VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
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

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR B.E. (ECE) III and IV Semesters

With effect from 2023-24
(For the batch admitted in 2022-23)
(R-22)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Phones: +91-40-23146040, 23146041
Fax: +91-40-23146090

Institute Vision

Striving for a symbiosis of technological excellence and human values

Institute Mission

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

Department Vision

Striving for excellence in teaching, training and research in the areas of Electronics and Communication Engineering and fostering ethical values

Department Mission

To inculcate a spirit of scientific temper and analytical thinking and train the students in contemporary technologies in Electronics and Communication Engineering to meet the needs of the industry and society with ethical values

B.E (ECE) Program Educational Objectives (PEO's)	
PEO I	Graduates will be able to identify, analyze and solve engineering problems.
PEO II	Graduates will be able to succeed in their careers, higher education, and research.
PEO III	Graduates will be able to excel individually and in multidisciplinary teams to solve industry and societal problems.
PEO IV	Graduates will be able to exhibit leadership qualities and lifelong learning skills with ethical values.

B.E. (ECE) PROGRAM OUTCOMES (PO's) Engineering Graduates will be able to:	
PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	Design / development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
PO4	Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Lifelong learning: Recognize the need, and for have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

B.E (ECE) PROGRAM SPECIFIC OUTCOMES (PSO's)	
PSO I	ECE students will be able to analyze and offer circuit and system level solutions for complex electronics engineering problems, keeping in mind the latest technological trends.
PSO II	ECE students will be able to apply the acquired knowledge and skills in modeling and simulation of communication systems.
PSO III	ECE students will be able to implement signal and image processing techniques for real time applications.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031.
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-22)** :: B.E. - ECE : THIRD SEMESTER (2023-24)

B.E (ECE) III – SEMESTER								
Course Code	Name of the Course	Scheme of Instruction Hours per Week			Scheme of Examination Duration in Hrs	Scheme of Examination Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U22PC310EC	Electronic Devices	3	-	-	3	60	40	3
U22PC320EC	Digital Logic Design	3	-	-	3	60	40	3
U22PC330EC	Signal Analysis and Transform Techniques	3	1	-	3	60	40	4
U22BS320MA	Partial Differential Equations and Numerical Methods	3	-	-	3	60	40	3
U22OE3XXXX	Open Elective - I	2	-	-	3	60	40	2
U22HS320EH	Skill Development Course - I: Communication Skills in English-I	1	-	-	2	40	30	1
U22BS340MA	Skill Development Course - II: Aptitude - I	1	-	-	2	40	30	1
U22HS030EH	Human Values and Professional Ethics - II	1	-	-	2	40	30	1
PRACTICALS								
U22PC311EC	Electronic Devices Lab	-	-	2	3	50	30	1
U22PC321EC	Digital Logic Design Lab	-	-	2	3	50	30	1
U22PC331EC	Signals and Systems Lab	-	-	2	3	50	30	1
U22PC341EC	Electronic Workshop	-	-	2	3	50	30	1
	TOTAL	**17**	**1**	**8**		**620**	**410**	**22**
	GRAND TOTAL	**26**				**1030**		

Left over hours will be allocated for: Sports / Library / Mentor - Mentee Interaction / CC / RC / TC / ECA / CCA.

Note: **1)** Every Student shall complete one NPTEL course certification of 8 weeks duration (equivalent to 2 credits weightage) by the end of VI-Semester.
2) Students willing to Opt B.E (ECE) Honours Degree in System on Chip Design shall complete one NPTEL Course Certification (equivalent to 2 Credits weightage) by the end of IV-Semester.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-22)** :: B.E. - ECE : THIRD SEMESTER (2023-24)

Bridge Course for ECE Lateral Entry Students								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			Credits
		Hours per Week			Duration in Hrs	Maximum Marks		
		L	T	P/D		SEE	CIE	
THEORY								
UB22ES310EC	Programming Techniques to Problem Solving	2	-	2	3	50	-	-
UB22BS300MA	Matrix Theory and Vector Calculus	2	-	-	3	50	-	-

COURSES OFFERED TO EEE								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			Credits
		Hours per Week			Duration in Hrs	Maximum Marks		
		L	T	P/D		SEE	CIE	
THEORY								
U22ES310EC	Electronics Engineering – I	3	-	-	3	60	40	3
PRACTICALS								
U22ES311EC	Electronics Engineering - I Lab	-	-	2	3	50	30	1

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Devices

SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U22PC310EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To familiarize the students with various two terminal and three terminal electronic devices working and use in the design of real time electronic products. 2. To understand the students with fabrication process for Electronic devices.	On completion of the course, students will be able to 1. Plot the electric field distribution across the junctions 2. Analyze the characteristics of various diodes and transistors. 3. Employ PN- Junction diode as a circuit element. 4. Distinguish between properties of BJT, MOSFET & FinFET with reference to packing density and power dissipation. 5. Illustrate the fabrication processes for CMOS inverter.

CO-PO/PSO Mapping

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

UNIT - I : Carrier Transport Mechanisms Review of semiconductor physics:

Carrier Drift: Drift Current Density, Mobility Effects, Conductivity, Velocity Saturation. Carrier Diffusion: Diffusion Current Density, Total Current Density. Graded Impurity Distribution: Induced Electric Field, The Einstein Relation. Carrier Generation and Recombination.

UNIT - II : PN Junction Characteristics:

Basic Structure of the pn Junction, Zero Applied Bias: Built-in Potential Barrier, Electric Field, Space Charge Width. Forward and Reverse Applied Bias. Junction Capacitance, Non-uniformly Doped Junctions.pn Junction Current equation, I-V characteristics, Temperature Effects. Small-Signal Model of the pn Junction. Charge Storage and Diode Transients: The Turn-off Transient, the Turn-on Transient. Junction Breakdown: Avalanche

and Zener breakdown.

UNIT - III : PN junction applications and Metal-Semiconductor:
Full wave rectifier with filters. Non-linear wave shaping: Clipping and clamping circuits, Zener diode as regulator. Special Diodes: LED, Photo diode and Tunnel Diode. The Schottky Barrier Diode: Ideal Junction Characteristics, Comparison of the Schottky Barrier Diode and the PN Junction Diode, Metal-Semiconductor Ohmic Contacts.

UNIT - IV : Transistors:
Bipolar Junction Transistor I-V characteristics, Ebers-Moll Model, MOS structure and its Operating modes, MOS capacitor, C-V characteristics, MOSFET, I-V characteristics, and small signal models of MOS transistor.

UNIT - V : CMOS and Integrated circuit fabrication process:
CMOS as Invertor, CMOS invertor Switching characteristics. Short channel Effects in MOSFET. Introduction to FinFET Technology. Oxidation, diffusion, ion implantation, photolithography, Etching, Chemical vapor deposition, sputtering, twin-tub CMOS process.

Learning Resources:

1. D. Neamen, D. Biswas & quot; Semiconductor Physics and Devices, 4th Edition, McGraw-Hill Education 2012.
2. Christos C. Halkias, SatyabrataJit, Jacob Millman "Electronic Devices and Circuits (SIE)" 4th Edition, MC Graw Hill Publication 2015.
3. S. M. Sze and K. N. Kwok, "Physics of Semiconductor Devices," 3rd edition, John Wiley & amp; Sons, 2006.
4. VLSI Fabrication Principles, Silicon and Gallium Arsenide 2nd Edition-1994 Sorab K Gandhi, Wiley- India Publications.
5. G. Streetman, and S. K. Banerjee, "Solid State Electronic Devices," 7th edition, Pearson, 2014.
6. https://nptel.ac.in/courses/113106062/# Electronic materials, Devices and Fabrication by Dr. S. Parasuraman IIT Madras.
7. https://nptel.ac.in/courses/117106091/ Solid State Devices by Prof. S. Karmalkar, IIT Madras.

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Digital Logic Design

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U22PC320EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To acquire knowledge of combinational and sequential circuits. 2. Learn language fundamentals of Verilog and able to simulate and synthesize digital circuits.	On completion of the course, students will be able to 1. Understand the basics of Boolean algebra and simplification. 2. Design & analyze combinational circuits. 3. Design & analyze sequential logic circuits 4. Apply the basic concept of Verilog HDL & Model digital circuits using Verilog. 5. Use the behavioural constructs for Logic Synthesis.

CO-PO/PSO Mapping

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

UNIT - I :

Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms, introduction to logic gates, Minimization of switching functions: Karnaugh map method (up to 5 variables), Binary codes.

UNIT - II :

Combinational circuits: Code Converters, Binary half and full adders, parallel adders, carry look ahead adder, Binary Subtractors, BCD adder, Encoders, Priority encoders, decoders. Multiplexers, Demultiplexers, and their applications, Comparators.

UNIT - III :

Sequential Logic Design: Latches and Flip flops, Ripple and Synchronous counters, Shift registers, Finite state machines, design of synchronous circuits, PAL, PLA.

UNIT - IV :

Introduction to HDLs: Basic Concepts of Verilog HDL, Data Types, System Tasks and Compiler Directives, Gate Level Modelling, Gate types and delays, Dataflow Modelling, continuous assignment and delays, Switch level Modelling, Design of Stimulus Block.

UNIT - V :

Behavioral Modelling: Structured procedures, procedural assignments, timing control, conditional statements, sequential and parallel blocks, Tasks and Functions, Design of Moore and Mealy FSMs using Verilog, Logic Synthesis. Introduction to Programmable Logic Devices.

Learning Resources:

1. Morris Mano M. and Michael D. Ciletti, "Digital Design. With an Introduction to Verilog HDL ", 6th edition, Pearson 2018.
2. Samir palnitkar, "Verilog HDL: A Guide to Digital Design and Synthesis, "Second edition, Pearson 2008.
3. https://nptel.ac.in/courses/108/106/108106177/
4. http://nptel.ac.in/courses/117105080/5

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Signal Analysis and Transform Techniques

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U22PC330EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To define and classify continuous and discrete time signals & systems 2. To determine the frequency domain characteristics of continuous and discrete time signals using various transform techniques. 3. To verify the causality and stability of LTI system and find its response using convolution.	On completion of the course, students will be able to 1. Analyze different types of continuous and discrete time signals and systems, and investigate whether the system is stable. 2. Apply different transformation techniques on continuous time signals and systems. 3. Determine the response of an LTI system using convolution. 4. Convert continuous time signals to discrete time signals using sampling and find the effects of aliasing. 5. Apply different transformation techniques on discrete time signals and systems.

CO-PO/PSO Mapping

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

UNIT - I :

Continuous Time Signals & Systems: Signals and Systems as seen in everyday life, and in various branches of engineering and science. Elementary signals, Basic operations on signals and its classification. Introduction to systems and its classification. Orthogonal signals.

Fourier Series: Introduction, Existence and Convergence, Trigonometric and exponential Fourier series representations and their relations, Symmetry conditions, Properties, Complex Fourier spectrum.

UNIT - II :

Signal Representation by Continuous Exponentials: Introduction to Fourier Transform, Existence, Fourier transform of singularity functions

and signals, Properties, Fourier transform of a periodic function.

Signal Transmission Through Linear Systems: Introduction to Linear Shift Invariant (LSI) system, Unit Impulse and step response, Convolution, Transfer function of an LSI system, Distortion less transmission.

UNIT - III :

Signal Representation by Generalized Exponentials: Introduction to Laplace transforms, Existence, Region of convergence (ROC) and it properties. Properties of Laplace transform. Inverse Laplace transform. Analysis and characterization of continuous LTI systems using Laplace Transform.

Sampling: Introduction to Sampling, Sampling Theorem, Aliasing, Sampling Techniques, Reconstruction: ideal interpolator, Zero – order hold and First order hold.

UNIT - IV :

Discrete Time Signals & Systems: Introduction, Elementary signals, Basic operations on signals and its classification. Introduction to systems and its classification. Discrete Fourier Series (DFS), Discrete Time Fourier Transform (DTFT). Linear Shift invariant (LSI) systems – Linear Convolution, Stability and Causality

UNIT - V :

Z-Transforms: Introduction to Z-Transform, Existence, Region of Convergence (ROC) and its properties. S-plane and Z-plane correspondence, Properties of Z-Transform, Inverse Z-Transform, Analysis and characterization of discrete LTI systems using Z-Transform.

Learning Resources:

1. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.
2. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
3. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 Ed.
4. Signals and Systems – A. Rama Krishna Rao – 2008, TMH.
5. M.J. Robert " Fundamentals of signals and systems", McGraw Hill, 2008
6. https://onlinecourses.nptel.ac.in/noc19_ee07/preview (Principle of Signals and Systems by Prof. Aditya K Jagannatham)
7. https://www.edx.org/course/signals-and-systems-part-1-1
8. https://www.edx.org/course/signals-systems-part-2-iitbombayx-ee210-2x-3

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

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

Partial Differential Equations and Numerical Methods

SYLLABUS FOR B.E. III – SEMESTER (for ECE only)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U22BS320MA**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: 1. **Formulate** and understand linear and nonlinear partial differential equations. 2. **Study** the applications of Partial Differential equations. 3. **Study t**he methods of interpolation, apply numerical methods to interpolate. 4. **Understand** numerical differentiation and solve differential equations using numerical methods. 5. **Study** the method to fit different curves to a given data and measuring the Correlation between variables.	At the end of the course students will be able to: 1. **Formulate t**he Partial differential equations by eliminating arbitrary constants and functions and solve linear, nonlinear Partial differential equations. 2. **Solve** the one-dimensional wave (Vibrations of a string), heat equations and two dimensional heat equations. 3. **Apply** numerical methods to interpolate. 4. **Solve** problems using numerical differentiation using interpolation approach and differential equations using numerical methods. 5. **Solve** problems to fit various curves to the given data using curve fitting, and also to find co-efficient of correlation between the variables

CO-PO/PSO Mapping

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

UNIT-I : (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-II: (10 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).

UNIT-III: (10 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-IV: (12 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 4th order (without proofs).

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

Learning Resources:

Text Books:
1 R.K. Jain & S.R.K. lyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2 Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.

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

Online Resources:
1 http://mathworld.wolfram.com/topics
2 http://www.nptel.ac.in/course.php

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

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD - 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

Skill Development Course – I: Communication Skills in English - I

SYLLABUS FOR B.E. III – SEMESTER (COMMON FOR ALL BRANCHES)

L:T:P (Hrs./week) : 1:0:0	SEE Marks : 40	Course Code: **U22HS320EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. Get students proficient in both receptive and productive skills especially virtuall 2. Enable students to understand the importance and method of exchanging information in a formal space- both written and spoken 3. Introduce students to an ideal structure for a presentation and discussion- individually and in groups 4. Develop and improve reading skills needed for college work and reproduce the content based on the situational need.	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 content and write an effective summary

CO-PO/PSO Mapping

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

Unit 1: Delightful Descriptions

1.1 Introductions on an Online Forum
1.2 Making Observations and Giving Opinion
1.3 Recalling and Describing

Unit 2: Formal Conversation Skills

2.1 Ask for Information
2.2 Give Information
2.3 Give Feedback

2.4 Seek Permission

Unit 3: Technical Expositions and Discussions

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

Unit 4: Rational Recap

4.1 Paraphrasing - Written
4.2 Summarizing - Written
4.3 Paraphrasing – Spoken
4.4 Summarizing – 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	:	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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD - 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Skill Development Course-II : Aptitude - I

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 40	Course Code: **U22BS340MA**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

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	: 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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

Human Values and Professional Ethics - II

SYLLABUS FOR B.E. III – SEMESTER COMMON FOR ALL BRANCHES

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: **U22HS030EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

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

CO-PO/PSO Mapping

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

UNIT-I: NORMATIVE ETHICS & SOCIETAL ETHICS

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

1.1 Ethical Accountability
1.2 Society & Ethics
1.3 Rights & Responsibilities

UNIT-II: PROFESSIONAL ETHICS - NEED FOR ETHICAL CODES

This unit covers the code of Professional Ethics- it is designed to ensure

that students learn the necessary skills that groom them to behave like employees should, one that is socially acceptable and respectful of one another. It establishes the rules for behavior and sends a message to every employee that universal compliance is expected.
2.1 Professional Ethics
2.2 Ethical Code
2.3 Flipped Classroom

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

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

MODE of DELIVERY

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

Relevant Websites, CD's and Documentaries

- Value Education website, Http://www.universalhumanvalues.info UPTU website, Http://www.uptu.ac.in
- Story of stuff, Http://www.storyofstuff.com
- Al Gore, As Inconvenient Truth, Paramount Classics ,USA

- Charlie Chaplin, Modern Times, United Artists, USA
- IIT Delhi, Modern Technology-The Untold story-Anand Gandhi, Right Here Right Now, Cyclewala production.

Learning Resources:

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

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

1.	No. of Internal Tests	: 1	Max. Marks for each Internal 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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Devices Lab

SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs./week) : 0:0:2	SEE Marks : 50	Course Code: **U22PC311EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
To develop an understanding of the underlying concepts of Electronic devices so that they can use them for circuits and systems.	On completion of the course, students will be able to 1. Plot the characteristics of electronic devices to understand their behavior 2. Employ Diode as a circuit element to get a given output response. 3. Operate electronic test equipment and hardware/software tools to characterize the behavior of electronic devices. 4. Analyze the various device parameters effects on device characteristics 5. Comparative analysis of MOSFET and FinFET using cadence tool.

CO-PO/PSO Mapping

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

Cycle - I Experiments

1. Zener Diode Characteristics and Zener as Voltage Regulator.
2. Common Base characteristics of BJT and measurement of h - parameters.
3. Common Emitter characteristics of BJT and measurement of h – parameters.
4. MOSFET Characteristics and measurement of its small signal

parameters.

5. CMOS invertor Transfer characteristics with different capacitive loads.
6. Diode Clipper circuits.
7. Clamper circuits.
8. Design of Half wave and Full wave Rectifiers with and without Filters.

Cycle - II Experiments (Using Cadence Tool)

1. Plotting MOSFET I V Characteristics
2. DC & transient analysis of CMOS Inverter
3. DC & transient analysis of FinFET Inverter

New / Additional experiments planned

1. Verification of I & V characteristics of MOSFET and FinFET.
2. DC & Transient analysis of CMOS and FinFET inverter.

Learning Resources:

1. "LAB MANUAL", Department of ECE, Vasavi College Of Engineering.
2. Paul B Zbar and Alber P Malvino, Michael A Miller, "Basic Electronics: A Text Lab Manual", 7th edition, Tata McGraw Hill, 2009.
3. David A Bell, "Laboratory Manual for Electronic Devices and Circuits", 4th edition, PHI, 2001.
4. https://community.cadence.com/cadence_technology_forums/ Cadence Community

Tools:

1. Multisim/Cadence may be used to facilitate analysis of characteristics of devices.
2. Cadence tool can be used to do analysis on CMOS & FinFET

The break-up of CIE :

1. No. of Internal Test	:	1
2. Max. Marks for internal tests	:	12
3. Marks for day-to-day laboratory class work	:	18

Duration of Internal Test : 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Digital Logic Design Lab

SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs./week) : 0:0:2	SEE Marks : 50	Course Code: **U22PC321EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To acquire knowledge on simulation and synthesis of digital circuits using HDL.	On completion of the course, students will be able to 1. Lists various constructs and features in Verilog HDL. 2. Design and analyze various combinational and sequential circuits. 3. Use HDL tools for digital logic design simulation and Synthesis.

CO-PO/PSO Mapping

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

CYCLE - I Experiments

1. Adders, Subtractors.
2. Multiplexers and Demultiplexers.
3. Encoders, Decoders, Priority Encoder and Comparator.
4. Implementation of logic functions using multiplexers.
5. Arithmetic and Logic Unit with minimum of sixteen instructions.
6. Flip-Flops (SR, JK, T and D)
7. Registers, Counters.
8. Sequence Detector using Mealy and Moore type state machines.

Note:

1. All the codes should be implemented appropriately using Gate level, Dataflow and Behavioral Modeling.
2. All the programs should be simulated using test benches.

CYCLE - II Experiments

9. Transistor Level implementation of Inverter, NAND and NOR, Half Adder and Full Adder.
10. Transistor Level implementation of 4:1 Multiplexer, 2:4 Decoder.
11. 16-bit adder using 4-bit tasks and functions.
12. Mini Project.

At least four combinational and sequential circuits should be implemented on FPGA.

New / Additional experiments planned

1. Binary multipliers
2. BDC Adders.

The break-up of CIE :

1.	No. of Internal Test	:	1
2.	Max. Marks for internal tests	:	12
3.	Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Signals and Systems Lab

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U22PC331EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To impart the knowledge to write MATLAB codes for the generation of signals, to perform different operations and to verify various transforms for converting time domain signal to frequency domain signal.	On completion of the course, students will be able to 1. Write MATLAB codes for the generation of signals. 2. Apply various transforms on signals to find it's Spectrum using MATLAB. 3. Correlate two signals and can remove noise using correlation. 4. Find the response of the system using convolution function in MATLAB. 5. Perform sampling of continuous time signal.

CO-PO/PSO Mapping

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

CYCLE - I Experiments

1. Basic operations on Matrices
2. Signal representation
3. Fourier Series analysis
4. The Fourier transform and its properties
5. Frequency Domain analysis of systems
6. Mini Project

CYCLE - II Experiments

7. Convolution representation
8. The Laplace Transform and its properties
9. System response using Laplace transform
10. Fourier analysis of Discrete time signals and systems
11. Verification of Sampling theorem
12. Correlation between signals and systems

New / Additional experiments planned

1. Generation of Sine wave using Simulink.
2. Finding the Gaussian distribution using Simulink.

Learning Resources/ Tools :

1. Taan S. ElAli and Mohammad A. Karim, "Continuous Signals and systems with MATLAB", 2/e, 2009, CRC Press.
2. Edward W.Kamen and Bonnie S. Heck, "Fundamentals of Signals and Systems Using MATLAB", PHI Inc.

The break-up of CIE :

1. No. of Internal Test	:	1
2. Max. Marks for internal tests	:	12
3. Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Workshop

SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U22PC341EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To study and use different electronic components and measuring instruments.	On completion of the course, students will be able to 1. Identify electronics components like resistors, capacitors, diodes, transistors etc. 2. Use measuring instruments like the multimeter and equipments such as Function generator, power supply & Digital Storage Oscilloscope. 3. Assemble circuits on a breadboard. 4. Perform soldering and de-soldering of circuit components, for doing connections and disconnections. 5. Fabricate Printed Circuit Board of electronic circuits.

CO-PO/PSO Mapping

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

Experiments

1. Study of Electronic components (all types of discrete active & passive devices, display devices, integrated components/circuits with their packaging etc.,), electro mechanical components (switches, sockets, connectors etc.,) electromagnetic components (coils-different types of magnetic and ferrite cored, potted components, relays etc.)
2. Study and use of different meters (moving coil, moving iron, volt/ammeter, AVO / Multimeter) for the measurement of electrical parameters.
3. Measurement of R, L, C components using LCR Meter

4. Study and use of bread board to connect circuits and measure basic parameter.
5. Study of CRO & Measurement of voltage, frequency and Phase Angle.
6. Characteristics and Applications of Relays
7. Design of AC mains operated step down transformer for a given turns ratio, current ratings and core specifications. Measurements of their functional electrical parameters.
8. PCB design of a small circuit with its layout using tapes & etching.
9. Soldering & de-soldering exercises using discrete components & ICs for a specific circuit requirement.
10. Fault diagnosis of electronic circuits.
11. Mini Project
12. Mini Project

New / Additional experiments planned

1. Design and fabrication (winding) of an iron cored inductance coil for a given value of L, current and core specifications.
2. Characteristics and applications of Light dependent resistors.

Mini Project(s)

Learning Resources / Tools:

1. Paul Zbar, Albert Malvino, Michael Miller, Basic Electronics: A Text-Lab Manual, McGraw Hill Education (India) Private Limited; 7/e , 2001.
2. Paul B. Zbar, Industrial Electronics, A Text – Lab Manual, 3rd Edition, TMH, 1983

The break-up of CIE :

1. No. of Internal Test	:	1
2. Max. Marks for each internal tests	:	12
3. Marks for day-to-day laboratory class work	:	18

Duration of Internal Test : 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD– 500031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Programming Techniques to Problem Solving

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code: **UB22ES310EC**
Credits :--	CIE Marks : --	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Acquire problem solving skills 2. Develop flow charts 3. Understand structured programming concepts 4. Write programs in C Language	On completion of the course, students will be able to 1. Design flowcharts and algorithms for solving a problem and choose appropriate data type for writing programs in C language 2. Design modular programs involving input output operations, decision making and looping constructs 3. Apply the concept of arrays for storing, sorting and searching data 4. Apply the concept of pointers for dynamic memory management and string handling 5. Design programs to store data in structures and files

UNIT-I

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Flowcharts.

Introduction to C Language- Background, C Programs, Identifiers, Types, Variables, Constants, Input/Output, Expressions, Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion, Statements, Bitwise Operators.

UNIT-II

Selection: Logical Data and Operators, if… else, switch Statements, Standard Functions.

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

Functions: Designing Structured Programs, Functions Basics, User Defined Functions.

UNIT-III

Recursion-Recursive Functions, Preprocessor Commands.

Arrays: One-Dimensional Arrays, Linear Search and Binary Search, Selection Sort and Bubble Sort, Two-Dimensional Arrays.

UNIT-IV

Pointers: Introduction, Pointers to Pointers, Arithmetic operations using pointers.

Strings – Concepts, C Strings, String Input/output, Functions, Arrays of Strings, String Manipulation Functions.

UNIT-V

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

Input and Output: Files, Streams, Standard Library Input/Output Functions, Character Input/Output Functions.

Learning Resources:

1. B.A. Forouzan & Richard F. Gilberg, "A Structured Programming Approach using C", 3rd Edition, Cengage Learning, 2013.
2. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Prentice-Hall, 2006.
3. Rajaraman V, "The Fundamentals of Computer", 4th Edition, Prentice-Hall of India, 2006.
4. Steve Oualline, "Practical C Programming", 3rd Edition, O'Reilly Press.
5. Jeri R. Hanly, Elliot B. Koffman, "Problem Solving and Program Design in C", 5th Edition, Pearson Education, 2007.
6. E. Balagurusamy, "Programming in ANSI C", 4th Edition, TMG, 2008.
7. Gottfried, "Programming with C", 3rd Edition, TMH, 2010.
8. R.G Dromey, "How to Solve it by Computer", 1st Edition, Pearson Education, 2006.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

Matrix Theory and Vector Calculus

SYLLABUS FOR B.E. III SEMESTER

BRIDGE COURSE B.E. III-SEMESTER (CBCS) (For CSE, EEE, ECE & IT)

L:T:P (Hrs./week): 2:0:0	SEE Marks :50	Course Code: **UB22BS300MA**
Credits : -	CIE Marks : -	Duration of SEE : 3 Hours

UNIT-I: (4 Hours)
DIFFERENTIATION & INTEGRATION
Differentiation of standard functions (Formulae) - Partial Derivatives – Derivativeof Composite functions and Implicit functions - Chain Rule - Total Derivative
Integration - Elementary Integration – Integration of standard functions- Methods of Integration-Integration by substitution- Integration by parts.

UNIT –II (6 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 - Conservative vector field.

UNIT – III (6 Hours)
MULTIPLE INTEGRALS: Double and Triple integrals (Cartesian) - Change of order of integration (Cartesian Coordinates).
VECTOR INTEGRATION: Line integral and Green's Theorem (without proof)

UNIT- IV (8 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. B.S. Grewal, Higher Engineering Mathematics
2. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Engineering – I

SYLLABUS FOR B.E. (EEE) III - SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U22ES310EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To give understanding on semiconductor materials and characteristics of the p-n junction diode. 2. To understand the operation of BJT, FET, MOSFET and characteristics of special purpose electronic devices. 3. To familiarize students with biasing circuits of BJT, FET, MOSFET.	On completion of the course, students will be able to 1. Define and describe the principle of operation of electronic devices like PN junction diode, Zener diode, BJT, FET and MOSFET etc. 2. Analyze and design various rectifier circuits with and without filters for a regulated DC power supply. 3. Illustrate the use of diode in practical applications and gain knowledge on special diodes 4. Analyze the small signal low frequency Bipolar junction Transistor model in exact and approximate model. 5. Analyze the small signal low frequency Field effect transistor amplifiers in different configurations with the help of their equivalent circuits.

CO-PO/PSO Mapping

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

UNIT - I : **Semiconductor Diodes and Rectifiers**

P-n junction as a rectifier, V-I characteristics, temperature dependence of V-I characteristics, Breakdown of junctions – Zener and Avalanche, halfwave, fullwave, bridge rectifiers, L,C, π –section filters, Regulation andRipple characteristics.

UNIT - II : BJT circuits

BJT current components, Structure and I-V characteristics of a BJT, modes of transistor operation, Early effect, BJT input and

output characteristics in CB, CE and CC configuration. BJT as a switch. BJT as an amplifier. BJT biasing techniques thermal runaway, operating point, biasstabilization circuits.

UNIT - III : Small Signal analysis of Transistor Circuits

Small signal low frequency h-parameters model of BJT, h-parameters, analysis of BJT amplifier with exact and approximate models, comparison of CB, CE and CC amplifier configurations, Miller's theorem. RC coupled amplifier.

UNIT - IV : Field effect transistors

V-I characteristics of JFET, JFET biasing, low frequency small signal model of FETs, MOSFETs: Enhancement and depletion mode MOSFETs, V-I characteristics. MOSFET biasing, MOSFET as a switch. MOSFET as an amplifier: common-source amplifier and common-gate amplifier. small signal equivalent circuits - gain, input and output impedances, trans conductance.

UNIT - V : CRO & Special devices:

Study of CRO block diagram, Elementary treatment on the functioning of tunnel diode, varactor diode, photo diode, light emitting diode, LCD, UJT, SCR, photo transistor.

Learning Resources:

1. Jacob Millman and Christos C. Halkias, Satyabratajit "Electronics Devices andCircuits", McGraw hill, 3rd edition, 2010.
2. Jacob Millman and Christos C. Halkias, Chetan D Parikh, "Integrated Electronics" Mc Graw Hill, 2009.
3. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", PHI, 11th edition 2015.
4. A. S. Sedra and K. C. Smith, "Microelectronic Circuits", Seventh Edition NewYork, Oxford University Press, 2014.
5. https://nptel.ac.in/courses/108102095/
6. https://nptel.ac.in/courses/117101106/

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Engineering – I Lab

SYLLABUS FOR B.E. (EEE) III - SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U22ES311EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To develop an understanding of the characteristics of Electronic devices and circuits with Qualitative approach	On completion of the course, studentswill be able to 1. Estimate the parameters from V-I characteristics of different diodes. 2. Design various rectifiers withdifferent filter combinations. 3. Set up bias point in a transistor. 4. Estimate the parameters from BJTand FET characteristics. 5. Compute the bandwidth of RC coupled BJT and FET amplifiers from the frequency response.

CO-PO/PSO Mapping

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

CYCLE - I Experiments

1. V-I Characteristics of Si, Ge and Zener diode
2. Zener as Voltage Regulator
3. Design of Half wave and Full wave Rectifiers with and without Filters
4. Common Base characteristics of BJT and measurement of h –
5. Common Emitter characteristics of BJT and measurement of h-parameters,
6. Applications of Cathode ray oscilloscope.
7. MOSFET Characteristics and measurement of its small signal parameters.

CYCLE - II Experiments

8. BJT biasing.
9. Analysis and bandwidth calculation of Single stage RC coupled CEAmplifier.
10. Analysis and bandwidth calculation of Emitter follower.
11. Single stage FET Common Source RC coupled Amplifier
12. Analysis and bandwidth calculation of Source follower.
13. Characteristics of UJT.

New / Additional experiments planned

1. MOSFET as a switch in Microwind and in Multisim tools.
2. V-I Characteristics of Light Emitting Diode.

Mini Project(s)

Designing of various basic applications using devices.

Learning Resources:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, "Basic Electronics, A Text -Lab Manual", 7th Edition, TMH 2001.
2. S. Poorna Chandra, B. Sasikala, Electronics Laboratory Primer, A design approach, Wheeler publishing, 2005.

The break-up of CIE :

1.	No. of Internal Test	:	1
2.	Max. Marks for each internal tests	:	12
3.	Marks for assessment for day to day evaluation	:	18

Duration of Internal Test : 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031.
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-22)** :: B.E. - ECE : FOURTH SEMESTER (2023-24)

B.E (ECE) IV – SEMESTER								
Course Code	Name of the Course	Scheme of Instruction Hours per Week			Scheme of Examination Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U22PC410EC	Electronic Circuits	3	-	-	3	60	40	3
U22PC420EC	Electromagnetic Field Theory	3	1	-	3	60	40	4
U22PC430EC	Probability Theory and Stochastic Process	3	1	-	3	60	40	4
U22PC440EC	Data Structures	3	1	-	3	60	40	4
U22OE4XXXX	Open Elective – II	3	-	-	3	60	40	3
U22BS440MA	Skill Development Course-III : Aptitude – II	1	-	-	2	40	30	1
U22PE410EC	Skill Development Course-IV : Technical Skills-I	1	-	-	2	40	30	1
PRACTICALS								
U22PC411EC	Electronic Circuits Lab	-	-	2	3	50	30	1
U22PC421EC	Data Structures Lab	-	-	2	3	50	30	1
U22PW419EC	Mini Project - I	-	-	2	-	50	30	1
	TOTAL	**17**	**3**	**6**		**530**	**350**	**23**
	GRAND TOTAL	**26**				**880**		

Left over hours will be allocated for: Sports / Library / Mentor - Mentee Interaction / CC / RC / TC / ECA / CCA.

Note: 1) Every Student shall complete one NPTEL course certification of 8 weeks duration (equivalent to 2 credits weightage) by the end of VI-Semester.
2) Students willing to Opt B.E (ECE) Honours Degree in System on Chip Design shall complete one NPTEL Course Certification (equivalent to 2 Credits weightage) by the end of IV-Semester.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-22)** :: B.E. - ECE : FOURTH SEMESTER (2023 - 24)

Bridge Course for ECE Lateral Entry Students

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								
UB22HS410EH	English Language and Communication	2	-	-	3	50	-	-
PRACTICALS								
UB22HS411EH	English Language and Communication Skills Lab	-	-	2	3	50	-	-

COURSES OFFERED TO EEE

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								
U22ES410EC	Electronics Engineering - II	3	-	-	3	60	40	3
PRACTICALS								
U22ES411EC	Electronics Engineering - II Lab	-	-	2	3	50	30	1

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Circuits

SYLLABUS FOR B.E. IV - SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U22PC410EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To familiarize the students with design and working of various amplifiers and analyze concepts of positive and negative feedback in amplifiers.	On completion of the course, students will be able to 1. Understand the importance of Q point in the design of an Amplifier. 2. Analyze and design various small signal amplifier circuits. 3. Analyze the effect of negative feedback in amplifier circuits. 4. Design of oscillator circuits for the given specifications. 5. Design of power amplifier circuits for audio frequency applications.

CO-PO/PSO Mapping

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

UNIT - I : Transistor Biasing

Transistor Biasing: MOSFET Modes of operation, operating point, FET Biasing Techniques, Problems on biasing, MOSFET Small signal low frequency model, MOS Transistor as an amplifier, Classification of amplifiers.

UNIT - II : MOSFET applications

MOSFET high frequency equivalent circuits, Mid-band analysis in single and multistage amplifiers. Low frequency and high frequency analysis of single and multistage RC coupled and transformer coupled amplifiers, Differential amplifier.

UNIT - III : Feedback amplifiers

The feedback concept, general characteristics of negative feedback, Effect of negative feedback on input and output impedances, Feedback topologies: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., calculation with practical circuits, and concept of stability.

UNIT - IV : Oscillators

Positive Feedback and conditions for sinusoidal oscillations, RC oscillators oscillators (phase shift, Wien bridge etc.), LC oscillator (Hartley, Colpitt etc.) and Crystal oscillator, Amplitude and frequency stability of oscillator.

UNIT - V : Large signal amplifiers

FET as large signal audio amplifier, Classes of operation, Harmonic distortion, power dissipation, efficiency calculations. Design considerations of audio power amplifiers under Class-A, Class-B, Class-D, Class-AB operations, Qualitative analysis on R.F. Tuned amplifiers.

Learning Resources:

1. Adel S. Sedra and Kenneth C. Smith "Micro Electronic Circuits theory and applications" 7th edition Oxford publications, 2017.
2. Jacob Millman, Christos Halkias, Chetan Parikh, "Integrated Electronics", 2nd Edition, McGraw Hill Publication, 2009.
3. Paul R. Gray & Robert G. Meyer, Analysis and Design of Analog Integrated Circuits, John Wiley, 3rd Edition
4. https://nptel.ac.in/courses/108102097/
   (Introduction to Electronic circuits, Prof. S.C. Dutta Roy, Dept of Electrical Engineering, IIT Delhi).

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electromagnetic Field Theory

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U22PC420EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To familiarize the students in the concepts of: 1. Electric and magnetic fields due to their sources. 2. To understand the electric energy and magnetic energy stored through different objects. 3. Formulation of Maxwell's equations and solution in different media. 4. Propagation/reflection characteristics of uniform plane waves in dielectric/conducting media. 5. To understand the basic principles of transmission lines.	On completion of the course, students will be able to 1. Apply the fundamental laws of electric and magnetic fields 2. Solve for electric potential and energy density due to different charged objects. 3. Apply concepts of magnetostatics to evaluate the magnetic fields for different engineering problems. 4. Formulation of Maxwell's equations for time varying electromagnetic fields. 5. Analyze the characteristics of electromagnetic waves through the boundaries of different media and in transmission lines.

CO-PO/PSO Mapping

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

UNIT - I :

Cartesian, Cylindrical and spherical coordinate systems - Review of vector analysis – Divergence, Gradient Curl. Coulomb's Law. Electric Field Intensity. Electric field due to different charge distributions: Line charge, Sheet charge and Volume charge distributions.

UNIT - II :

Electric flux, flux density, Gauss's Law and applications, Energy and Potential, Potential field due to different charge distributions, Potential gradient. Energy density, Boundary conditions in static electric field, Capacitance of parallel plate capacitor, Coaxial cable, Continuity equation, current density, Poisson's equation, Laplace's equation.

UNIT - III :

Steady magnetic field, Biot-Savart's law, Ampere's law, Magnetic scalar and vector potentials. Magnetic boundary conditions, Magnetomotive force, Permeability, Self and mutual inductances, Evaluation of inductance of solenoid, toroid.

UNIT - IV :

Time varying fields & Maxwell's equations: Faraday's Law, Modified Ampere's law, Displacement Current, Maxwell's Equation in Point Form & Integral Form. Wave Propagation in Free Space.

UNIT - V :

Wave Propagation in Dielectrics, Propagation in good conductors, Skin Effect. Poynting's theorem and Power, Reflection of Uniform Plane waves at normal incidence and oblique incidence. Transmission lines: Primary and secondary constants, terminated lines: open circuit, short circuit, matched load.

Learning Resources:

1. Engineering Electromagnetics, 8th Edition, William H. Hayt, Jr. John A. Buck, Tata McGraw Hill Education, 2017.
2. Principles of Electromagnetics, Mathew N.O. Sadiku and SV Kulkarni, 6th ed., Oxford Univ. Press, 2015.
3. Electromagnetics with Applications, John D Kraus and Daniel A. Fleisch, McGraw Hill, 1999.
4. R.K. Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill India, 2005.
5. E.C. Jordan & K.G. Balmain, Electromagnetic Waves & Radiating Systems, Prentice Hall India.
6. Umesh Sinha, "Transmission Lines and Network", Satya Prakashan Publishing Company, New Delhi, 2012.
7. John D Ryder, Networks lines and Fields, Second edition, Pearson Education India, 2015
8. https://swayam.gov.in/nd1_noc19_ph08

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Probability Theory and Stochastic Process

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 4:1:0	SEE Marks : 60	Course Code: **U22PC430EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To understand, analyze and solve typical problems in probability and random process.	On completion of the course, students will be able to 1. Apply the basic theorems and concepts of probability. 2. Apprehend a single random variable and its operations to estimate statistical properties. 3. Extend the concepts of single random variable to multiple random variables to estimate the statistical properties. 4. Analyze the temporal characteristics of a random process to estimate correlation and covariance. 5. To estimate power spectral density and mutual information of a system.

CO-PO/PSO Mapping

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

UNIT - I : Probability

Probability: Experiments and Sample Spaces, Introduction to probability, Relative Frequency, Discrete and Continuous Sample Spaces, Events, Independent Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Principles of Counting, Permutations and combinations, Bernoulli's' trails, Total Probability, Bayes' Theorem. Application of probability: binary symmetric channel.

UNIT - II : Random Variable and Operation on One Random Variable

Random Variable: Definition of a Random Variable, Conditions for a Function to be a random Variable, Discrete, Continuous and Mixed Random Variables. Distribution & Density Functions: Distribution and Density functions and their Properties - Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Conditional Distribution, Conditional Density, and Properties. Application: AWGN channel model.

Operation on One Random Variable – Expectations: Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function.

UNIT - III : Multiple Random Variables and operations

Multiple Random Variables: Joint Distribution Function and its Properties Joint Density Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem (Proof not expected), Unequal Distribution, Equal Distributions. Application: Wireless fading channel model.

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties.

UNIT - IV : Random Processes – Temporal Characteristics

The Stochastic Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationarity and Statistical Independence, First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross Correlation Function and its Properties, Covariance and its Properties, Gaussian Random Processes, Poisson Random Process.

UNIT - V : Random Processes – Spectral Characteristics

The Power Density Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum and its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function, Some Noise Definitions, White Noise and Colored Noise, Product Device Response to a Random Signal.

Information Theory: Uncertainty, Information and entropy. Discrete memory less channels, Probability relations in a channel.

Learning Resources:

1. A. Papoulis and S. Unnikrishnan Pillai, Probability, Random Variables and Stochastic Processes, Fourth Edition, McGraw Hill.
2. Peyton Z. Peebles, Probability, Random Variables & Random Signal Principles, 4th edition, Tata McGraw Hill, 2001.
3. H. Stark and J. Woods, Probability and Random Processes with Applications to Signal Processing, Third Edition, Pearson Education.
4. S. Ross, Introduction to Probability Models, tenth edition, Elsevier
5. https://nptel.ac.in/courses/117105085/
6. https://nptel.ac.in/courses/117104117/

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Data Structures

SYLLABUS FOR B.E. IV - SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U22PC440EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Identify and use appropriate data structure for a given problem with effective utilization of space and time. 2. Describe the linear and nonlinear data structures. 3. Analyze the complexities of different sorting techniques.	On completion of the course, students will be able to 1. Compute time and space complexities of Algorithms. Design a solution to a given problem using arrays. 2. Develop applications using stacks, queues and linked lists. 3. Choose the appropriate nonlinear data structure and perform operations on them. 4. Choose suitable sorting technique to maximize the performance of the solution. 5. Explain operations on Binary Search Trees and Select the hashing technique to perform dictionary operations.

CO-PO/PSO Mapping

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

UNIT-I:

Introduction to Data Structures: Algorithms and Flowcharts, Basics Analysis on Algorithm, Complexity of Algorithm, Introduction and Definition of Data Structure, Classification of Data, Various types of Data Structure, Functions, Recursion, Static and Dynamic Memory Allocations.

Arrays, Strings and Structures: Introduction to Arrays, Definition, One Dimensional Array and Multidimensional Arrays, Introduction to Pointers, Pointer operations. Introduction to Strings, Definition, Library Functions of Strings; structures, pointer to a structure and self referential structure.

UNIT-II:

Polynomial: Construction and operations; Sparse Matrix: Representation, transpose and different operations; Pattern matching algorithm.

Stacks and Queues: Stacks, Stacks using arrays, Queues, Circular Queues using arrays; evaluation of Expressions – Evaluating Postfix Expression, Infix to Postfix.

UNIT-III:

Linked Lists: Definition**,** advantages, Singly Linked Lists, Operations on SLL: Insertion, deletion and traversal. Linked Stacks and Queues; Introduction to Doubly Linked Lists and Circular Linked Lists.

UNIT-IV:

Sorting: Bubble Sort, Selection Sort, Insertion Sort, Quick sort, Merge sort, Heap sort; Performance analysis of different sorting algorithms.

UNIT-V:

Trees: Introduction, Binary Trees, Binary Tree Traversals, Introduction to Heaps, Binary Search trees (BST)
Graphs: The Graph ADT, Elementary graph operations
Hashing: Introduction, Hash tables and Hash functions

Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition (2008), Universities Press.
2. Gilberg R. F and Forouzan B. A, Data Structures: A Pseudocode Approach with C, Second Edition(2007), CengageLeaming
3. Mark A Weiss, Data Structures and Algorithm Analysis In C, 2nd Edition (2002), Pearson.
4. Kushwaha D. S and Misra A.K, Data Structures A Programming Approach with C, Second Edition(2014), PHI.
5. http://nptel.ac.in/courses/106106127/
6. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos
7. http://www.nptel.ac.in/courses/106102064

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Skill Development Course-III: Aptitude-II

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: **U22BS440MA**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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- 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

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Circuits Lab

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U22PC411EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To develop an understanding of the concepts of electronic circuits for different applications.	On completion of the course, students will be able to 1. Design different amplifiers with & without feedback. 2. Analyze various types of transistor amplifiers & oscillators. 3. Compare the theoretical & practical performance characteristics.

CO-PO/PSO Mapping

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

CYCLE - I Experiments

1. FET transistor biasing techniques.
2. Design and verify Frequency response of single stage amplifier
3. Frequency response of multi-stage RC-Coupled amplifier using MOSFET.
4. Frequency response of Voltage series feedback amplifier.
5. Frequency response of Current Shunt feedback amplifier.
6. Design of Oscillators: RC Phase shift.
7. Design of Oscillators: Hartley and Colpitts.
8. Design of Power amplifiers: Class – A and Class – B.

CYCLE - II Experiments (simulation using Cadence)

9. Design and Simulation of Common Source Amplifier.
10. Simulation of Differential Amplifier.
11. Simulation of Source Follower
12. Simulation of LC Oscillators.

New / Additional experiments planned

1. Design of tuned Amplifier.
2. Frequency response of current series feedback amplifier.

Learning Resources / Tools :

1. Paul R. Gray & Robert G. Meyer, Analysis and Design of Analog Integrated Circuits, John Wiley, 3rd Edition.

The break-up of CIE:

1.	No. of Internal Test	:	1
2.	Max. Marks for internal tests	:	12
3.	Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Data Structures Lab

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U22PC421EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Design and analyze linear and nonlinear data structures. 2. Acquire programming skills to implement sorting and searching techniques. 3. Identify and apply the suitable data structure for the given real world problem.	On completion of the course, students will be able to 1. Implement insert, delete, search, sort and traverse operations on array and linked list. 2. Develop applications using stack and queue. 3. Apply nonlinear data structures to solve a problem. 4. Implement appropriate sorting technique for a given data set. 5. Implement hashing techniques to perform dictionary operations.

CO-PO/PSO Mapping

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

Programming Exercise:

1. Implementation of 1D and 2D arrays and different operations.
2. Implementation of Polynomial Arithmetic
3. Implementation of Sparse Matrix and related operations.
4. Implementation of String Matching algorithms.
5. Implementation of Singly Linked List and Doubly Linked List.
6. Implementation of Stacks, Queues.
   (Using both Arrays and Linked Lists).

7. Implementation of Infix to Postfix Conversion, Postfix Expression Evaluation.
8. Implementation of Bubble, Selection, Merge Sorts.
9. Implementation of Quick, Heap, and Insertion Sort.
10. Implementation of Binary Search Tree.
11. Implementation of Graphs.
12. Implementation of Hashing.

Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press.
2. Gilberg R. F and Forouzan B. A, Data Structures: A Pseudocode Approach with C, Second Edition(2007), Cengage Leaming
3. Mark A Weiss, Data Structures and Algorithm Analysis In C, 2nd Edition (2002), Pearson.
4. Kushwaha D. S and Misra A.K, Data Structures A Programming Approach with C, Second Edition(2014), PHl.
5. http://nptel.ac.in/courses/106106127/
6. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos
7. http://www.nptel.ac.in/courses/106102064

The break-up of CIE :

1.	No. of Internal Test	:	1
2.	Max. Marks for internal tests	:	12
3.	Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mini Project - I

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U22PW419EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3

COURSE OBJECTIVES	COURSE OUTCOMES
Students should be 1. Exposed to contemporary technologies in Electronics and Communication Engineering and apply engineering knowledge into a real world problem with proper Design.	On completion of the course, students will be able to 1. Review the literature survey to identify the problem 2. Propose the solution to address the problem 3. Design/Develop/Implement /Solve the problem and test the solution 4. Demonstrate the work done in the mini project through presentation and documentation 5. Adapt to contemporary technologies

CO-PO/PSO Mapping

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

Note: COs must be mapped with one of the relevant PSOs based on the domain of the project.

The students are required to carry out mini projects in relevant areas of Electronics Communication Engineering such as Electronic Devices and Circuits, Embedded Systems, RF Technology, Microwave and Wireless Communications, Communication Systems, Signal Processing, Image and Video Processing, VLSI, Networking.

Course of Action:

1) Students are divided into teams of 2 or 3 for each project.
2) Faculty supervisors are allotted for the teams.
3) The project titles are to be submitted by the students and approved by their supervisor.
4) Progress of the project will be reviewed weekly.

A. Grades awarded to the Mini Project - I.

Outstanding	–	≥ 45 marks
Excellent	–	≥ 40 - 44 marks
Very Good	–	≥ 35 - 39 marks
Good	–	≥ 30 - 34 marks
Average	–	≥ 25 - 29 marks

Continuous Internal Evaluation (CIE) – 30 marks:

Evaluation Criteria	Maximum Marks
Literature Survey	6
Problem Formulation	6
Design / Methodology	6
Implementation & Results	6
Presentation & Documentation	6

Semester End Examination (SEE) – 50 marks:

Evaluation Criteria	Maximum Marks
Literature Survey	10
Problem Formulation	10
Design / Methodology	10
Implementation & Results	10
Presentation & Documentation	10

Note: Rubrics are used for assessment and evaluation.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

English Language Communication

SYLLABUS FOR B.E. (ECE) IV – SEMESTER
Bridge Course for Lateral Entry Students

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code: **UB22HS410EH**
Credits : -	CIE Marks : -	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Course will enable the Learners 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	At the end of the course the students will be able to : 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-I 1.0: Communication & Functional English
1.1 Role and Importance of Communication, Process of Communication, Non- verbal communication, barriers to Communication, overcoming barriers.
Conversational phrases: greetings, introductions, apology, compliments, agreeing and disagreeing, polite forms in everyday conversations.

UNIT-II: 2.0: Listening
2.1 Importance of listening, Active listening

UNIT-III: 3.0: Writing
3.1 Paragraph writing, coherence and cohesion.

UNIT-IV: 4.0: Grammar and Vocabulary
4.1 Common Errors, one-word substitutes, collocations.

UNIT-V: 5.0: Reading
5.1 Prose text- Our Own Civilization—CEM Joad.

Prescribed textbook 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 - Nuttal.J.C - Orient Blackswan
3. Sunitha Mishra,C. Murali Krishna, Communication Skills for Engineers, Pearson, 2004.
4. M. Ashraf Rizvi. Effective Technical Communication. Tata Mcgraw Hill, 2005.
5. Allen and Waters., How English Works.
6. Willis Jane., English through English.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

English Language Communication Skills Lab

SYLLABUS FOR B.E. (ECE) IV – SEMESTER
Bridge Course for Lateral Entry Students

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **UB22HS411EH**
Credits : -	CIE Marks : -	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Course will enable the learners to: 1. Converse in various situations. 2. Make paper and power point presentations. 3. Speak effectively using discourse markers.	At the end of the course the learners will be able to : 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 - INTERACTIVE COMMUNICATION SKILLS LAB
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, concluding 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 textbook for laboratory:
Speak Well: Jayshree Mohanraj, Kandula Nirupa Rani and Indira Babbellapati - Orient Black Swan.
Longman Dictionary of Contemporary English - 6th Edition, 2020. (The students will be given the PDF format).

Learning Resources:
1. Balasubramanian: A textbook 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.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Engineering - II

SYLLABUS FOR B.E. (EEE) IV - SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U22ES410EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students: 1. To familiarize the student with the analysis & design of feedback amplifiers, oscillators, multistage amplifiers and power amplifiers. 2. To understand the operation and design of linear and non-linear wave shaping circuits.	On completion of the course, students will be able to 1. Design and analyze various non-linear wave shaping Circuits. 2. Analyze and design various multistage amplifiers. 3. Analyze different types of feedback amplifiers. 4. Design sinusoidal oscillators for required frequency. 5. Analyze different types of power amplifiers.

CO-PO/PSO Mapping

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

UNIT - I : Wave-Shaping Circuits

RC low pass and high pass circuit, response to Step, Pulse, Ramp and Square wave inputs, Clipping circuits for single level and two levels, clamping circuits.

UNIT - II : Multi stage amplifiers

Cascading amplifier stages, classification of amplifiers, frequency responses of RC coupled amplifiers, Transformer coupled amplifiers, effect of cascading on band width. Direct Coupled (DC) Amplifiers, drawbacks of DC amplifiers, Drift Compensation techniques.

UNIT - III : Feedback amplifiers

Concept of Feedback, General characteristics of negative feedback

amplifier, Effect of negative feedback on input and output impedances, voltage and current, series and shunt feedbacks.

UNIT - IV : Oscillators

Barkhausen criterion, RC type oscillators: RC phase shift and Wien bridge oscillators, LC type oscillators: Hartley and Colpitt's oscillators, Crystal oscillators (BJT only), frequency stability of oscillator.

UNIT - V : Power amplifiers

Classification of power amplifiers, Analysis of class A and B power amplifiers, Harmonic distortion, Power dissipation, efficiency calculations, Push pull amplifiers, Complementary symmetry Power amplifiers.

Learning Resources:

1. Jacob Millman and Christos C. Halkias, Satyabratajit "Electronics Devices and Circuits", McGraw hill, 3rd edition, 2010.
2. Jacob Millman and Christos C. Halkias, Chetan D Parikh, "Integrated Electronics" Mc Graw Hill, 2009.
3. Robert L.Boylestad and Louis Nashelsky,"Electronic Devices and Circuit Theory", PHI, 11th edition 2015.
4. Jacob millman and Taub: "Pulse, Digital and switching wave forms", Mc Graw hill, 2003.
5. https://nptel.ac.in/courses/108102095/
6. https://nptel.ac.in/courses/117101106/

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Engineering – II Lab

SYLLABUS FOR B.E. (EEE) IV - SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U22ES411EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: 1. Develop an understanding of the underlying concepts of analog electronic circuits including feedback amplifiers, power amplifiers & oscillators, and design linear wave shaping and non-linear waveshaping circuits.	On completion of the course, students will be able to: 2. Design & Analyze RC Low pass and High pass Circuits for different time constants and to design different types of clippers and clampers. 3. Build a multi stage amplifier and find the frequency response of amplifier. 4. Analyze the small signal amplifiers behavior with and without feedback. 5. Design and verify the functioning of various sinusoidal oscillators.

CO-PO/PSO Mapping

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

CYCLE - I Experiments

1. Linear wave shaping circuits-Integrator & Differentiator
2. Clipping circuits
3. Clamping Circuits
4. Frequency response of Voltage series feedback amplifier
5. Frequency response of Voltage Shunt feedback amplifier
6. Frequency response of Current series feedback amplifier
7. Frequency response of Current Shunt feedback amplifier

CYCLE - II Experiments

8. Frequency response of Two stage amplifier
9. Design of Hartley Oscillator
10. Design of Colpitt's Oscillator
11. Design of RC Phase Shift oscillator.
12. Transformer coupled Class A power amplifier
13. Class B Power amplifier

New Experiments

1. OP-Amp Applications(Adder, Subtractor, Comparator)
2. OP-Amp Applications(Integrator & Differentiator)

Learning Resources:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, "Basic Electronics, A Text – Lab Manual", 7th Edition, TMH 2001.
2. Paul B. Zbar, Industrial Electronics, A Text-Lab Manual, 3rd Edition, TMH 1990.

The break-up of CIE :

1. No. of Internal Test	:	1
2. Max. Marks for internal tests	:	12
3. Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

III – Semester Open Electives (Open Elective - I)

S.No.	Department	Course Code	Name of the Course	Stream Type	Stream Name	Credits
1	Civil	U22OE310CE	Green Buildings	General	-	2
2	CSE	U22OE320CS	Programming Essentials In Python	Stream	AIML	2
3	CSE	U22OE310CS	Introduction to Python Programming	General	-	2
4	EEE	U22OE310EE	Non Conventional Energy Sources	General	-	2
5	Mech	U22OE320ME	Fundamentals of Unmanned Aerial Vehicles	General	-	2
6	Mech	U22OE310ME	Introduction to Industrial Robotics	Stream	Robotics	2
7	IT	U22OE320IT	Computing Using Python	Stream	AIML	2
8	IT	U22OE310IT	Fundamentals of Python Programming	General	-	2
9	HSS	U22OE310EH	Learning to Learn	General	-	2
10	HSS	U22OE360EH	Constitution of India	General	-	2
11	HSS	U22OE340EH	Mastering Leadership	General	-	2
12	Maths	U22OE310MA	Linear Algebra	General	-	2
13	Physics	U22OE310PH	Smart Materials and Applications	General	-	2
14	Chem.	U22OE310CH	Polymeric Materials	Stream	Materials for Engineers	2

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

DEPARTMENT OF CIVIL ENGINEERING

GREEN BUILDINGS (Open Elective-I)

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:60	Course Code: U22OE310CE
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

PROGRAMMING ESSENTIALS IN PYTHON

Stream - Artificial Intelligence & Machine Learning (OPEN ELECTIVE-I)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code :**U22OE320CS**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

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

Iteration: while statement

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

Recursion

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

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

Department of Computer Science & Engineering

INTRODUCTION TO PYTHON PROGRAMMING
(OPEN ELECTIVE-I)

SYLLABUS FOR B.E. III-SEMESTER (COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code : **U22OE310CS**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Acquire problem solving skills 2. Learn programming and solve problems using Python language	On completion of the course, students will be able to 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, 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-spring2011/python-tutorial/
9. www.scipy-lectures.org/intro/language/python_language.html

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Non Conventional Energy Sources Open Elective-I
SYLLABUS FOR B.E. III SEMESTER

L: T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:**U22OE310EE**
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

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

Duration of Internal Tests :90 Minutes

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

Introduction to Unmanned Aerial Vehicles (Open Elective-I)
(Stream: Unmanned Aerial Vehicles)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U22OE320ME**
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: **1 Hour 30 Minutes**

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

Introduction to Industrial Robotics (Open Elective-I)
(**Stream: Robotics)**
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U22OE310ME**
Credits :02	CIE Marks:40	Duration of SEE: 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: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTING USING PYTHON
(AIML STREAM : OPEN ELECTIVE-I) SYLLABUS FOR B.E. III SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks :60	Course Code:**U22OE320IT**
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 student will be able to:**
Acquire problem solving skills for writing python scripts	1) Demonstrate an understanding of fundamental Python syntax and semantics and be fluent in the use of Python control flow statements and functions. 2) Acquire basic knowledge on NumPy array and plotting data in lists. 3) Construct python data structure programs using tuples, dictionaries, and sets. 4) Develop programs using Object oriented paradigm and handle file related operations

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.
Tuples: Introduction, operations on tuples, packing and unpacking, nested tuples, tuple methods and functions.

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

UNIT – IV:

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

Learning Resources:

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

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

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

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF INFORMATION TECHNOLOGY

Fundamentals of Python Programming
(General Pool Stream : OPEN ELECTIVE-I)
SYLLABUS FOR B.E. III SEMESTER

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

Course Objectives	Course Outcomes
The objectives of the course: Acquire problem solving skills for writing python scripts	On completion of the course, students will be able to 1. Understand the fundamentals of python and implement control structures. 2. Understand basic knowledge on strings, lists and tuples. 3. Implement programs using dictionaries, and sets. Implement OOP concepts in python.

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

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

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

UNIT-IV:

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

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. hppts://onlinecourses-archive.nptel.ac.in/noc19_cs09/
5. hppt://nptel.ac.in/course/117106113/34
6. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-01sc-introduction-to-electricalengineering-and-computer-science-i-spring-2011/pyton-tutorial/

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

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

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

COURSE NAME-LEARNING TO LEARN

(Open Elective) SYLLABUS FOR B.E. 2/4 – III SEMESTER

Instruction: 2 Hours	SEE: 60	Course code: **U22OE310EH**
Credits: 2	CIE: 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), HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

COURSE- CONSTITUTION OF INDIA-BASIC FEATURES & FUNDAMENTAL PRINCIPLES

(Open Elective) SYLLABUS FOR B.E. 2/4 – III SEMESTER

Instruction: 2 Hours	SEE: 60	Course code: **U22OE360EH**
Credits: 2	CIE: 40	Duration of SEE: 3 Hours

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

CONSTITUTION OF INDIA – BASIC FEATURES & FUNDAMENTAL PRINCIPLES

Unit –I:

Constitution: Meaning & Constitutionalism, Historical perspective - : 1909 Act, 1919 Act &
1935 Act, Salient features & nature of the Constitution,

Unit –II:

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

Unit –III:

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

Unit –IV:

Federal structure & distribution of legislative and financial powers between the Union and the States.

Suggested Readings:

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

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

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

COURSE NAME-MASTERING LEADERSHIP

(Open Elective) SYLLABUS FOR B.E. 2/4 – III SEMESTER

Instruction: 2 Hours	SEE: 60	Course code: **U22OE340EH**
Credits: 2	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
COURSE OBJECTIVES The course will enable the learners to: 1. Develop self-awareness, assess personal strengths, and set goals for leadership growth. 2. Foster inclusive teamwork by leveraging diverse talents and viewpoints. 3. Apply rational decision-making models and critical thinking to engineering challenges. 4. Manage time efficiently, balance priorities, and integrate continuous improvement practices. 5. Integrate competence-building, self-development, and ethical leadership into engineering leadership roles.	At the end of the course the learners will be able to: 1. Create a personalised leadership development plan, showcasing selfawareness and goals for growth. 2. Demonstrate the ability to lead inclusive teams, leveraging diverse talents and viewpoints. 3. Employ innovative problem-solving techniques to tackle complex technical issues. 4. Demonstrate efficient time management skills, balancing priorities and integrating continuous improvement. 5. Integrate competence-building, self development, and ethical leadership principles into their engineering leadership roles.

Unit 1: Foundations of Leadership in Engineering (6 hours)

1.1 Introduction to Leadership
1.2 Exploring diverse leadership styles and their applications
1.3 Building Competence and Self-Development
1.4 Assessing personal strengths and areas for improvement
1.5 Setting SMART goals for leadership and professional growth

Unit 2: Communication and Team Collaboration (6 hours)

2.1 Active listening, empathy, and conflict resolution
2.2 Enhancing Personal and Team Performance
2.3 Leveraging strengths within a team for optimal performance
2.4 Constructive feedback and coaching for skill development
2.5 Techniques for fostering a collaborative and high-performing team

Unit 3: Decision Making and Problem Solving (6 hours)

3.1 Rational decision-making models and critical thinking
3.2 Strategies for innovative problem-solving in engineering projects

3.3 Self-Supervision and Ethical Leadership
3.4 Reflecting on personal leadership decisions and their impact
3.5 Balancing ethical considerations with technical challenges
3.6 Cultivating a culture of integrity and accountability within teams

Unit 4: Leading Change and Project Management (6 hours)
4.1 Navigating technological advancements and industry shifts
4.2 Leading teams through organisational change and adaptation
4.3 Time Management and Continuous Improvement
4.4 Techniques for effective time management and priority setting
4.5 Strategies for managing multiple engineering projects and deadlines
4.6 Integrating personal and team growth into ongoing project improvement

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

1. "Drive: The Surprising Truth About What Motivates Us" by Daniel H. Pink
2. "Crucial Conversations: Tools for Talking When Stakes Are High" by Kerry Patterson, Joseph Grenny, Ron McMillan, and Al Switzler
3. "Ethics for the Real World: Creating a Personal Code to Guide Decisions in Work and Life" by Ronald A. Howard and Clinton D. Korver
4. "Thinking, Fast and Slow" by Daniel Kahneman
5. "Scrum: The Art of Doing Twice the Work in Half the Time" by Jeff Sutherland
6. "Mindset: The New Psychology of Success" by Carol S. Dweck

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)
Accredited by NAAC with A++ Grade
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State
DEPARTMENT OF MATHEMATICS

LINEAR ALGEBRA

(OPEN ELECTIVE-I for Civil, EEE, ECE, Mech of 2/4 B.E III-Sem)

L:T:P (Hrs./week):2:0:0	SEE Marks :60	Course Code: **U22OE310MA**
Credits : 2	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. Study the concept of Vector Spaces and understand the meaning of Basis and Dimension of a vector Space and Co-ordinates. 2. Understand the meaning of Linear transformation, properties. 3. Understandthe Range and Kernel, Rank-Nullity and Matrix of Linear Transformation. 4. Understand theInner Product Spaces, Orthonormal sets, Gram-Schmidt's Orthogonalization process.	1. Solve theproblems on Vector Spaces and determine the Basis and Dimension of a Vector Space and find the Co-ordinates. 2. Determinethe Linear Transformation, Range and Kernel and Matrix of Linear Transformation. 3. Determinethe Range and Kernel, Rank-Nullity and Matrix of Linear Transformation. 4. Determine the distance, orthogonal, orthonormal sets and construct orthonormal basis based on Gram-Schmidt's Orthogonalization process.

UNIT – I (8 classes)
Vector Spaces-Definition of a Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis.

UNIT – II (6 classes)
Linear Transformation -I
Definition of Linear Transformation- Properties of Linear Transformations – Product of Linear Transformations – Algebra of Linear Operators- Linear sum- Scalar multiple-Composition of maps.

UNIT – III (6 classes)
Linear Transformation -II
Range and kernel of a linear map – Dimension of Range and Kernel - Rank and nullity – Inverse of linear transformation - Rank nullity

theorem (without Proof)- Matrix of Linear Transformation.

UNIT – IV (8 classes)
Inner Product Spaces-The Dot Product on R and Inner Product Spaces, Orthonormal Bases, Orthogonal Complements- Gram-Schmidt's Orthonormolization process.

Learning Resources:
1. Introduction to Linear Algebra with Application, Author : Jim Defranza, Daniel Gagliardi, Publisher : Tata McGraw-Hill
2. An Introduction to Linear Algebra, V.Krishna Murthy, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd

Reference Books:
1 Elementary Linear Algebra, Author: Anton and Rorres, Publisher: Wiley India Edition.
2 Advanced Engineering Mathematics, Author : Erwin Kreysig, Publisher : Wiley Publication
3 Elementary Linear Algebra, Author : Ron Larson, Publisher : Cengage Learning

Online Resources :
1 http://mathworld.wolfram.com/topics
2 http://www.nptel.ac.in/course.php

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	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)
DEPARTMENT OF PHYSICS
Open elective Course
SMART MATERIALS AND APPLICATIONS (General Pool)

L : T : P	Credits	CIE		SEE		Course Code
		Marks	Exam Duration	Marks	Exam Duration	
02 :0 :0	02	40	90 min	60	3hours	U22OE310PH
CIE	Assignments (02)		Quizzes (02)	Internal Exams(02)		Total CIE Marks
Ave. Marks	05		05	30		40

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

VASAVI COLLEGE OF ENGINEERING (A)
DEPARTMENT OF CHEMISTRY

POLYMERIC MATERIALS

Stream Name: Materials for Engineers
OPEN ELECTIVE

Instruction :2Hour / Week	SEE- Marks : 60	Course Code : U22OE310CH
Credit : 2	CIE- Marks : 40	SEE- Duration : 2Hours

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. PRINCIPLES OF POLYMERIZATION Fourth Edition GEORGE ODIAN, University of New York, New York.
2. TEXTBOOK OF POLYMER Science THIRD EDITION, FRED W. BILLMEYER, Troy, 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. NPTEL Polymer Chemistry Course, D. Dhara, IIT Kharagpur.
2. Polymer chemistry by Gowariker

IV – Semester Open Electives (OPEN ELECTIVE-II)

S.No.	Dept.	Streams	Course Code	Name of the Course	Credits
1	Civil	General Pool	U22OE410CE	Disaster Management	3
2	CSE	General Pool	U22OE410CS	Introduction to Operating Systems	3
	CSE	Artificial Intelligence & Machine Learning	U22OE420CS	Mathematical Computing for AI&ML with Python	3
3	EEE	General Pool	U22OE410EE	Solar Power and Applications	3
4	IT	General Pool	U22OE410IT	Introduction to Database Management Systems	3
5		AI&ML	U22OE420IT	Essentials of Mathematics For Machine Learning using Python	3
6	Mechanical	Unmanned Aerial Vehicles	U22OE410ME	Design Principles of UAVs	3
7		Robotics	U22OE420ME	Kinematics and Dynamics of Robotics	3
8		General Pool	U22OE430ME	Optimization Methods	3
9	H&SS	General Pool	U22OE430EH	Critical Thinking	3
10		General Pool	U22OE020EH	Technical Writing and Professional Presentations	9

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

DISASTER MANAGEMENT (Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs./week):3:0:1	SEE Marks:60	Course Code:**U22OE410CE**
Credits: 3	CIE Marks:40	Duration of SEE : 3Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
In this subject the students will	Upon the completion of this course students will be able to
1. Know about the state of art of disaster management in world and explore the history of the disasters and comprehend how past events have helped shape the future. 2. Study the various natural and manmade disasters and apply the mitigation measures. 3. Expose students to various technologies used for disaster mitigation and management.	1. Attain knowledge on various types, stages, phases in disaster international policies and programmes with reference to the disaster reduction. 2. Understand various types of natural disaster, their occurrence, Effects, Mitigation and management System in India. 3. Understand different types of manmade disasters, their occurrence, Effects, Mitigation and Management System in India. 4. Explain the utility of geography information systems (GIS), Remote sensing technology in all phases of disaster mitigation and management. 5. Understand the Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management.

UNIT-I: Introduction: Hazard, vulnerability and risk, Types of disasters, Disaster management cycle, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India.

UNIT-II: Natural Disasters-Hydro-meteorological based disasters: Tropical cyclones, floods, drought zones-Causes, Types, effects and Mitigation measures.

UNIT-III: Natural Disasters Geographical based disasters: Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures.

UNIT-IV: Human Induced hazards: Chemical industrial hazards, major power break downs, traffic accidents, etc.

UNIT-V: Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management: Introduction to remote sensing and GIS, its applications in disaster management.

Learning Resources:

1. Rajib, S and Krishna Murthy, R.R.(2012) "Disaster Management Global Challenges and
   Local Solutions "Univerities Press, Hyderabd, 2012.
2. Navele, P & Raja, C.K. (2009), Earth and Atmospheric Disasters Management, Natural and Manmade, B.S. Publications, Hyderabad, 2009.
3. Battacharya, T. Disaster Science and Management, Tat McGraw Hill Company, New Delhi, 2012.

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)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

INTRODUCTION TO OPERATING SYSTEMS (OPEN ELECTIVE-II)

SYLLABUS FOR B.E. IV-SEMESTER

(COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **U22OE410CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Understand different Operating system Structures and Services.	1 Explain Operating system structures and internal structure of a process 2 Compare CPU scheduling algorithms. Analyze Disk scheduling algorithms 3 Apply different techniques for Main memory management. 4 Describe file management techniques. 5 Describe deadlock handling methods.

UNIT-I:

Introduction to operating systems: Definition, User view and System view of the Operating system, Operating system structure, Operating system services.

Process: Process concept, Process Control block, Context switching.

UNIT-II:

CPU Scheduling: Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Round Robin

Device Management: Disk Scheduling algorithms: FCFS, SSTF, SCAN.

UNIT –III:

Memory Management: Swapping, Contiguous memory allocation: Fixed Partitioning, Variable Partitioning. Non-Contiguous memory allocation: Paging.

Virtual memory: Demand paging, Page replacement Algorithms: FIFO, Optimal, LRU.

UNIT –IV:

File System Interface: File Concept, Access Methods: Sequential, Indexed, and Direct

File System Implementation: File-System Structure, Allocation Methods: Contiguous, Linked and Indexed.

UNIT-V:

Deadlocks: System model, deadlock characterization: Mutual Exclusion, Hold and Wait, Non pre-emption, Circular wait. Deadlock Prevention, Deadlock Avoidance: Banker's algorithm.

Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Operating System Concepts, 9th Edition (2016), Wiley India.
2. Andrew S. Tanenbaum, Modern Operating Systems, 2nd Edition (2001), Pearson Education, Asia.
3. Dhananjay, Dhamdhere.M, Operating System-concept based approach, 3rd edition (2009), Tata McGraw Hill, Asia
4. Robet Love: Linux Kernel Development, (2004)Pearson Education
5. Richard Stevens, Stephen Rago, Advanced Programming in the UNIX Environment, 3rd Edition(2013), Pearson Education
6. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php
7. https://nptel.ac.in/courses/106106144/

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MATHEMATICAL COMPUTING FOR AI & ML WITH PYTHON

Stream- Artificial Intelligence & Machine Learning

OPEN ELECTIVE-II

(COMMON for CIVIL, ECE, EEE & MECH) SYLLABUS FOR B.E IV SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: U22OE420CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT-V

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

Learning Resources:

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

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

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

Duration of Internal Test: 1 Hour 30 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Solar Power and Applications Open Elective-II
SYLLABUS FOR B.E. IV SEMESTER

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

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

Duration of Internal Tests : 90 Minutes

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

INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS
(GENERAL POOL : OPEN ELECTIVE-II)
SYLLABUS FOR B.E. IV SEMESTER (Common for CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code :**U22OE410IT**
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

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

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

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

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

UNIT – IV

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

UNIT – V

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

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

Learning Resources :

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

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

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

With effect from Academic Year 2023-24 (R22)

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF INFORMATION TECHNOLOGY

Essentials of Mathematics for Machine Learning using Python
(AIML STREAM : OPEN ELECTIVE-II)
SYLLABUS FOR B.E. IV SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks :60	Course Code: **U22OE420IT**
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

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

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

UNIT – II:
Statistical methods: Intro, Scipy statistics, five-number summary, Sampling distribution, Law of large numbers and Central limit theorem.
Correlation and covariance.

Hypothesis testing basics, confidence intervals**.**
Applications: Expected estimations using samples (Stochastic Gradient Descent).

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

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

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

Learning Resources:

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

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

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

Duration of Internal Test: **90 Minutes**

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

Design Principles of UAVs (Open Elective-II)
SYLLABUS FOR B.E. IV-SEMESTER (Stream: Unmanned Aerial Vehicles)

Instruction: 3Hours /week	SEE Marks : 60	Course Code : U22OE410ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES**
	On completion of the course, students will be able to
The objective of this Course is to understand the features of fundamentals of design and parameters, aerodynamic design, performance, weight estimation and stability of UAVs	1 Describe the design fundamentals of UAVs. 2 Apply the fundamental parameters in the design of UAVs. 3 Analyze the aerodynamic design of UAVs. 4 Explore the design concepts for the performance of UAVs. 5 Estimate the weight and stability of UAVs.

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

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

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

UNIT III: Aerodynamic design: Lift and drag.

Generation of Lift and drag: How lift is generated, Variation of lift with angle of attack, Sources of Drag. Aerodynamic center, Center of pressure, Various wing planforms, Mean aerodynamic cord. Lifting line theory, NACA airfoils, Drag generation and dear polar. Difference between Airfoil and Finite wing, Numerical problems on wing planforms. Interpreting airfoil data, Lift curve slope of finite wing, Drag Polar, Numerical problems on selection of an airfoil.

UNIT IV: Design for performance: Thrust and power.

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

UNIT V: Weight estimation and stability

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

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

Kinematics and Dynamics of Robotics (Open Elective-II)
SYLLABUS FOR B.E. IV-SEMESTER (Stream: Robotics)

Instruction : 3Hours /week	SEE Marks : 60	Course Code: U22OE420ME
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 and Newton-Euler mechanics 4 Develop motion and force control strategies for robotic systems using feedback control techniques 5 Generate and analyze robot trajectories for various applications

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

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

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

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

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

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

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

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

UNIT-IV

Non linear programming problems

Optimization methods for single variable, multivariable functions, Maxima-Minima

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

UNIT-V

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

Learning Resources:

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

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

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), HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

COURSE NAME- CRITICAL THINKING

(Open Elective) SYLLABUS FOR B.E. 2/4 – IV SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: **U22OE430EH**
Credits: 3	CIE: 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

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

ASSESSMENTS

- Online assignments
- Individual and Group

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:	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), HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Technical Writing and Professional Presentations

(Open Elective) SYLLABUS FOR B.E. 2/4 – IV SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: **U22OE020EH**
Credits: 3	CIE: 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:	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