaning and Characteristics of Social Change
13: Factors of Social Change (Digitality and Social Media)
14: Types of Social Change
15: Social Change in a Digital world
16: Movements against Inequalities, Climate Change and Sustainability

UNIT-IV: Introduction to Digital Sociology

17: Meaning and Characteristics of Digital Sociology
18: Factors and Emergence
19: AI and Social Bias
20: Digital World and Social Movements

LEARNING RESOURCES:-

1. Principles of Sociology with an Introduction to Social Thought - Book by C N Shankar Rao
2. Sociology: Themes and Perspectives -Textbook by Martin Holborn and Michael Haralambos
3. Lupton, Deborah. 2014. Digital Sociology. New York: Routledge.
4. Dr. Mohammed Shahid, Impact of Liberalization, Privatization, and Globalization (LPG) on the Indian Economy, pg: 175-180.
5. https://dx.doi.org/10.47772/IJRISS.2025.90600013

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 MATHEMATICS

SKILL DEVELOPMENT COURSE III – APTITUDE II

(Common to All Branches)
SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code: U25BS430MA
Credits: 1	CIE Marks: 30	Duration of SEE: 2 Hours

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

UNIT 1
QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -1

1.1 Time speed and distance
1.2 Boats and Streams
1.3 Problems on trains

UNIT 2
REASONING ABILITY- LOGICAL REASONING

2.1 Seating Arrangements- Linear; Circular; Complex
2.2 Venn diagrams
2.3 Syllogism
2.4 Cubes & Cuboids
2.5 Dices

UNIT 3
REASONING ABILITY- NON VERBAL REASONING
3.1 Figure Series
3.2 Directions
3.3 Clocks
3.4 Calendars

UNIT 4
QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -2
4.1 Mensuration Part -1
4.2 Mensuration Part -2
4.3 Logarithms

LEARNING RESOURCES:

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

SKILL DEVELOPMENT COURSE IV- TECHNICAL SKILL I

(CADD & Solid Modeling)

SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week): 1:0:0	SEE Marks: 40	Course Code: U25PE430ME
Credits: 1	CIE Marks: 30	Duration of SEE: 2 Hours

Unit 1

Introduction to CAD package, Setting up drawing environment, Command and System variables, Coordinate system.

Creating graphic primitives like Point, Line, Arc, Planes, Circle, polygon, Annotation etc.

Unit 2

Creating and editing 2D objects, e.g., quick trim, quick extend, fillet, chamfer, mirror, offset.

Unit 3

Creating 2D sketches using different types of lines, e.g, dotted, axis, and dimension lines.

Developing different 2D sketches.

Unit 4

Working in 3D Space, Creating simple 3D Objects using various commands.

Development of 3D components using extrude, sweep and revolve.

Development of Mechanical components eg., gear, spring, bolt and nut, bottle.

LEARNING RESOURCES:

1. Shan Tickoo, Auto CAD 2021: A Problem Solving Approach, Autodesk Press USA.

https://caddexpert.com/nx-3d-modeling-practice-drawings-pdf/

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

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

Duration of Internal Tests : 60 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering

FLUID MECHANICS AND HYDRAULIC MACHINES LAB
SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week): 0:0:2	SEE Marks: 50	Course Code: U25PC421ME
Credits : 1	CIE Marks: 30	Duration of SEE: 3Hours

COURSE OBJECTIVE *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
provide practical knowledge in verification of principles of fluid flow while imparting knowledge in measuring pressure, discharge and velocity of fluid flow. Also gain knowledge in performance testing of hydraulic machines.	1. identify whether flow is laminar or turbulent. 2. evaluate the discharge coefficients of various flow measuring devices. 3. determine the coefficient of impact on semi circular vane of a jet at different loads. 4. evaluate the performance of impulse and reaction turbines at constant head. 5. calculate the efficiency of dynamic and positive displacement pumps for various flow rates.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	2	1	1	1				1	1		1			
CO2	3	2	1	1				1	1		1			
CO3	3	2	1	1				1	1		1			
CO4	2	2	1	1				1	1		1			
CO5	2	2	1	1				1	1		1			

List of Experiments:

1. To determine the type of flow using Reynold's apparatus.
2. To verify Bernoulli's Equation for an incompressible flow.
3. To determine the discharge coefficient of venture meter.
4. To determine the discharge coefficient of orificemeter.
5. To determine the friction factor in pipe flow.
6. To determine the impact coefficient of jet on given vane.
7. To study the performance characteristics of a Pelton wheel at constant head.

8. To study the performance characteristics of a Francis Turbine at constant head.
9. To study the performance characteristics of a Kaplan Turbine at constant head.
10. To study the performance characteristics of a centrifugal pump at constant speed.
11. To study the performance characteristics of a self-priming pump at constant speed.
12. To study the performance characteristics of a reciprocating pump at constant speed.
13. To study the performance characteristics of a gear pump at constant speed.

From the above experiments, each student should perform at least 12 (Twelve) experiments.

No. of Internal Tests:	02	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 Mechanical Engineering

PROGRAMMING THROUGH DATA STRUCTURES LAB
SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : U25ES411ME
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. Implement operations on various arrays and linked list. 2. Implement operations on stacks and queues 3. Implement traversals on binary trees. 4. Choose appropriate searching and sorting techniques for given set of data.

CO-PO and CO-PSO mapping														
CO	PO mapping											PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	3	1	1		1	2	2		2			
CO2	3	2	3	1	1		1	2	2		2			
CO3	3	2	3	1	1		1	2	2		2			
CO4	3	2	3	1	1		1	2	2		2			

1. Implementation of Linear search and binary search.
2. Implementation of bubble sort, selection sort and insertion sort.
3. Menu driven program that implements arrays for the following operations.
   a) read b)display c)insert d)delete
4. Implementation of Singly Linked List.
5. Implementation of Doubly Linked List,
6. Implementation of Circular Linked list
7. Menudrivenprogramthatimplements Stacksusingarraysforthefollowingoperations.
   a) create b) push c) pop d) peek
8. Implementation of Stack using Singly Linked List.
9. Implementation of evaluation of post fix expression using stacks

10. Menu driven program that implements Queues using arrays for the following operations
    a) create b)insert c)delete d)display
11. Implementation of Queue using Singly Linked List
12. Implementation of Recursive Traversals (Preorder, Inorder, Postorder) on binary Trees.

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

LEARNING RESOURCES:

1. EllisHorowitz,SartajSahniandSusanAnderson-Freed,FundamentalsofDataStructures inC,2/e,UniversitiesPress,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 Pseudo code Approach with C", Cengage, 2nd Edition
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stem'IntroductiontoAlgorithms'2002.
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures usingC, Second Edition (2008),Pearson
6. Data Structures through Cindepth, S K Srivastava, Deepali Srivastava, BPB publications, 2nd Edition

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-25)
B.E. – MECH : BRIDGE COURSE (2026-2027)

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	
III-SEMESTER								
THEORY								
UB25BS300MA	Foundation to Engineering Mathematics	2	-	-	3	50	-	0
UB24ES340CE	Mechanics for Engineers	2	-	-	3	50	-	0
	TOTAL	**4**	**-**	**-**	**-**	**100**	**-**	**0**
IV-SEMESTER								
THEORY								
UB24HS410EH	English Language and Communication Skills	2	-	-	3	50	-	0
PRACTICALS								
UB24HS411EH	English Language and Communication Skills Lab	-	-	2	3	50	-	0
	TOTAL	**2**	**-**	**2**	**-**	**100**	**-**	**0**
	GRAND TOTAL	**4**			-	**100**		**0**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

FOUNDATION TO ENGINEERING MATHEMATICS

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L : T : P (Hrs./week): 2:0:0	SEE Marks: 50	Course Code: UB25BS300MA
Credits : - - -	CIE Marks: - - -	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. **Study** the concepts of vector differentiation, Directional derivative, Divergence and Curl of a vector point function. 2. **Understand** the concepts of Descriptive Statistics. 3. **Learn** the basics of Set theory, Permutations and Combinations and Probability. 4. **Understand** the concept of Rank of a matrix, Echelon form, System of Linear Equations and Eigen Values and Eigen Vectors.	1. **Solve** problems on fitting of a straight line to the given data and also to find co-efficient of correlation and to determine regression lines and their application problems. 2. **Apply** the concepts of Descriptive Statistics to calculate Mean, Median, Mode, Measures of Dispersion, Mean Deviation and Standard Deviation. 3. **Solve** the problems on Permutations, Combinations and Probability. 4. **Compute** the Rank of a matrix and Eigen values and Eigen vectors of a matrix.

CO-PO and CO-PSO mapping															
CO	PO mapping												PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2										1			
CO2	3	2										1			
CO3	3	2										1			
CO4	3	2										1			
	3	2										1			

UNIT – I: (8 Hours)

CALCULUS

Differentiation of standard functions (Formulae) - Partial Derivatives – Scalar and Vector point functions -Vector Differentiation-Level Surfaces-Gradient of a scalar point function- Normal to a level surface- Directional Derivative – Divergence and Curl of a Vector field -Solenoidal and Irrotational vector

UNIT – II: (6 Hours)
DESCRIPTIVE STATISTICS
Mean-Median-Mode-Measures of Dispersion: Range-Mean Deviation-Standard Deviation

UNIT –III: (6 Hours)
BASICS OF PROBABILITY
Basics concepts of set theory - Permutations & Combinations - Random event & Experiment-Sample space - Classical definition of Probability - Axioms of probability.

UNIT – IV: (8 Hours)
MATRICES
Rank of matrix- Echelon form - System of Linear Equations- Consistency of Homogeneous and Non-homogeneous system of equations- Eigen values and EigenVectors.

Learning Resources:
1. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics, Dr. B.S. S Grewal 40th Edition, Khanna Publishers.
3. Fundamentals of Mathematical Statistics, S.C. Gupta; V.K. Kapoor, S Chand & Sons.

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): 3:0:0	SEE Marks:50	Course Code:UB25ES340CE
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. Understand the concepts of dynamics and its principles. 2. Explain kinetics and kinematics of particles, projectiles, curvilinear motion, fixed axis rotation of rigid bodies. 3. Impart the concepts of work-energy meDthod and its applications to translation and rotation. 4. Impart the concept of impulse momentum relation	1. Distinguish between statics and dynamics and differentiate between kinematics and kinetics. 2. Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear and rotatory motion in rigid body motion. 3. Solve problems using work energy equations for translation and fixed axis rotation. 4. Solve problems using impulse momentum equation

UNIT–I: Kinematics of Particle: Rectilinear motion, Curvilinear motion, Projectile motion, Velocity and acceleration.

UNIT–II: Kinematics of Rigid Bodies: Types of rigid body motion, and its analysis of fixed axis rotation.

UNIT-III: Kinetics of Particle: Analysis as a particle, Dalemberts Principle and its applications

UNIT-IV: Kinetics of Rigid Bodies: Analysis as a rigid body in translation, Fixed axis rotation

UNIT –V: Work Energy: Principles of work-energy and its application to translation.

Impulse and momentum: Introduction, linear impulse-momentum, principle of conservation of linear momentum, loss of kinetic energy.

Learning Resources:

1. Singer F.L., "Engineering Mechanics", Harpper & Collins, Singapore, 2010.
2. Timoshenko S.P. and Young D.H., "Engineering Mechanics", McGraw Hill International Edition, 2014.
3. Andrew Pytel, Jaan Kiusalaas., "Engineering Mechanics", Cengage Learning, 2016.
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, 2012.
6. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", Umesh Publications, 2011.
7. Basudeb Bhattacharyya., "Engineering Mechanics", Oxford University Press, 2017.
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)

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION SKILLS

SYLLABUS FOR BRIDGE COURSE B.E. IV-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:50	Course Code: UB24HS410EH
Credits : - - -	CIE Marks: - - -	Duration of SEE: 2 Hrs

COURSEOBJECTIVES The Course will enable the Learners to:	**COURSEOUTCOMES** At the end of the course the students will be able to:
1. Converse effectively in various context. 2. Listen for general and specific comprehension and write paragraphs. 3. Understand the elements of a good paragraph 4. Speak appropriately in daily conversations	1. Use language in appropriate contexts. 2. Listenforglobalcomprehensionandinfermeaningfromspokendiscourses. 3. Write paragraphs coherently. 4. Use phrases, essential vocabulary and polite expressions in everyday conversations.

Unit 1

1.0 Communication & Functional English

1.1 Role and importance of Communication, Process of Communication, Non-verbal communication, barriersto Communication, overcoming barriers. Conversational phrases: greetings, introductions, apology, compliments, agreeing and disagreeing, polite forms in every day conversations.

Unit 2

2.0 Listening

2.1 Importance of Active listening and features, types of listening,

Unit 3

3.0: Writing

3.1 Paragraph writing, coherence and cohesion.
Transition words and phrases.

Unit 4

4.0 Grammar and Vocabulary

4.1 Common Errors in tenses, articles and prepositions. Vocabulary: one word substitutes, words often confused.

Unit 5

5.0 Reading

5.1 Prose text 'Yesterday was beautiful' by Roald Dahl

Prescribed text book for theory:

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

Learning Resources:

1. E. Suresh Kumar, P. Sreehariand J. Savithri – Essential English
2. Reading comprehension-Nuttai. J. C-Orient Blackswan
3. Sunitha Mishra, C. Murali Krishna, Communication Skills for Engineers, Pearson, 2004.
4. M.AshrafRizvi.EffectiveTechnicalCommunication.TataMcgrawHill,2005.
5. Allenand Waters., How English Works
6. Willis Jane., English through English.

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

SYLLABUS FOR BRIDGE COURSE B.E. IV-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:50	Course Code:UB24HS411EH
Credits : - - -	CIE Marks: - - -	Duration of SEE: 2Hrs

COURSEOBJECTIVES The Course will enable the Learners to:	**COURSEOUTCOMES** At the end of the course the students will be able to**:**
1. Converse in various situations. 2. Make paper and power point presentations. 3. Speak effectively using discourse markers.	1. Participate effectively in group discussions, public speaking, debates (formal and informal) 2. Research and sift information to make presentations. 3. Listen for gist and make inferences from various speeches. 4. Use connectives and make transitions effectively while speaking.

INTERACTIVE COMMUNICATION SKILLS LAB

Public speaking: Do's and Dont's of public speaking, Listening to speeches of great personalities in history to understand the nuances of public speaking.

Presentation Skills: Making effective presentations, research on various topics, use of Audio visual aids, coping with nerves.

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

Prescribed text book for laboratory:

Speak Well: Jayshree Mohanraj, Kandula Nirupa Rani and Indira Babbellapati- Orient Black Swan.

Learning Resources:

1. Bala subramanian: A text book of English phonetics for Indian students, Macmillan, 2008.
2. Priyadarshini Patnaik: Group discussion and interviews, Cambridge University Press India private limited 2011.
3. Daniel Jones: Cambridge English Pronouncing Dictionary-A Definitive guide to contemporary English pronunciation.