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-23)
WITH EFFECT FROM 2024-25
(For the students admitted in 2023-24)

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	Graduates demonstrate knowledge of basic sciences and mechanical engineering.
2	Graduates demonstrate an ability to identify, formulate and solve engineering problems
3	Graduates demonstrate an ability to design and conduct experiments, analyze and interpret data.
4	Graduates demonstrate an ability to design a system, component or process as per needs and specifications
5	Graduates demonstrate skills to use modern engineering tools, software and equipment to analyze for problem solving.
6	Graduates demonstrate an ability to visualize and work on laboratory and multi disciplinary tasks.
7	Graduate shows the understanding of impact of environment and society of engineering solutions and aim to provide sustainable solutions.
8	Graduates demonstrate knowledge of professional and ethical responsibilities.
9	Graduates shall be able to work independently and also in multi disciplinary teams
10	Graduates are able to communicate effectively in both verbal and written form.
11	Graduates will demonstrate the ability to handle the projects through appropriate project management techniques.
12	Graduates develop confidence for self education and ability for life-long learning

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-23)

B.E. – MECH : THIRD SEMESTER (2024-2025)

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								
U23BS310MA	Transform Techniques & Partial Differential Equations	3	-	-	3	60	40	3
U23PC310ME	Materials Engineering	3	-	-	3	60	40	3
U23ES320ME	Programming for Engineers	3	-	-	3	60	40	3
U23PC330ME	Mechanics of Materials	3	-	-	3	60	40	3
U23OE3XXXX	Open Elective-I	2	-	-	3	60	40	2
U23HS020EH	Human Values and Professional Ethics-II	1	-	-	2	40	30	1
U23HS320EH	Skill Development Course I - Communication Skills in English I	1	-	-	2	40	30	1
U23BS330MA	Skill Development Course II - Aptitude-I	1	-	-	2	40	30	1
PRACTICALS								
U23PC311ME	Materials Engineering Lab	-	-	2	3	50	30	1
U23ES321ME	Programming for Engineers Lab	-	-	2	3	50	30	1
U23PC331ME	Mechanics of Materials Lab	-	-	2	3	50	30	1
	TOTAL	**17**	**-**	**6**		**570**	**380**	**20**
	GRAND TOTAL	**23**				**950**		**20**

1) Student should complete one NPTEL certification course equivalent to 2 credits (8 weeks) by the end of VI semester.
2) Left over hours allotted to Sports / Library / PDC / Mentor Interaction / CC / RC / TC / CCA / ECA.
3) Students opting for B.E. Honours should complete one NPTEL certification course of 12 weeks (Robotics related) by the end of IV semester.

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: U23BS310MA
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	At the end of the course students will be able to:
1. Understand the definition and properties of the Laplace transform. 2. Understand the definition and properties of the inverse Laplace transform. 3. Study the concept of Fourier series and its applications. 4. Learn the formation Partial Differential Equations and solution of linear and non-linear first order partial differential equations. 5. Study the applications of Partial Differential equations.	1. Evaluate Laplace transform of functions 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, and two-dimensional heat equation under steady-state conditions.

UNIT-I (10Hours)
Laplace Transforms:
Introduction to Laplace transforms - Sufficient Condition for Existence of Laplace Transform - Properties of Laplace Transform - First shifting theorem - Second shifting theorem - Change of scale property - Differentiation of Laplace transform - Integration of Laplace Transform - Laplace Transform of Derivatives - Laplace Transform of Integrals - Evaluation of Integrals by Laplace Transforms.

UNIT-II (10Hours)
Inverse Laplace Transforms:
Introduction to Inverse Laplace transforms - Properties of Inverse Laplace Transform-First shifting theorem - Second Shifting theorem -Change of

scale theorem - Multiplication with s^n - Division by s –Convolution Theorem (without proof)- Application of Laplace transforms to higher order linear differential equation with Constant Coefficients.

UNIT –III (10Hours)
Fourier series:
Introduction to Fourier series – Conditions for a Fourier expansion – Functions having points of discontinuity – Change of Interval - Fourier series expansions of even and odd functions - Fourier Expansion of Half-range Sine and Cosine series.

UNIT –IV (10 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 (8 Hours)
Applications of Partial Differential Equations:
Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation – Two-Dimensional Heat equation (steady state condition).

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

MATERIALS ENGINEERING
SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U23PC310ME
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVE The objective of the course is to	**COURSE OUTCOMES** On completion of the course, students will be able to
study phase diagrams, heat treatment, crystal defects, loading and failure of metals and alloys.	1 interpret binary phase diagrams of metals and alloys to assess property changes that occur during equilibrium cooling or heating 2 examine property changes in metals and alloys due to different heat treatment processes 3 summarize the relationship between crystal structure, crystal defects and mechanical properties 4 outline the failure behavior of materials under different loading conditions 5 explain properties and applications of alloy steels and non ferrous alloys.

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	2	2		1								2	3	1	1
CO2	2	3		1								2	2	2	3
CO3	3	2	2	3	2							2	2	1	1
CO4	3	3	2	3	2							2	2	2	1
CO5	3	3	1	2	1							2	2	1	1

UNIT-I: STRUCTURE OF ALLOYS

Construction and interpretation of Thermal equilibrium diagram of binary nonferrous alloys, Gibb's phase rule, Study of Eutectic, Eutectoid, Peritectic reactions. Lever rule. Iron– Iron Carbide Equilibrium diagram, Study and interpretation.

Plain Carbon Steels: types, properties and applications

Cast Irons: types, properties and applications.

UNIT-II: HEAT TREATMENT

Purpose of heat treatment, Annealing, Normalising, Hardening, Tempering, Construction and interpretation of T.T.T curve. Austempering and Martempering. Case Hardening: Carburising, Nitriding, Carbo–nitriding, Flame Hardening, Induction Hardening.

UNIT-III: CRYSTAL STRUCTURE & ATOMIC PACKING

Common crystal structure of metals, Calculation of atomic packing factor for simple cubic, BCC, FCC and HCP crystal structures.

Defects in crystals, point, line, surface and volume defects. Mechanisms of plastic deformation: slip and twinning, Critical resolved shear stress, Hall– Petch equation, cold working and hot working, strain Hardening and Bauschinger effect. Recovery, Recrystallisation, Grain growth and its effect on mechanical properties of metals.

UNIT-IV:

Fracture: Types of fracture in metals, Ductile and brittle fracture, Griffith theory of brittle fracture, modes of fracture, ductile-brittle transition.

Fatigue: Types of fatigue loading, Experimental determination of fatigue strength (RR– Moore Test),S–N Curve, Structure of fatigue fractured specimen, Factors to be considered for the improvement for the fatigue life.

Creep: Creep Test, Creep curve, Creep strength.

UNIT-V: ALLOY STEELS AND NON-FERROUS ALLOYS

Effects of alloying elements like Nickel, Chromium, Manganese, Silicon and Tungsten and Titanium. Study about Stainless steels, HSS, Maraging steels, Hadfield steel, Brass, Bronze, Invar, Duralumin and Ti Alloy (Ti– 6Al– 4V) – their composition, properties and applications.

Learning Resources:

1. V. Raghavan, "Material Science and Engineering", 5th Edition, Prentice Hall of India Ltd., 1994.
2. S.H. Avner, "Introduction to Physical Metallurgy", 2ndEdition, Tata McGraw Hill, 1997.
3. William D. Callister and David G. Rethwisch, "Materials Science and Engineering: An Introduction", 9th Edition, John Wiley and Sons Ltd., 2014
4. OP Khanna, "Metallurgy and Material Science" . S. Chand, New Delhi 2005.
5. E. Dieter, "Mechanical Metallurgy", 3rdEdition, Tata McGraw Hill, 1997.
6. William F Smith, JavadHashemi, Ravi Prakash, "Material Science and Engineering", 5th Edition, McGraw Hill Education, 2014.
7. Physical Metallurgy Principles - Robert E Reed-Hill and Reza Abbaschian, 4th Edition, Cengage Learning.

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

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

Duration of Internal Tests : 90 Minutes

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

PROGRAMMING FOR ENGINEERS
SYLLABUSFORB.E.III-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks: 60	Course Code:**U23ES320ME**
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 store data 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	12	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, Arrayof strings.

UNIT-V:

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

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

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

Learning Resources:

1. Forouzan B. A & Richard F. Gilberg, A Structured Programming Approach using C, 3rdEdition (2013), CengageL earning.
2. Brian W. Kernighan and Dennis M. Ritchie, the C ProgrammingLanguage,2ndEdition(2006),Prentice-Hall.
3. Rajaraman V, The Fundamentals of Computer, 4th Edition(2006), Prentice-HallofIndia
4. Steve Oualline, Practical C Programming, 3rd Edition (2006), O'ReillyPress.
5. JeriR. 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, 3rd Edition (2010), TMH.
8. R G Dromey, Howto 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			

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: U23PC330ME
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	12	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 strainsin 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, annular 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.

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

Learning Resources:

1. Ferdinand P. Beer, E. Russell Johnston, John T. Dewolf, Mechanics of Materials, 2017.
2. Ramamrutham S., Narayanan R., Strength of Materials, DhanpatRai Publishing Company, 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

B.E- III SEM OPEN ELECTIVE-I COURSES			
Dept.	**Title**	**Code**	**Credits**
MECH	Introduction to Industrial Robotics (Stream: Robotics)	U23OE310ME	2
	Fundamentals of Unmanned Aerial Vehicles (General Pool)	U23OE320ME	2
CIVIL	Green Buildings (General Pool)	U23OE310CE	2
CSE	Programming Essentials in Python (Stream: Artificial Intelligence & Machine Learning)	U23OE320CS	2
	Introduction to Python Programming (General Pool)	U23OE310CS	2
EEE	Non-Conventional Energy Sources (General Pool)	U23OE310EE	2
ECE	Mathematical Programming for Engineers (General Pool)	U23OE310EC	2
IT	Computing using Python (Stream: Artificial Intelligence and Machine Learning)	U23OE320IT	2
	Object Oriented Programming using Java (General Pool)	U23OE310IT	2
Physics	Essentials of Semiconductor Physics (Stream: Semiconductor Physics and Device Applications)	U23OE320PH	2
	Fundamentals of Materials Science (Steam: Materials Science for Engineers)	U23OE330PH	2
	Smart Materials and Applications (General Pool)	U23OE310PH	2
Chemistry	Polymeric Materials (General Pool)	U23OE310CH	2
HSS	Learning to Learn	U23OE310EH	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: U23OE310ME
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

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

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	2	2					2	3	1	2
CO2	3	2			1	2	2					2	3	1	2
CO3	3	2			1	2	2					2	3	1	2
CO4	3	2			1	2	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. Position and velocity feedback devices

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

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

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

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

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

Duration of Internal Test: 90 Minutes

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

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

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

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				3	3	3				3	3	2	3
CO2	3	3				3	3	2				3	3	2	3
CO3	3	2				3	3	2				3	3	2	3
CO4	3	2				3	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: UAV Elements, Navigation and Guidance

Components: Arms, motors, propellers, electronic speed controller (ESC), flight controller; Propulsion; Data Link; Sensors and Payloads: GPS, IMU, Light Detection and Ranging (LiDAR), Imaging cameras, Classification of payload based on applications; Hyper-spectral sensors; Laser Detection and Range (LADAR); Synthetic Aperture Radar (SAR); Thermal cameras; ultra-sonic detectors; Case study on payloads. Introduction to navigation systems and types of guidance; Mission Planning and Control.

Unit-IV: Design & Simulation of UAV

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of 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: U23OE310CE
Credits :02	CIE Marks:40	Duration of SEE:03Hours

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

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

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

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

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

Learning Resources:

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

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

1	No. of Internal Tests:	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:U23OE320CS
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.

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:U23OE310CS
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	

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 ELECTRICAL AND ELECTRONICS ENGINEERING

NON-CONVENTIONAL ENERGY SOURCES

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

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

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To provide a survey of the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state- of -the-art energy systems.	1. Demonstrate the generation of electricity from various Non-Conventional sources of energy and solar power generation 2. Illustrate the generation of energy from wind and generation of energy from waste 3. Demonstrate the generation of energy by biomass and fuel cells 4. Illustrate the ocean and geo thermal energy generation

UNIT-I: Introduction and Solar Energy:

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

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

UNIT-II: Wind Energy and Waste to Energy:

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

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

UNIT-III: Biomass Energy and Fuel Cells:

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

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

UNIT-IV: Ocean Energy and Geothermal Energy:

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

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

Learning Resources:

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

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

1	No. of Internal Tests:	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: U23OE310EC
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	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 OFINFORMATION 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: U23OE320IT
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

Object Oriented Programming using Java

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

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U23OE310IT
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:
Explain the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, building simple GUI applications.	1. Understand fundamental concepts in Object oriented approach. 2. Develop object-oriented programs using the concepts of exception handling and multi threading. 3. Demonstrate the usage of Java I/O streams to handle user input and output. 4. Design and develop GUI programs.

UNIT- I

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

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

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

Interfaces: Defining interfaces, extending interfaces, implementing interfaces.

UNIT- II

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

UNIT- III

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

UNIT- IV

Introducing Awt, Awt Controls:

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

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

Learning Resources:

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

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

1	No. of Internal Tests	: 2	Max. Marks for each Internal 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 OFPHYSICS
Smart Materials and Applications
(Open Elective-I)
(General Pool)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U23OE310PH
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

CO-PO Mapping

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

Course Objectives	Course Outcomes	BTL
The student will be able to 1. grasp the concepts of peizo and ferro electric materials 2. Learn fundamentals of pyro and thermo electric materials 3. gain knowledge on shape memory alloys 4. acquire fundamental knowledge on chromic materials	The student should at least be able: 1. summarize various properties and applications of peizo and ferro electric materials 2. apply fundamental principles of pyro and thermo electricity in relevant fields of engineering 3. Explain types of shape memory alloys and their properties and applications 4. Outline the importance of chromic materials in engineering fields.	2 3 3 2

UNIT I: PIEZO AND FERRO MATERIALS (8 hours)
Piezo electric effect and inverse piezoelectric effect, Piezo electric materials, Structure of Quartz crystal, Piezoelectric oscillator, Magnetostriction, Magnetostriction oscillator, piezo-electric sensors, applications of Piezo-electric materials.
Characteristics and properties of ferro-electric materials, Curie-Weiss law, applications of Ferro electric materials

UNIT II: PYRO AND THERMO-ELECTRIC MATERIALS (6 hours)

Pyroelectricity: pyro electric effect, pyro electric materials, pyro-electric detector.

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

UNIT III: SHAPE MEMORY MATERIALS (8 hours)

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

UNIT-IV: (6 hours)

Electro-chromaticity, Electro-chromic materials, Electro-chromic sensors and devices.

Photo-chromaticity, Photo-chromic materials, Photo-chromic sensors and devices.

Thermo-chromaticity, thermo-chromic materials, thermo-chromic sensors and devices.

Smart fluids: Magneto-rheological and Electro-rheological fluids.

Learning Resources:

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

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

1. No. of Internal Tests	:	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 PHYSICS

ESSENTIALS OF SEMICONDUCTOR PHYSICS

(Stream: Semiconductor Physics and Device Applications)

(Open Elective-I)

SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U23OE320PH
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:
1. Explore the merits of quantum mechanics over classical mechanics 2. Describe carrier concentrations in semiconductors 3. Describe the various growth mechanisms in semiconductors 4. Illustrate the carrier transport phenomenon in Semiconductors	1. Apply Schrodinger wave equation to quantum mechanical systems to evaluate Eigen values. 2. Apply semiconductor physics to fabricate various devices. 3. Recognize impact of different growth mechanisms on various properties of semiconductors 4. Categorize the semiconductors based on transport phenomenon and use them for appropriate applications

UNIT I:

Basics of Quantum Mechanics (8 Hrs)

Existence of matter waves, Wave function and its significance, Schrodinger time dependent and independent wave equations, Wave equation of a free particle, Origin of band gap, Energy bands in solids, Postulates of quantum mechanics, Quantum mechanical operators and expectation values, Potential well , Quantum tunnelling.

UNIT II:

Semiconductors: Energy Band and Charge Carriers (6 Hrs)

Types of semiconductors (doping, bandgap, composition), Fermi-Dirac statistics- Density of states of semiconductor, Fermi level in semiconductors, Law of mass action, Charge compensation and charge neutrality, Hall probes and its applications.

UNIT-III:

Growth of Semiconductors (6 Hrs)

Introduction, Bulk crystal growth, Epitaxial crystal growth, Evaporation and sputtering, defects in crystal, Band gap engineering, GaAs crystal growth.

UNIT IV:

Carrier Transport in Semiconductors (6 Hrs)

Carrier generation, Carrier life time, Carrier scattering and mobility, Low-field and high-field transport, introduction to diffusion, Drift-diffusion current and total current density, Einstein relation , Direct and indirect recombination and trapping, Current continuity equation, Carrier injection, ambipolar transport, Diffusion length.

Learning Resources:

1. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
2. Donald Neamen, Semiconductors Physics and Devices, Tata Mc Graw Hill, 2003
3. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley Publications, 2002.
4. Semiconductor Devices, Basic Principles Jasprit Singh, Wiley Publications, 2001
5. Electronic Devices and Circuits- Millman and Halkias-Tata Mc Graw Hill, 1983.
6. Solid State Electronic Devices - Ben G Streetman-Prentice Hall, New Delhi, 1995.

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 OFPHYSICS

FUNDAMENTALS OF MATERIALS SCIENCE (Open Elective-I)

(Stream: Materials Science for Engineers)
SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U23OE330PH
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:
1. Demonstrate the impact of atomic structure and various chemical bonding on the crystal properties. 2. Illustration of various types of atomic packing systems in crystals 3. Comprehend the basic principles of phase transformations 4. Describe various methods for strengthening mechanisms	1. Classify crystals based on their structure and chemical bonding. 2. Interpret the behaviour of crystals based on their atomic packing 3. Describe various types of phase transformations and apply them to suitable engineering scenarios. 4. Select proper processing technologies for synthesis and fabrication of different materials

UNIT I: Atomic structure and Chemical Bonding (8 hours)
Structure of the atom, The quantum states, Forces between atoms, Ionization potential, Electron affinity and electronegativity. Bond energy, Bond type and Bond length. Types of Bonds-Ionic, Covalent, Metallic bonding, Hydrogen bond, Vanderwalls bond, Cohesive energy of ionic crystals, Madelung constant.

UNIT II: Atomic Packing (6 hours)
Simple crystal structures, Classification of close packings 2-D & 3-D, Voids in closed packings, size and coordination of voids, significance of voids, axial ratio and lattice constants, effect of radius ratio, representation of closed packing, Paulings rule, Applications of Paulings rule to actual structures, examples of closed packed structures. Line and surface density of atoms.

UNIT III: Diffusion in Solids (8 hours)

Solid state diffusion, Diffusion mechanisms, Self-diffusion, Impurity diffusion coefficient, Fick's laws, Diffusion coefficient, determination of diffusion coefficient, Random walk diffusion, Diffusion in a simple cubic structure, Diffusion under external field, Kirkendall shift, Ionic conductivity, Ionic conductivity of alkali halides.

UNIT-IV: Strengthening Mechanisms (6 hours)

Solidification of metals and alloys, cooling curves, concepts of nucleation and growth, Heat transfer associated in nucleation and growth, Homogeneous and Heterogeneous nucleation, Structure of metal ingots, Construction of binary alloys, Formation of alloy phases, viz. Solid solutions – substitutional and interstitial, intermetallic compounds.

Learning Resources::

1. A.J.Dekker, Solid State Physics, Macmillan India Ltd., 2008.
2. V Raghavan, Materials Science and Engineering, PHI, 6thEdn, 2015
3. W.D. Callister Jr & David G. Rethwich, Materials Science and Engineering an Introduction-, John Wiley, 10thEdn, 2018.
4. M. A. Wahab, Solid State Physics, Narosa. 2015.
5. J. P. Srivastava, Elements of Solid State Physics, PHI, 2014.

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

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

Duration of Internal Tests: 90 Minutes

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

POLYMERIC MATERIALS

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

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U23OE310CH
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 familiarize with various types of polymers 2. To acquaint with different methods of polymerization. 3. To converse the different polymerization techniques 4. To familiarize with various high performance/ specialty polymers.	1. Classify the polymers. 2. Analyze the different polymerization methods and their mechanisms. 3. Discuss the polymerization techniques used for the selected polymers. 4. Discuss the synthesis, properties and applications of selected polymers.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	-	-	-	-	-	1	-	-	-	-	1
2	3	1	-	-	-	-	1	-	-	-	-	1
3	3	-	-	-	-	-	1	-	-	-	-	1
4	3	-	-	-	-	-	1	-	-	-	-	1

UNIT-I:
INTRODUCTION TO POLYMERS AND TYPES: (5h)

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

UNIT-II:
POLYMERIZATION: (7h)

Initiators- Types of Initiators, Thermal Decomposition of Initiators, Redox Initiation, Photochemical Initiation, Initiation by Ionizing Radiation, Pure

Thermal Initiation, Other Methods of Initiation, Initiator Efficiency, Definition -Mechanism - Cage Effect.Step-Reaction (Condensation) Polymerization, Polymerization Mechanisms- Mechanism of Stepwise Polymerization, Radical Chain (Addition) Polymerization, Chain Polymerization, Ionic and Coordination Chain (Addition) Polymerization, Cationic Polymerization, Anionic Polymerization, Copolymerization - Mechanisms of Copolymerization, Block and Graft Copolymers

UNIT-III:

TECHNIQUES OF POLYMERIZATION: (7h)

Living Radical Polymerization - General Considerations, Atom Transfer Radical Polymerization (ATRP) -Polymerization Mechanism, Stable Free-Radical Polymerization (SFRP), Radical Addition–Fragmentation Transfer (RAFT) -and Other Living Radical Polymerizations.process conditions -bulk (mass) polymerization - solution polymerization- emulsion & suspension polymerization - heterogeneous polymerization - other processes; self-assembly and nanostructures.

UNIT-IV:

COMMERCIAL &HIGH-PERFORMANCE POLYMERS: (7h)

Synthesis, properties and applications of commercial polymers: polyvinyl chloride, polystyrene

Requirements for High-Temperature Polymers.

Synthesis, properties and applications of

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

Text Books:

1. George Odian, Principles of Polymerization Fourth Edition, University of New York.
2. Fred w. Billmeyer, Textbook of Polymer Science Third Edition, New York
3. P.C.Jain and Monica Jain, "Engineering Chemistry", DhanpatRai Pub, Co., New Delhi (2002)
4. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).

Learning Resources:

1. D. Dhara, NPTEL Polymer Chemistry Course, IIT Kharagpur.
2. Gowarikar R V, Polymer Chemistry

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

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

Duration of Internal Tests: 90 Minutes

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

LEARNING TO LEARN

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

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U23OE310EH
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

UNIT 1: STUDY SKILLS
Good study skills can increase a student's confidence, competence, and self-esteem. They can also reduce anxiety about tests and deadlines. This module is designed to develop effective study skills, and enable students to cut down on the number of hours spent studying, leaving more time for other important things in their life

1.1 Study Skills Checklist
1.2 Learning Styles
1.3 Habits of Effective Students
1.4 Using the Focused and Diffuse Modes
1.5 Introduction to memory and Memory Technique

UNIT 2: Chunking

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

2.1 Knowledge Chunking
2.2 Skill and Will
2.3 Sleep and Learning

UNIT 3: Procrastination and Memory

In this module, we talk about two intimately connected ideas—procrastination and memory. Building solid chunks in long term memory--chunks that are easily accessible by your short term memory—takes time. This is why learning to handle procrastination is so important. Finally, we talk about some of the best ways to access your brain's most powerful long term memory systems so that learning is long term and the learner has the ability to recall and use it as per need.

3.1 Controlling Procrastination
3.2 Ranking the importance of tasks with a to- do list
3.3 Finding their most productive time
3.4 Keeping track of time spent on different tasks
3.5 Introduction to Deep learning

UNIT 4: Renaissance Learning and Unlocking Your Potential

In this module we're going to talk more about important ideas and techniques that will enhance student's ability to learn. Students will also discover how to more profitably interact with fellow learners, how to recognize your own strengths, and how to avoid the "imposter syndrome." Fighter pilots and surgeons use checklists to help them with their critical duties—you can use a similar checklist to help you prepare for tests. Ultimately, you will learn more about the joys of living a life filled with learning!

4.1 Psychology of Goal Setting
4.2 Criteria for Goal Setting
4.3 Steps in Goal Setting

4.4 Visioning
4.5 Strategy & Action Plan
4.6 Goal Progress Review

Learning Resources:
learn.talentsprint.com

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

1. No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2. No. of Assignments	:	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: U23HS030EH
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	• Discussions • Skits • Short movies/documentaries • Team tasks and individual tasks • Research based tasks

assignments	• 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 COURSEI - COMMUNICATION SKILLS IN ENGLISH I

SYLLABUS FOR BE III Semester

L:T:P(Hrs/week):2:0:0	SEE Marks:40	Course Code: U23HS320EH
Credits :01	CIE Marks:30	Duration of SEE: 02Hours

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

1.1 Introductions on an Online Forum

1.2 Making Observations and Giving Opinion

1.3 Recalling and Describing

Unit 2: Formal Conversation Skills

2.1 Ask for Information

2.2 Give Information

2.3 Give Feedback

2.4 Seek Permission

Unit 3: Technical Expositions and Discussions

3.1 Classification

3.2 Sequence

3.3 Compare and Contrast

3.4 Cause and Effect

3.5 Problem and solution

Unit 4: Rational Recap

4.1 Paraphrasing - Written
1.2 Summarizing - Written
1.3 Paraphrasing – Spoken
1.4 Summarizing – Spoken

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

Learning Resources:

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 COURSEII – APTITUDE I

SYLLABUS FOR BE III Semester

L:T:P(Hrs/week):2:0:0	SEE Marks:40	Course Code: U23BS330MA
Credits :01	CIE Marks:30	Duration of SEE: 03Hours

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

MATERIALS ENGINEERING LAB
SYLLABUS FOR B.E. III-SEMESTER

L :T:P (Hrs./week)0 : 0 : 2	SEE Marks:50	Course Code: U23PC311ME
Credits : 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVE The objective of the course is to	**COURSE OUTCOMES** On completion of the course, students will be able to
prepare metallographic samples, observe micro structure for various metals, heat treatment of steel samples and examine micro structures using metal analyzer.	1 illustrate the relationship between microstructure and properties of ferrous alloys. 2 illustrate the relationship between microstructure and properties of non-ferrous alloys. 3 examine property changes in steels due to Annealing and Normalising processes. 4 examine property changes in steels due to Hardening and Tempering processes. 5 interpret the microstructure using image analyzer.

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	1		2	2				1	1			2	2	1	1
CO2	1		3	2				2	1			2	2	1	1
CO3	1		3	2				2	1			2	2	1	1
CO4	1		2	2				2	1			2	2	1	1
CO5	1		2	2				2	1			2	2	1	1

List of Experiments:

1. Study of General Procedure for Specimen preparation and Metallurgical Microscope.
2. Preparation of Mounted samples with the help of mounting press.
3. Metallographic study and analysis of Low Carbon Steel.
4. Metallographic study and analysis of Medium Carbon Steel.
5. Metallographic study and analysis of High Carbon Steel.
6. Metallographic study and analysis of Gray Cast Iron.
7. Metallographic study and analysis of Spheroidal cast iron.

8. Metallographic study and analysis of α– Brass.
9. Metallographic study and analysis of α– β Brass.
10. Metallographic study and analysis of Bronze.
11. Study of effect on Hardness of plain carbon steel before and after the following Processes: Annealing and Normalizing.
12. Study of effect on Hardness of plain carbon steel before and after the following Processes: Hardening and Tempering.
13. Measurement of hardenability using Jominy End Quench Test.
14. Study of crystal structure and calculation of packing factor of Simple Cubic, BCC, FCC and HCP crystals.
15. To evaluate the grain characteristics of a given ferrous specimen.
16. To evaluate the grain characteristics of a given non-ferrous specimen.

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

The break-up of CIE:

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: U23ES321ME
Credits:1	CIE Marks: 30	Duration of SEE:3 Hours

COURSE OBJECTIVES In this subject the students will	**COURSE OUTCOMES** 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 data type for implementing programs using C language. 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 store data in 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	12	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. Kernigh anand 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 ANSIC, 4th Edition (2008),TMG.

No. of Internal Test:	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

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

L:T:P(Hrs./week):0:0:2	SEE Marks:50	Course Code: U23PC331ME
Credits :01	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	12	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.

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)
SCHEME OF INSTRUCTION AND EXAMINATION (R-22)
B.E. – MECH : FOURTH SEMESTER (2023-2024)

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								
U23BS410MA	Numerical Methods, Probability & Statistics	3	-	-	3	60	40	3
U23PC410ME	Applied Thermodynamics	3	-	-	3	60	40	3
U23PC420ME	Fluid Mechanics and Hydraulic Machines	3	-	-	3	60	40	3
U23ES430ME	Programming through Data Structures	3	-	-	3	60	40	3
U23PC440ME	Machine Drawing	2	-	2	3	60	40	3
U23OE4XXXX	Open Elective II	3	-	-	3	60	40	3
U23BS430MA	Skill Development Course III– Aptitude II	1	-	-	2	40	30	1
U23PE430ME	Skill Development Course IV- Technical Skills I (CADD and Introduction to Solid Modelling)	1	-	-	2	40	30	1
PRACTICALS								
U23PC411ME	Applied Thermodynamics Lab	-	-	2	3	50	30	1
U23PC421ME	Fluid Mechanics and Hydraulic Machines Lab	-	-	2	3	50	30	1
U23ES431ME	Programming through Data Structures Lab	-	-	2	3	50	30	1
	TOTAL	**19**	**-**	**8**		**590**	**390**	**23**
	GRAND TOTAL	**27**				**980**		**23**

1) Student should complete one NPTEL certification course equivalent to 2 credits (8 weeks) by the end of VI semester.
2) Left over hours allotted to Sports / Library / PDC / Mentor Interaction / CC / RC / TC / CCA / ECA
3) Students opting for B.E. Honours should complete one NPTEL certification course of 12 weeks (Robotics related) by the end of IV semester.

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: U23BS410MA
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 approximating derivatives and 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 approximate derivatives of functions at given points and solve first-order ordinary differential equations. 3. Differentiate between discrete and continuous random variables and apply various probability distributions to solve practical problems 4. Formulate Null and Alternative Hypotheses and apply the tests of hypothesis for small samples. 5. Apply the method of least squares to fit various curves to the given data and Calculate Karl Pearson's coefficient of correlation.

UNIT –I (08 Hours)
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 (08 Hours)
Numerical Solutions of ODE:
Numerical Differentiation -Interpolation approach- Numerical Solutions of Ordinary Differential Equations of first order - Taylor's Series Method - Euler's Method - Runge-Kutta of 4^{th} order (without proofs)

UNIT-III (08 Hours)
Probability Distribution:
Random Variables - Discrete and Continuous Random Variables – Mass and density functions – Distribution functions - Definitions of Mean, Median, Mode and Variance – Continuous Distributions - Normal Distribution – Properties - Standard Normal variate.

UNIT-IV (10 Hours)
Test of Hypothesis:
Introduction -Testing of Hypothesis- Null and Alternative Hypothesis - Errors- -Level of Significance – Confidence Intervals-Tests of Significance for small samples - t-test for single mean - F- test for comparison of variances - Chi-square test for goodness of fit.

UNIT-V (08 Hours)
Curve Fitting:
Curve fitting by the Method of Least Squares - Fitting of Straight line-Second order curve (parabola)-Exponential curve--Correlation – Karl Pearson's Co-efficient of Correlation.

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

APPLIED THERMODYNAMICS
SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: U23PC410ME
Credits :03	CIE Marks:40	Duration of SEE:03Hours

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	12	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, Intercooling 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: types of combustion chambers in SI and CI engines.

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-fire tube boilers- Cochran boiler; water tube boilers-Babcock and Wilcox boiler; super critical boilers-Benson boiler; boiler mountings and accessories; boiler performance; boiler draught (concept only).

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.

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, DhanapatRai& 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
Department of Mechanical Engineering

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

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: U23PC420ME
Credits :03	CIE Marks:40	Duration of SEE:03Hours

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 and flow separation 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	12	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 of Fluids: Introduction, definition of fluid and flow, continuum fluid, fluid properties; 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, velocity potential and stream function.

Fluid Dynamics: mass, momentum and energy conservation equations; 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.

Boundary Layer Theory: formation and its thickness, displacement, momentum and energy thickness.

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 and types; cavitation.

UNIT-V

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

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

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

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 :U23ES430ME
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	12	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-In order Traversal, Preorder Traversal and Post order 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), PHl.,
4. Gilberg R. F and Forouzan B. A, Data structures: A Pseudocode Approach with C, Second Edition(2007), Cengage Leaming
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press
7. YedidyahLangsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI

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

1 No. of Internal Tests : 2 Max. Marks for each Internal Tests : 30

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

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

Duration of Internal Tests : 90 Minutes

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

MACHINE DRAWING
SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):2:0:2	SEE Marks:60	Course Code: U23PC440ME
Credits :03	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
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	12	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

B.E- IV SEM OPEN ELECTIVE-II COURSES			
Dept.	**Title**	**Code**	**Credits**
MECH	Kinematics and Dynamics of Robotics (Stream: Robotics)	U23OE410ME	3
	Operations Research (General Pool)	U23OE420ME	3
CIVIL	Solid Waste Management (General Pool)	U23OE410CE	3
CSE	Mathematical Computing for AI & ML with Python (Stream: Artificial Intelligence & Machine Learning)	U23OE420CS	3
	Basics of Java Programming (General Pool)	U23OE410CS	3
EEE	Solar Power and Applications (General Pool)	U23OE410EE	3
ECE	Sensors for Engineering Applications (General Pool)	U23OE410EC	3
IT	Essentials of Mathematics For Machine Learning using Python (Stream: Artificial Intelligence and Machine Learning)	U23OE420IT	3
	Introduction to Database Management Systems (General Pool)	U23OE410IT	3
Physics	Basic Semiconductor Devices (Stream: Semiconductor Physics and Device Applications)	U23OE410PH	3
	Synthesis and Properties of Materials (Stream: Materials Science for Engineers)	U23OE420PH	3
HSS	Critical Thinking (General Pool)	U23OE430EH	3
	Technical Writing and Professional Presentation	U23OE020EH	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: U23OE410ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE The objective of the course is to	**COURSE OUTCOMES** On completion of the course, students will be able to
To develop the fundamental knowledge and skills required to analyze, design and control robotic systems	1. Analyze the kinematics of robotic systems and apply them to solve real world problems 2 Apply differential kinematics and statics concepts to design and control robotic systems 3 Analyze the dynamics of serial manipulators using 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	12	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 RR planar manipulators.

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

UNIT-III

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

Dynamics of serial manipulators

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

Unit-IV

Dynamics of serial manipulators

Recursive dynamics using Newton-Euler formulation of RP and RR serial manipulator.

UNIT-V

Trajectory Generation

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

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

Learning Resources:

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

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

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 : U23OE420ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

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	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.

UNIT-III

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

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

UNIT-IV

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

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

UNIT-V

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

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

Learning Resources:

1. Hamady A. Taha, "Operations Research – An introduction", 6th Edition, PHI Pvt. Ltd., 1997.
2. S.D. Sharma, "Operations Research", Kedarnnath, Ramnath& Co., Meerut, 2009.

3. Harvey M. Wagner, "Principles of Operations Research", 2nd Edition, PHI Pvt. Ltd., 1980.
4. V.K. Kapoor, "Operations Research", S. Chand Publishers, New Delhi, 2004.
5. S.S. Rao, "Engineering Optimization – Theory and Practice", 4th Edition, John Wiley & Sons Inc., 2009.

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

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

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF 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:U23OE410CE
Credits: 3	CIE Marks:40	Duration of SEE : 3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
In this subject the students will	Upon the completion of this course students will be able to
1. Understand characteristics of solid waste and legislation of solid waste management. 2. Understand processing, collection and transportation of solid wastes. 3. Gain insight into transformation, energy recovery and 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. 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: U23OE420CS
Credits: 3	CIE Marks: 40	Duration of SEE: 3Hours

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

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF 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: U23OE410CS
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, read and write operations using console and files IO streams.

UNIT-I: Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Concepts, Benefits of Object Oriented Development.
Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables and Arrays, Operators, Control Statements.

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

UNIT-III: Exception Handling: try, catch, throw, throws, finally, creating user defined exceptions
Multithreaded Programming: Types of Thread creation, multiple threads, isalive, join, thread priority, Thread Synchronization, Inter process communication.

UNIT-IV: String Handling: String constructors, operations, character extraction, comparison, search, modification. StringBuffer, methods, StringBuilder, StringTokenizer
Util: Date, Calendar, Random, Timer, Observable
IO: Files and Directories, I/O Classes and Interfaces, Byte Streams classes and Character Stream classes

Learning Resources:

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

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

1	No. of Internal Tests:	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 ELECTRONICSENGINEERING

SOLAR POWER AND 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: U23OE410EE
Credits: 3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To impart the basics of solar energy harnessing and solar panel and array.	1. Compare different energy resources. 2. Identify and choose proper type of meter for solar radiation measurement. 3. Use proper solar thermal system according to the load requirements. 4. Categorize and compare photovoltaic cells. 5. Apply the knowledge of solar energy.

Unit – I

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

Unit – II

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

Unit – III

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

Unit – IV

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

Unit – V

Solar PV systems & Applications: Solar PV system classification - Stand-Alone Solar PV system and Grid-Interactive Solar PV system. Applications - Water Pumping, lighting, medical refrigeration, village power and Telecommunication.

Suggested Reading:

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

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

1	No. of Internal Tests:	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: U23OE410EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

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: U23OE420IT
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 essential math principles and Python programming techniques for understanding and applying machine learning to real-world problems.	1. Understand and apply linear algebra principles to solving system of linear equations using Python libraries. 2. Understand and apply statistical methods to various estimation problems. 3. Understand and apply probability theory to various problems like density estimation, sampling, and classification. 4. Understand and apply calculus principles to implement various learning problems using neural networks. 5. Understand and apply optimization principles to solve various ML algorithms.

UNIT – I:

Linear algebra: Vectors, arithmetic on vectors, norms, dot and cross products. Matrix, arithmetic on matrices, types of matrices, sparsity, tensor.

Numpy arrays, indexing, slicing, reshape, broadcasting and setting axis.

Intro. to Scipy linear algebra.

System of linear equations: inverse, pseudo inverse, solving linear equations.

Matrix decompositions: Eigen values, eigen vectors, Eigen decomposition, Singular value decomposition, Principal component analysis.

UNIT – II:

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

UNIT-III:

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

UNIT-IV:

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

UNIT V:

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

Learning Resources:

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

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

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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

Introduction to Database Management Systems

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

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

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

UNIT – I

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

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

UNIT – II

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

UNIT – III

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

UNIT – IV

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

UNIT – V

Transactions: Transaction Concepts, Transaction State, Concurrent Executions, Serializability

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

Learning Resources :

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

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 PHYSICS

Basic Semiconductor Devices (Open Elective - II)

(Steam: Semiconductor Physics and Device Applications)
SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U23OE410PH
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Discuss construction and working of PN junction diode	Explain the design considerations and explore uses of variousp-n junction diodes
Describe various Metal-Semiconductor Junctions	Illustrate the physical mechanisms governing the operation ofMetal-Semiconductor Junctions
Categorize several Special Semiconductor Devices	Identify the design of semiconductor devices to meet performance requirements
Describe the construction and working of BJT and Thyristors	Summarize BJT and other devices performance.
Explain various BJT fabrication methods	Interpret the influence of the fabrication method on various properties and select appropriate fabrication technique

UNIT I: Junction Diode (8 hours)
Basic structure of PN junction, Band bending, zero bias condition, Expression for built in potential, Electric field and space charge width, Abrupt and Graded junctions, Diode equation, Effect of temperature on PN junction diode, Capacitive effects in PN junction, Diode –applications.

UNIT II: Metal-Semiconductor Junction (10 hours)
Schottky and Ohmic contacts, Schottky barrier diode, Current voltage relationship, comparison of Schottky barrier diode and pn junction diode, Static Barrier Characteristics, Dynamic Characteristics, Ohmic Contact, Metal Oxide Semiconductor Capacitor-Capacitance-Voltage, Ideal MOS system-Threshold voltage.

UNIT III: Special Semiconductor Devices (8 hours)
Small signal equivalent circuits of PN-diode, short and long diode, Breakdown mechanisms in Zener diode, Varactor diode, Tunnel diode, Gunn diode, Shockley diode, IMPATT diode.

UNIT IV: BJT and Thyristor (8 hours)

BJT's – Construction and characteristics, Thyristor – Construction, working and characteristics, comparison of BJT and Thyristor, Heterojunction Bipolar junction transistor, Basics of gate turn-off thyristor (GTO), SiC based Bipolar Devices-Applications, Building a GaN Transistor-GaN Transistor Electrical Characteristics.

UNIT V: Fabrication Techniques (6 hours)

BJT fabrication: Diffused, point contact, fused or alloy and rate grown techniques, molecular beam epitaxy (MBE), epitaxial vapour phase, Liquid phase growth.

Learning Resources:

1. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
2. Donald Neamen, Semiconductors Physics and Devices, Tata Mc Graw Hill, 2003
3. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley Publications, 2002.
4. Semiconductor Devices, Basic Principles Jasprit Singh, Wiley Publications, 2001
5. Electronic Devices and Circuits- Millman and Halkias-Tata Mc Graw Hill, 1983.
6. Solid State Electronic Devices - Ben G Streetman-Prentice Hall, New Delhi, 1995.

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 PHYSICS

Synthesis and Properties of Materials (Open Elective - II)

(Steam: Materials Science for Engineers)
SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U23OE420PH
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Illustrate the different physical methods of material synthesis Describe various chemical methods of material synthesis Interpret the various electrical properties of the materials Summarize various physical properties of the materials Outline the different optical and thermal properties of the materials	articulate basic principles of the synthesis and sample handling . explain the principles of synthesis of materials by various chemical methods . Categorize the materials based on electrical properties and choose the right materials for specific engineering applications . Identify the materials based on physical properties and choose the appropriate material for specific applications Recognize the materials for suitable applications based on their optical and thermal properties

UNIT I: SYNTHESIS OF MATERIALS-PHYSICAL METHODS (10 hours)

Solid state reaction, diffusion, melt quenching, vapor deposition, Chemical vapor deposition, physical vapor deposition, sputtering, mechanical milling, electron beam deposition.

UNIT II: SYNTHESIS OF MATERIALS-CHEMICAL METHODS (8 hours)

Introduction, slow evaporation at room temperature, high-temperature solution growth, Sol-gel process, Aerosol method, Hydro-thermal process, Solvo-thermal synthesis, Photo-chemical synthesis.

.

UNIT III: Electrical Properties of Materials (8 hours)

The Boltzmann transport equation, Electrical conductivity, electrical conductivity at low temperatures, Matheissen's rule, Thermal conductivity,

Widemann-Franz law, Hall-effect, Temperature variation of electrical conductivity

UNIT-IV: Physical properties of Materials (10 hours)

Fundamentals of magnetism, different types of magnetism, Permeability, Magnetic Hysteresis, Coercive force.

Young's modulus, Bulk modulus, Modulus of rigidity, tensile testing and tensile strength, breaking strength, plastic deformation, failure analysis, hardness-testing, Brinell's, Viker's impact testing – toughness, resilience, scratch test.

UNIT-V: Optical and Thermal Properties of Materials (10 hours)

Optical properties: photoconductivity, optical absorption & transmission, energy band gap determination, photoluminescence, phosphorescence, electroluminescence.

Thermal properties: concept of phonons, thermal conductivity, specific heat, exothermic & endothermic processes.

Learning Resources:

1. A.J.Dekker, Solid State Physics, Macmillan India Ltd., 2008.
2. V Raghavan, Materials Science and Engineering, PHI, 6thEdn, 2015
3. W.D. Callister Jr & David G. Rethwich, Materials Science and Engineering an Introduction-, John Wiley, 10thEdn, 2018.
4. M. A. Wahab, Solid State Physics, Narosa. 2015.
5. J. P. Srivastava, Elements of Solid State Physics, PHI, 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:	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

CRITICAL THINKING

(General Pool: Open Elective - II)

SYLLABUS FOR B.E. IV SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U23OE430EH
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

UNIT 1: COMPONENTS OF CRITICAL THINKING

1.1 Applying Reason
1.2 Open Mindedness
1.3 Analysis
1.4 Logic

UNIT 2: NON-LINEAR THINKING

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

UNIT 3: LOGICAL THINKING

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

UNIT 4: INFER MEANING FROM INFORMATIVE TEXTS
4.1 Making Assumptions
4.2 Watch out for Bias
4.3 Ask Clarifying Questions
4.4 SWOT Analysis

UNIT 5: PROBLEM SOLVING
5.1 Identifying Inconsistencies
5.2 Trust your Instincts
5.3 Asking Ask?

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

Learning Resources:
learn.talentsprint.com

1. Calling Bullshit: The Art of Skepticism in a Data-Driven World. by Carl Bergstrom & Jevin West. ...
2. Thinking, Fast and Slow. by Daniel Kahneman. ...
3. Factfulness: Ten Reasons We're Wrong About The World — And Why Things Are Better Than You Think. ...
4. Box Thinking: The Surprising Truth About Success. ...

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

TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS

(General Pool: Open Elective - II)

SYLLABUS FOR B.E. IV SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U23OE020EH
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. Understand the principles and mechanics of technical writing for students of engineering. 2. Identify different kinds of business correspondences and the dos and don'ts for each of them. 3. Make effective presentations as part of today's workplace demands. 4. Recognize the need for Video and Written CVs with focus on specific elements. 5. Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs	At the end of the course the learners will be able to: 1. Write effective reports. 2. Articulate business correspondences based on need. 3. Make persuasive presentations. 4. Design their videos CVs. 5. Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose

UNIT 1: FORMAL & INFORMAL TECHNICAL REPORTS

1.1 Informal Report Formats
1.2 Project and Research Reports
1.3 Formal Report Components, Feasibility Reports, Evaluation reports
1.4 Analytical and Informational reports
1.5 Executive summaries.

UNIT 2: BUSINESS CORRESPONDENCE

2.1 Electronic communication
2.2 Effective emails
2.3 Instant and text messaging guidelines

UNIT 3: PROFESSIONAL PRESENTATIONS

3.1 Paper presentations & Poster presentations
3.2 PowerPoint presentations
3.3 Storyboard writing

UNIT 4: RESUME & CVs

4.1 Technical Resume
4.2 Cover letter, resume format
4.3 Video CVs

UNIT 5: WRITING PROPOSALS & SOPs

5.1 Types of proposals
5.2 Request for proposals
5.3 Stating your objective.

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

1. Read Me First: A Style Guide for the Computer Industry by Sun Technical Publications
2. Eats, Shoots and Leaves Paperback – 18 February 2010 by Lynne Truss
3. Don't Make Me Think, Revisited: A Common Sense Approach to Web & Mobile Usability Third Edition By Pearson Paperback –
4. The Design of Everyday Things: Revised and Expanded Edition Paperback –Illustrated, 5 November 2013 by Don Norman (Author)

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 I

(Common to All Branches)

SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code: U23BS430MA
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

UNIT 5
QUANTITATIVE APTITUDE- ENGINEERING MATHEMATICS
5.1 Permutations and combinations
5.2 Probability

Learning Resources :

Prescribed textbook for theory:

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

Suggested Reading

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

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

1.	No. of Internal Tests	: 2	Max. Marks for each Internal 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& Introduction to Solid Modeling)

SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week): 1:0:0	SEE Marks: 40	Course Code: U23PE430ME
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.

Layers and object Properties, Creating dimensions.

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.

Creating a layout to plot, documents, file formats.

Suggested Reading:

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	: 2	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

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

L:T:P(Hrs/week):0:0:2	SEE Marks:50	Course Code: U23PC411ME
Credits :01	CIE Marks:30	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 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.

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 a two-stroke Petrol engine.
9. To conduct performance test on twin-cylinder Diesel engine.
10. To study the performance of a Petrol engine under different compression ratios.
11. To conduct Morse test on multi cylinder Petrol engine.

12. To study Exhaust gas analysis of Diesel engine for carbon deposits using smoke meter.
13. To determine the viscosity of a given lubricating oil.
14. 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 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: U23PC421ME
Credits :01	CIE Marks:30	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*
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.

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.
14. To study the performance characteristics of a centrifugal pump at variable 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 :U23ES431ME
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	12	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. Menu driven program that implements Stacks using arrays for the following operations.
   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, In order, Post order) 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			

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			

Suggested Reading:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2/e, Universities Press, 2008
2. Mark AWeiss, 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. Rivestand Clifford Stem 'Introduction to Algorithms'2002.
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition(2008),Pearson
6. Data Structures through Cindepth, SK Srivastava, Deepali Srivastava, BPB publications, 2nd Edition

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)
B.E. – MECH : BRIDGE COURSE (2024-2025)

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								
UB23BS300MA	Calculus & Matrix Theory	2	-	-	3	50	-	0
UB23ES340CE	Mechanics for Engineers	2	-	-	3	50	-	0
	TOTAL	**4**	**-**	**-**	**-**	**100**	**-**	**0**
IV-SEMESTER								
THEORY								
UB23HS410EH	English Language and Communication Skills	2	-	-	3	50	-	0
PRACTICALS								
UB23HS411EH	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

CALCULUS & MATRIX THEORY

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:50	Course Code: UB23BS300MA
Credits : - - -	CIE Marks: - - -	Duration of SEE: 3 Hrs

UNIT-I: (08 Hours)

CALCULUS

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

UNIT –II (06 Hours)

VECTOR DIFFERENTIATION

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

UNIT – III (06 Hours)

MULTIPLE INTEGRALS: Double integrals - Change of order of integration (Cartesian Coordinates) – Change of variables (Cartesian to polar coordinates in two dimensions) - Triple integrals (Cartesian).

UNIT- IV (06 Hours)

MATRIX THEORY

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

Suggested 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.

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

MECHANICS FOR ENGINEERS

(Civil, Mech., & EEE)

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

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

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

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

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

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

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

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

Learning Resources:

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

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: UB23HS410EH
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. Listen for global comprehension and infer meaning from spoken discourses. 3. Write paragraphs coherently. 4. Use phrases, essential vocabulary and polite expressions in every day conversations.

Unit 1

1.0 Communication & Functional English

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

Unit2

2.0 Listening

2.1 Importance of listening, Active listening

Unit3

3.0: Writing

3.1 Paragraph writing, coherence and cohesion.

Unit4

4.0 Grammar and Vocabulary

4.1 Common Errors, one word substitutes, collocations.

Unit-5

5.0 Reading

5.1 Prose text-Our Own Civilization- C.E.M Joad.

Prescribed text book for theory:

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

Suggested Reading

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

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

SYLLABUS FOR BRIDGE COURSE B.E. IV-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:50	Course Code: UB23HS411EH
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.

ELCS-Component-INTERACTIVECOMMUNICATIONSKILLSLAB

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

Debate: Understanding the differences between a debate and a group discussion, essentials of debate, conclud**i**ng a debate.

Role Plays: Types of Role plays (formal and informal), use of discourse markers.

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

Prescribed text book for laboratory:

SpeakWell: Jayshree Mohanraj, Kandula Nirupa Rani and Indira Babbellapati-Orient Black Swan Longman Dictionary of Contemporary English 6TH edition, 2020

Learning Resources:

1. Balasubramanian: 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.