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 2024-25
(For the batch admitted in 2023-24)
(R-23)

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 OFELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-23)** :: B.E. - ECE : THIRD SEMESTER(2024-25)

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		SEE	CIE	
THEORY								
U23PC310EC	Electronic Devices	3	1	-	3	60	40	4
U23PC320EC	Digital Logic Design	3	-	-	3	60	40	3
U23PC330EC	Signal Analysis and Transform Techniques	3	1	-	3	60	40	4
U23BS320MA	Partial Differential Equations and Numerical Methods	3	-	-	3	60	40	3
U23OE3XXXX	Open Elective - I	2	-	-	3	60	40	2
U23HS320EH	Skill Development Course-I: Communication Skills in English-I	1	-	-	2	40	30	1
U23BS360MA	Skill Development Course - II: Aptitude - I	1	-	-	2	40	30	1
U23HS030EH	Human Values and Professional Ethics - II	1	-	-	2	40	30	1
PRACTICALS								
U23PC311EC	Electronic Devices Lab	-	-	2	3	50	30	1
U23PC321EC	Digital Logic Design Lab	-	-	2	3	50	30	1
U23PC331EC	Signals and Systems Lab	-	-	2	3	50	30	1
U23PC341EC	Electronics Workshop	-	-	2	3	50	30	1
	TOTAL	**17**	**2**	**8**		**620**	**410**	**23**
	GRAND TOTAL	**27**				**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.

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SCHEME OF INSTRUCTION AND EXAMINATION **(R-23)** :: B.E. - ECE : THIRD SEMESTER(2024-25)

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		SEE	CIE	
THEORY								
UB23ES310EC	Programming Techniques for Problem Solving	2	-	2	3	50	-	-
UB23BS300MA	Calculus and Matrix Theory	2	-	-	3	50	-	-

SERVICE 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		SEE	CIE	
THEORY								
U23ES310EC	Electronics Devices and Circuits	3	-	-	3	60	40	3
PRACTICALS								
U23ES311EC	Electronics Devices and Circuits Lab	-	-	2	3	50	30	1

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Devices

SYLLABUS FOR B.E.III - SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U23PC310EC**
Credits : 4	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 Inverter, CMOS inverter 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

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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: **U23PC320EC**
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 & analyse 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

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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: **U23PC330EC**
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 time signals and systems, and investigate whether the system is stable. 2. Apply Fourier Transform on continuous time signals, and systems and identify whether the LTI system is distortion less or not. 3. Apply Laplace Transform to find response of LTI system, and convert continuous time signal into discrete time signal by applying sampling operation. 4. Analyze different types of discrete time signals and systems, and apply Discrete Time Fourier Transform. 4. Apply Z Transform 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		2											3
CO2	3	3		2											3
CO3	3	3		2											3
CO4	3	3		2											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. https://onlinecourses.nptel.ac.in/noc19_ee07/preview (Principle of Signals and Systems by Prof. Aditya K Jagannatham)
5. https://www.edx.org/course/signals-and-systems-part-1-1,2.

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF 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: **U23BS320MA**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: 1. **Learn** the formation Partial Differential Equations and solution of linear and non-linear first order partial differential equations. 2. **Study** the applications of Partial Differential equations. 3. **Understand** the concepts of interpolation and to learn various methods for interpolating data points and approximating functions. 4. **Learn** numerical techniques for approximating derivatives and solving first-order ordinary differential equations. 5. **Understand** the principles of curve fitting using the method of least squares and the concept of correlation.	At the end of the course students will be able to: **1. Formulate** the Partial differential equations and solve the linear and non-linear first order Partial differential equations. **2. Solve** the one-dimensional wave equation, one-dimensional heat equation, and two-dimensional heat equation under steady-state conditions. **3. Apply** numerical methods to interpolate data points with equal and unequal intervals. **4. Use** numerical techniques to approximate derivatives of functions at given points and solve first-order ordinary differential equations. **5. Apply** the method of least squares to fit various curves to the given data and Calculate Karl Pearson's coefficient of correlation.

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 : (8 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: (8 Hours)
Applications of Partial Differential Equations:
Method of Separation of Variables - One Dimensional Wave Equation- One

Dimensional Heat Equation – Two-Dimensional Heat equation (Steady state condition).

UNIT-III: (8 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: (8 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: (8 Hours)
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 Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2 Higher Engineering Mathematics, Dr.B.S.Grewal, 40th Edition, Khanna Publishers.

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

Online Resources:
1 https://onlinecourses.nptel.ac.in/noc24_ma37/preview
2 https://onlinecourses.swayam2.ac.in/cec24_ma19/preview

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF HUMANITIES 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: **U23HS320EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

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

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-I: Delightful Descriptions

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

UNIT-II: Formal Conversation Skills

2.1 Ask for Information
2.2 Give Information

2.3 Give Feedback
2.4 Seek Permission

UNIT-III: 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-IV: 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

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DEPARTMENT OF MATHEMATICS

Skill Development Course-II : Aptitude-I

SYLLABUS FOR B.E. III – SEMESTER

(Common to CIVIL, EEE, ECE & MECH)

L:T:P (Hrs./week) : 1:0:0	SEE Marks : 40	Course Code: **U23BS360MA**
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

- Learn.talentsprint.com/References Courses
- Quantitative Aptitude Disha Publications
- 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: **U23HS030EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

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

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

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

UNIT-III: PRIVACY

This unit covers "Cyber ethics" - the code of responsible behavior on the Internet. Just as we are taught to act responsibly in everyday life with lessons such as "Don't take what doesn't belong to you" and "Do not harm others," we must act responsibly in the cyber world as well.

The basic rule is "Do not do something in cyberspace that you would consider wrong or illegal in everyday life."

3.1 Defining Privacy
3.2 Privacy in the Digital Age
3.3 The Ethics of Surveillance

UNIT-IV: Engineering Ethics for Future Innovators

This unit equips students, the future innovators of tomorrow, with a foundation in engineering ethics. Students will explore the ethical responsibilities engineers hold regarding safety, public well-being, and sustainability. Real-world scenarios and case studies will be examined to understand how ethical considerations impact engineering decisions.

4.1 Safety and Public Welfare
4.2 Sustainability and Environmental Impact
4.3 The Ethics of New Technologies

MODE of DELIVERY

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

Relevant Websites, CD's and Documentaries

- https://plato.stanford.edu/

Learning Resources:

- learn.talentsprint.com

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

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)
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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: **U23PC311EC**
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)
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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: **U23PC321EC**
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. BCD 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

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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: **U23PC331EC**
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 continuous time signals. 2. Apply various transforms on signals to find its Spectrum using MATLAB. 3. Find the response of the system using convolution function in MATLAB. 4. Perform sampling of continuous time signal. 5. Write MATLAB codes for the generation of discrete time signals.

CO-PO/PSO Mapping

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

CYCLE - I Experiments

1. Basic operations on Matrices.
2. Continuous time signal generation.
3. Operations on Continuous time signal.
4. Fourier series analysis.
5. The Fourier transform and its properties.
6. Frequency Domain analysis of systems

CYCLE - II Experiments

7. Continuous time Convolution.
8. Laplace Transform and its properties.
9. System response using Laplace transforms.
10. Verification of Sampling Theorem.
11. Discrete time signal generation and operations.
12. Z – Transform and its properties.

New / Additional experiments planned

1. Correlation between signals and systems.
2. Introducing 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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Workshop

SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U23PC341EC**
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 getc.,), electromechanical 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. Soldering & de-soldering exercises using discrete components & ICs for a specific circuit requirement.

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. Measurement of R, L, C components using LCR Meter
10. Fault diagnosis of electronic circuits.
11. Applications of 3D printer to design prototype.
12. Mini Project

New / Additional experiments planned

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

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Programming Techniques for Problem Solving

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code:**UB23ES310EC**
Credits :--	CIE Marks : --	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Acquire skills and methods for a given computing problem. 2. Develop solutions using structured programming concepts. 3. Write programs in C Language. 4. Develop programs using C++.	On completion of the course, students will be able to 1. Design modular programs involving input output operations, decision making and looping constructs. 2. Apply the concept of arrays for storing, sorting and searching data. 3. Apply the concept of pointers for dynamic memory management and process strings. 4. Design programs to store data in structures. 5. Develop programs using OOP principles using C++.

CO-PO/PSO Mapping

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

UNIT-I

Introduction to Programming Language- Background of C, structure of a C Programs, Identifiers, Types, Variables, Constants, Input/Output, Operators, Expressions, Precedence and Associativity.

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

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

UNIT-II

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

Recursion-Recursive Functions, Preprocessor Commands.

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

UNIT-III

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

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

UNIT-IV

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

Introduction to Object-Oriented Programming: Background of C++, Differences, Introduction to Classes and Objects, Members, Member functions and friend functions.

UNIT-V

Static Polymorphism: Function Overloading, Operator Overloading

Inheritance: Derived Classes, Virtual Base Class.

Dynamic Polymorphism: Virtual functions, Function Overriding, Templates.

Exception Handling in C++

Learning Resources:

1. B.A. Forouzan& Richard F. Gilberg, "A Structured Programming Approach using C", 3rd Edition, Cengage Learning, 2013.
2. Walter Savitch, "Problem solving with C++",6th Edition, Pearson Education, 2009.
3. Gottfried, "Programming with C", 3rd Edition, TMH, 2010.

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DEPARTMENT OF MATHEMATICS

Calculus and Matrix Theory

SYLLABUS FOR B.E. III SEMESTER

BRIDGE COURSE B.E. III-SEMESTER (CBCS) (Common to all branches)

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

UNIT-I: (08 Hours)
CALCULUS
Differentiation of standard functions (Formulae) -Taylor's Series – Maclaurin's Series for functions of one variable - Partial Derivatives – Total Derivative – Derivative of Composite functions and Implicit functions - Chain Rule.

UNIT –II (06 Hours)
VECTOR DIFFERENTIATION
Scalar and Vector point functions -Vector Differentiation-Level Surfaces-Gradient of a scalar point function- Normal to a level surface- Directional Derivative – Divergence and Curl of a Vector field -Solenoidal and Irrotational vector- Conservative vector field.

UNIT – III (06 Hours)
MULTIPLE INTEGRALS: Double integrals - Change of order of integration (Cartesian Coordinates) – Change of variables (Cartesian to polar coordinates in two dimensions) - Triple integrals (Cartesian).

UNIT- IV (06 Hours)
MATRIX THEORY
Rank of matrix- Echelon form - -System of Linear Equations- Consistency of Homogeneous and Non-homogeneous system of equations- Eigen values and EigenVectors.

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Devices and Circuits

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U23ES310EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To give understanding on semi conductor 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, Break down of junctions–Zener and Avalanche, halfwave, fullwave, bridge rectifiers, L,C, π – section filters, Regulation and Ripple 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, bias stabilization 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, transconductance.

UNIT-V: CRO & Special devices:

Study of CRO block diagram, 1Elementary treatment on the functioning of tunnel diode, varactor diode, photo diode, light emitting diode, LCD, UJT, SCR, phototransistor.

Learning Resources:

1. Jacob Millman and Christos C. Halkias, Satyabratajit "Electronics Devices and Circuits", Mc Graw 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. Sedraand K.C. Smith, "Microelectronic Circuits", Seventh Edition New York, 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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Devices and Circuits Lab

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U23ES311EC**
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, students will be able to 1. Estimate the parameters from V-I characteristics of different diodes. 2. Design various rectifiers with different filter combinations. 3. Setup bias point in a transistor. 4. Estimate the parameters from BJT and 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–parameters
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 band width calculation of Single stage RC coupled CE Amplifier.
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.
3. Basic Clipping Circuits.

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

With effect from the academic year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031.
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-23)** :: B.E. - ECE : FOURTH SEMESTER(2024-25)

B.E (ECE) IV– SEMESTER								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			Credits
		Hours per Week			Duration in Hrs	Maximum Marks		
		L	T	P		SEE	CIE	
THEORY								
U23PC410EC	Electronic Circuits	3	1	-	3	60	40	4
U23PC420EC	Electromagnetic Field Theory	3	1	-	3	60	40	4
U23PC430EC	Probability Theory and Stochastic Process	3	1	-	3	60	40	4
U23PC440EC	Data Structures	3		-	3	60	40	3
U23OE4XXXX	Open Elective – II	3	-	-	3	60	40	3
U23BS440MA	Skill Development Course-III : Aptitude – II	1	-	-	2	40	30	1
U23PE410EC	Skill Development Course-IV: Technical Skills - I	1	-	-	2	40	30	1
PRACTICALS								
U23PC411EC	Electronic Circuits Lab	-	-	2	3	50	30	1
U23PC421EC	Data Structures Lab	-	-	2	3	50	30	1
U23PW419EC	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-23)** :: B.E. - ECE : FOURTH SEMESTER(2024 - 25)

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		SEE	CIE	
THEORY								
UB23HS410EH	English Language and Communication	2	-	-	3	50	-	-
PRACTICALS								
UB23HS411EH	English Language and Communication Skills Lab	-	-	2	3	50	-	-

SERVICE 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		SEE	CIE	
THEORY								
U23ES410EC	Analog Electronics Circuits	3	-	-	3	60	40	3
PRACTICALS								
U23ES411EC	Analog Electronics Circuits Lab	-	-	2	3	50	30	1

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Circuits

SYLLABUS FOR B.E. IV - SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U23PC410EC**
Credits : 4	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 (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

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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: **U23PC420EC**
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. Campbell's equation.

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Probability Theory and Stochastic Process

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U23PC430EC**
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												2	
CO3	2	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 arandom 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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Data Structures

SYLLABUS FOR B.E. IV - SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U23PC440EC**
Credits : 3	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 the construction and operations on Binary Search Trees and Graphs

CO-PO/PSO Mapping

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

UNIT-I:

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

Arrays, Strings and Structures: Introduction to 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 Binary Search Tree (BST); Applications, BST traversals

Graphs: Introduction, Basic terminology, Traversals, Minimum Spanning Tree – Kruskal's Algorithm and Prim's Algorithm.

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), 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

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DEPARTMENT OF MATHEMATICS

Skill Development Course-III: Aptitude-II

SYLLABUS FOR B.E. IV – SEMESTER

(Common to CIVIL, EEE, ECE & MECH)

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: **U23BS440MA**
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

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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: **U23PC411EC**
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

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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: **U23PC421EC**
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	3	3	3						1			1	3	2	2
CO2	3	3	3						1			1	3	2	2
CO3	3	3	3						1			1	3	2	2
CO4	3	3	3						1			1	3	2	2
CO5	3	3	3						1			1	3	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.

List of Additional Experiments

1. Implementation of Circular Queue.
2. Implementation of Sparse Matrix operations using Linked Lists.

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), 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 :

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

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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: **U23PW419EC**
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.

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

English Language and 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: **UB23HS410EH**
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 Active listening and features, types of listening

UNIT-III: 3.0: Writing

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

UNIT-IV: 4.0: Grammar and Vocabulary

4.1 Common Errors in tenses, articles and prepositions.

Vocabulary: one word substitutes, word often confused.

UNIT-V: 5.0:Reading

5.1 Prose text- What should life by Particia Fleming.

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.

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

English Language and 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: **UB23HS411EH**
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, Listen for gist and make inferences from various speeches. 2. Research and sift information to make presentations. 3. 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.

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

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

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

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.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Analog Electronic Circuits

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U23ES410EC**
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 the 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 bandwidth. Direct Coupled (DC) Amplifiers, drawbacks of DC amplifiers, Drift Compensation techniques.

UNIT-III: Feedback amplifiers

Concept of Feedback, General characteristics of negative feed back

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 Wienbridge 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, Pushpull amplifiers, Complementary symmetry Power amplifiers.

Learning Resources:

1. Jacob Millman and Christos C. Halkias, Satyabratajit "Electronics Devices and Circuits", Mc Graw hill, 3rd edition, 2010.
2. Jacob Millman and Christos C. Halkias, Chetan D Parikh, "Integrated Electronics" McGraw Hill,2009.
3. Robert L. Boylestad and Louis Nashel sky, "Electronic Devices and Circuit Theory", PHI,11th edition2015.
4. Jacob mill man and Taub: "Pulse, Digital and switching wave forms", McGraw 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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Analog Electronics Circuits Lab

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U23ES411EC**
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 wave shaping 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						1	1				2	
CO2	3	2	2						1	1				2	
CO3	3	2	2						1	1				2	
CO4	3	2	2						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, TMH2001.
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

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OPEN ELECTIVES - I		
Department	**Code**	**Title**
Civil	U23OE310CE	**Green Buildings**
CSE	U23OE310CS	Introduction to Python Programming
	U230E320CS	Programming Essentials in Python (Stream - Artificial Intelligence & Machine Learning)
ECE	U23OE310EC	Mathematical Programming for Engineers
	U23OE320EC	Introduction to Signals and Systems
	U23OE340EC	Introduction to Signals and Systems (Stream: Communication Engineering)
EEE	U23OE310EE	Non Conventional Energy Sources
IT	U23OE310IT	Object Oriented Programming using Java
	U23OE320IT	Computing using Python (Stream: AI&ML)
Mechanical	U23OE310ME	Introduction to Industrial Robotics (Stream: Robotics)
	U23OE320ME	Fundamentals of Unmanned Aerial Vehicles
Chemistry	U23OE310CH	Polymeric Materials
English	U23OE310EH	Learning To Learn
	U23OEH340EH	Mastering Leadership
Maths	U23OE310MA	Complex Variables
Physics	U23OE310PH	Fundamentals of Smart Materials and Applications

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DEPARTMENT OF CIVIL ENGINEERING

GREEN BUILDINGS (Open Elective-I)

SYLLABUS FOR B.E. III-SEMESTER

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

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)
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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 : **U23OE310CS**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

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

Iteration: while statement

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

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Department of Computer Science & Engineering

PROGRAMMING ESSENTIALS IN PYTHON

Stream - Artificial Intelligence & Machine Learning

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III-SEMESTER

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

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Acquire problem solving skills	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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers

(General Pool: Open Elective - I)

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

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U23OE310EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO Mapping

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

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

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

UNIT - III : Numerical Methods Using MATLAB

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

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

UNIT - IV : Nonlinear Equations

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

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Signals and Systems

(General Pool: Open Elective - I)

SYLLABUS FOR B.E. III – SEMESTER (CSE, AI&ML & IT branches)

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

COURSE OBJECTIVES	COURSE OUTCOMES
1. Define and classify continuous and discrete time signals and systems. 2. Determine frequency domain characteristics of continuous and discrete time signals.	On completion of the course, students will be able to 1. Analyze basic signals and systems in continuous time domain. 2. Apply the properties of Fourier transformation techniques to analyze continuous time domain signals and systems in frequency domain. 3. Apply Laplace Transform, analyze the LTI systems. 4. Analyze basic signals and systems in discrete time domain

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	3	2												2
CO3	3	3	2												2
CO4	3	2	1												2

UNIT - I

Continuous time signals: types of signals, representation of signals, basic elementary signals, operations on signals.
Continuous time systems: classification of systems - static and dynamic, linear and non linear, time invariant and time variant.

UNIT - II

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

UNIT – III

Laplace transforms: Introduction, existence, Laplace transform of basic elementary signals, properties, inverse Laplace transforms, Analysis of LTI systems using Laplace Transform.

UNIT - IV

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

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

Learning Resources:

1. P. Ramakrishna Rao, Signals and Systems, Mc Graw Hill, 2008.
2. Alan V. Oppenheim, Alan S. Wilsky and S. Hamid Nawab, Signals and Systems, 2nd ed., PHI, 2009.
3. Nagoor kani , Signals and Systems McGraw Hill, 2013
4. https://onlinecourses.nptel.ac.in/noc19_ee07/preview (Principle of Signals and Systems by Prof. Aditya K Jagannatham
5. https://www.edx.org/course/signals-and-systems-part-1-1
6. https://www.edx.org/course/signals-systems-part-2-iitbombayx-ee210-2x-3

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Signals and Systems

(Communication Engineering Stream: Open Elective - I)

SYLLABUS FOR B.E. III – SEMESTER (CSE, AI&ML & IT branches)

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U23OE340EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Define and classify continuous and discrete time signals and systems. 2. Determine frequency domain characteristics of continuous and discrete time signals.	On completion of the course, students will be able to 1. Analyze basic signals and systems in continuous time domain. 2. Apply the Fourier analysis of to analyze continuous time domain signals and systems in frequency domain. 3. Apply Laplace Transform, analyze the LTI systems. 4. Analyze basic signals and systems in discrete time domain

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

UNIT - I

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

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

Lab Activity: Generation of elementary signals in MATLAB.

UNIT - II

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

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

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

UNIT – III

Laplace transforms: Introduction, existence, Laplace transform of basic elementary signals, properties, inverse Laplace transforms, Analysis of LTI systems using Laplace Transform.

Lab activity: Obtaining system response using Laplace transforms in MATLAB

UNIT - IV

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

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

Lab activity: Generation of elementary signals in MATLAB.

Learning Resources:

1. P. Ramakrishna Rao, Signals and Systems, Mc Graw Hill, 2008.
2. Alan V. Oppenheim, Alan S. Wilsky and S. Hamid Nawab, Signals and Systems, 2nd ed., PHI, 2009.
3. Nagoor kani , Signals and Systems McGraw Hill, 2013
4. https://onlinecourses.nptel.ac.in/noc19_ee07/preview (Principle of Signals and Systems by Prof. Aditya K Jagannatham
5. https://www.edx.org/course/signals-and-systems-part-1-1
6. https://www.edx.org/course/signals-systems-part-2-iitbombayx-ee210-2x-3

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

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

Duration of Internal Tests: 90 Minutes

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

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

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

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

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

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

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

UNIT-III: Biomass Energy and Fuel Cells:

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

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

UNIT-IV: Ocean Energy and Geothermal Energy:

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

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

OBJECT ORIENTED PROGRAMMING USING JAVA
(GENERAL TRACK : OPEN ELECTIVE-I)
(Common for CIVIL, ECE, EEE & MECH)
SYLLABUS FOR B.E. III SEMESTER

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

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

UNIT- I

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

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

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

Interfaces: Defining interfaces, extending interfaces, implementing interfaces.

UNIT- II

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

UNIT- III

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

UNIT- IV

Introducing Awt,Awt Controls:

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

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

COMPUTING USING PYTHON
(AI&ML TRACK: OPEN ELECTIVE-I)
(Common for CIVIL, ECE, EEE & MECH)
SYLLABUS FOR B.E. III SEMESTER

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

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

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

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

UNIT – III:
Set: Introduction, Set operations.

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

UNIT – IV:

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

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

Learning Resources:

1 Allen Downey, "Think Python: How to Think Like a Computer Scientist", O'Reilly publications,2nd Edition.

2.Reema Thareja, "Python programming using problem solving approach ", Oxford university press.

3. Mark J Guzdial, Introduction to Computing and programming in Python, 3rd Edition (2013), Pearson India

4. https://onlinecourses-archive.nptel.ac.in/noc19_cs09/

5. http://nptel.ac.in/courses/117106113/34

6. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-01sc-introduction-to-electricalengineering-and-computer-science-i-spring-2011/python-tutorial/

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

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

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

INTRODUCTION TO INDUSTRIAL ROBOTICS

(Stream: Robotics)

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

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

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

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

UNIT-I

ROBOT BASICS

Robot-Basic concepts, Need, Law, History, Anatomy, specifications.

Robot configurations-cartesian, cylindrical, polar, articulated and SCARA. Parallel robots

ROBOT APPLICATIONS

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

UNIT-II

ROBOT ELEMENTS

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

UNIT-III

ROBOT COORDINATE SYSTEMS

Coordinate frames, Rotation matrix, Euler angles, Roll pitch and yaw angle representation, Composite rotations, Homogeneous Transformation matrix.

UNIT-IV

ROBOT SENSORS

Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors

Robot programming

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

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

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

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

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

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

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

Unit-III: UAV Elements, Navigation and Guidance

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

Unit-IV: Design & Simulation of UAV

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (A)
DEPARTMENT OF CHEMISTRY
OPEN ELECTIVE (*General Pool*)
B E III SEMETER

POLYMERIC MATERIALS

Instruction : 2Hour / Week	SEE- Marks : 60	Course Code : U23OE310CH
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. George Odian, Principles of Polymerization Fourth Edition, University of New York.
2. Fred w. Billmeyer, Textbook of Polymer Science Third Edition, New York
3. P.C.Jain and Monica Jain, "Engineering Chemistry", DhanpatRai Pub, Co., New Delhi (2002)
4. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).

Learning Resources:

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

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: U23OE310EH
Credits: 2	CIE: 40	Duration of SEE: 3 Hours

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

No. of Internal tests	:	2	Max. Marks	:	30
No. of assignments	:	2	Max. Marks	:	5
No. of Quizzes	:	2	Max. Marks	:	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
W.E.F-2024-2025

Instruction: 2 Hours	SEE: 60	Course code: U23OEH340EH
Credits: 2	CIE: 40	Duration of SEE: 3 Hours

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

ASSESSMENTS
- Online assignments
- Individual and

LEARNING RESOURCES
learn.talentsprint.com

1. "Leaders Eat Last" by Simon Sinek
2. "The 7 Habits of Highly Effective People" by Stephen R. Covey
3. "Dare to Lead" by Brené Brown
4. "Good to Great: Why Some Companies Make the Leap... and Others Don't" by Jim Collins
5. "Start with Why: How Great Leaders Inspire Everyone to Take Action" by Simon Sinek

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

1	No. of Internal tests	:	2	Max. Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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DEPARTMENT OF MATHEMATICS

COMPLEX VARIABLES

(Open Elective) For B.E., III - Semester – CBCS

(For CIVIL, EEE, ECE & MECH only)

Instruction: 2 Hours per week	Sem. End Exam Marks: 60	Subject Reference Code: U23OE310MA
Credits: 2	Sessional Marks: 40	Duration of Semester End Exam: 3 Hours

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

UNIT – I (8 classes)

DIFFERENTIATION OF COMPLEX FUNCTION

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

UNIT – II (6 classes)

INTEGRATION OF COMPLEX FUNCTION

Complex Integration- Cauchy's Theorem (with proof) - Cauchy's Integral Formula (with proof) - Evaluation of integrals by Cauchy's Integral formula.

UNIT – III (6 classes)
SERIES OF COMPLEX FUNCTIONS
Power series - Taylor's Series - Laurent's Series (without proofs) –Zero and singularities of complex function.

UNIT – IV (8 classes)
RESIDUES
Introduction to Residues- Residues at singularities-Cauchy's Residue theorem (without proof) – Evaluation of integrals by Cauchy's Residue theorem.

Learning Resources:
1. Advanced Engineering Mathematics 3rd Edition, R.K.Jain & S.R.K.Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics 40th Edition Dr. B.S Grewal, Khanna Publishers.
3. A Text book of Engineering Mathematics, N.P. Bali & Manish Goyal, Laxmi Publications.

Online Resources:
1. https://onlinecourses.nptel.ac.in/noc24_ma03/preview

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

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS
Open elective Course
FUNDAMENTALS OF SMART MATERIALS AND APPLICATIONS
B.E. III Semester

L:T: P	Credits	CIE Marks	SEE Marks	SEE Duration	Course Code
2:0:0	02	40	60	3 hours	24OE310PH

CO-PO Mapping

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

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

UNIT I: INTRODUCTION TO SMART MATERIALS (6 hours)
Characteristics of metals, polymers and ceramics. Introduction to smart materials, need for smart materials, Classification of smart materials, Components of a smart System, Applications of smart material, role of smart materials in developing intelligent systems and adaptive structures.

UNIT II: PIEZO AND FERRO ELECTRIC MATERIALS (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 ferroelectric materials, Curie-Weiss law, applications of Ferro electric materials.

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

Pyro electricity: pyro electric effect, pyro electric materials, pyro-electric detector.

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

UNIT IV: SHAPE MEMORY MATERIALS (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.

Learning Resources:

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS
PHYSICS OPEN ELECTIVE TRACKS (B.E-III Semester)

MATERIALS SCIENCE FOR ENGINEERS
FUNDAMENTALS OF MATERIALS SCIENCE

L : T : P	Credits	CIE		SEE		Course Code
		Marks	Exam Duration	Marks	Exam Duration	
02 :0 :0	2	30	90 min	60	3hours	**U24OE330PH**
CIE	Assignments (02)		Quizzes (02)	Internal Exams(01)		Total CIE Marks
Ave. Marks	5		5	30		40

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

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

UNIT III: Diffusion in Solids (8 hours)
Solid state diffusion, Diffusion mechanisms, Self-diffusion, Impurity diffusion coefficient, Fick's laws, Diffusion coefficient, determination of diffusion coefficient, Random walk diffusion, Diffusion in a simple cubic structure, Diffusion under external field, Kirkendall shift, Ionic conductivity, Ionic conductivity of alkali halides.

UNIT-IV: Strengthening Mechanisms (6 hours)
Solidification of metals and alloys, cooling curves, concepts of nucleation and growth, Heat transfer associated in nucleation and growth, Homogeneous and Heterogeneous nucleation, Structure of metal ingots, Construction of binary alloys, Formation of alloy phases, viz. Solid solutions – substitutional and interstitial, intermetallic compounds.

References:

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

PHYSICS OE TRACKS (B.E-III Semester)

Semiconductor Physics and Device Applications
ESSENTIALS OF SEMICONDUCTOR PHYSICS

L : T : P	Credits	CIE		SEE		Course Code
		Marks	Exam Duration	Marks	Exam Duration	
02 :0 :0	2	30	90 min	60	3hours	**U24OE320PH**
CIE	Assignments (02)		Quizzes (02)	Internal Exams(01)		Total CIE Marks
Ave. Marks	5		5	30		40

UNIT I: Basics of Quantum Mechanics (8 Hrs)
Existence of matter waves, Wave function and its significance, Schrodinger time dependent and independent wave equations, Wave equation of a free particle, Origin of band gap, Energy bands in solids, Postulates of quantum mechanics, Quantum mechanical operators and expectation values, Potential well, Quantum tunnelling.

UNIT II: Semiconductors: Energy Band and Charge Carriers (6 Hrs)
Types of semiconductors (doping, bandgap, composition), Fermi-Dirac statistics- Density of states of semiconductor, Fermi level in semiconductors, Law of mass action, Charge compensation and charge neutrality, Hall probes and its applications.

UNIT-III: Growth of Semiconductors (6 Hrs)
Introduction, Bulk crystal growth, Epitaxial crystal growth, Evaporation and sputtering, defects in crystal, Band gap engineering, GaAs crystal growth.

UNIT IV: Carrier Transport in Semiconductors (6 Hrs)
Carrier generation, Carrier life time, Carrier scattering and mobility, Low-field and high-field transport, introduction to diffusion, Drift-diffusion current and total current density, Einstein relation , Direct and indirect recombination and trapping, Current continuity equation, Carrier injection, ambipolar transport, Diffusion length.

References:

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

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OPEN ELECTIVES - II		
Department	**Code**	**Title**
Civil	U23OE410CE	Solid Waste Management
CSE	U23OE410CS	Basics of Java Programming
CSE	U23OE420CS	Mathematical Computing for AI & ML with Python Stream - Artificial Intelligence & Machine Learning
ECE	U23OE410EC	Sensors for Engineering Applications
	U23OE420EC	Introduction to Principles of Communication Engineering
EEE	U23OE410EE	Solar Power and applications
IT	U23OE410IT	Introduction to Database Management Systems
	U23OE420IT	Essentials of Mathematics for Machine learning using Python (AI&ML Track)
Mechanical	U23OE410ME	Kinematics and Dynamics of Robotics (Stream: Robotics)
	U23OE420ME	Operations Research
English	U23OE430EH	Critical Thinking
	U23OE020EH	Technical Writing and Professional Presentations
Physics	U24OE420PH	Materials Science for Engineers Synthesis and Properties of Materials
	U24OE410PH	Semiconductor Physics and Device Applications Basic Semiconductor Devices

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DEPARTMENT OF CIVIL ENGINEERING

SOLID WASTE MANAGEMENT (Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

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

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

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

BASICS OF JAVA PROGRAMMING
(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 : **U23OE410CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply object oriented principles for developing an application using Java constructs. 2 Design GUI using existing Java classes and interfaces.	1 Adopt the fundamentals of Object oriented system development for developing a application. 2 Apply basic features of OOP to design an application. 3 Employ runtime error handling, concurrent programming practices to develop a parallel processing application. 4 Perform string handling, read and write operations using console and files IO streams.

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

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Sensors for Engineering Applications

(General Pool: Open Elective - II)

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

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

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

CO-PO-PSO Mapping

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

UNIT - I

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

UNIT – II

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

UNIT – III

Thermal and Optical Sensors temperature – temperature difference – heat quantity. Thermometers for different situations – thermocouples thermistors – color pyrometry. light intensity - wavelength and color - light dependent resistors,

photodiode, phototransistor, CCD, CMOS sensors. Radiation intensity, particle counter – Gieger Muller courter (gas based), Hallide radiation detectors.

UNIT – IV

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

UNIT – V

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

Lab Experiments:

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

Learning Resources :

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

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Principles of Communication Engineering

(General Pool: Open Elective - II)

SYLLABUS FOR B.E. IV – SEMESTER (CSE & IT branches)

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

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

CO-PO-PSO Mapping

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

UNIT - I

Amplitude Modulation: Introduction to Modulation, Need for Modulation, Modulation index, Side bands, AM Power, Double Side Band Suppressed Carrier Modulation, Single Side Band Modulation, Vestigial Side Band Modulation, AM demodulation, Frequency Division Multiplexing,

Lab Activity: Generation of AM using MATLAB and Simulink.

UNIT - II

Angle Modulation: Angle Modulation fundamentals, Frequency Modulation – Modulation index and sidebands, Narrowband FM, Wideband

FM, Principles of Phase Modulation, FM demodulation

Lab Activity: Generation of FM signals using MATLAB and Simulink.

UNIT - III

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

Digital Communication Techniques: Quantization, Data Conversion, Time Division Multiplexing, Pulse Code Modulation, Delta Modulation.

Lab Activity: Demonstration of Sampling using MATLAB.

UNIT - IV

Transmission of Binary Data in Communication Systems: Digital Codes, Principles of Digital Transmission, ASK FSK, BPSK

Lab activity: Demonstration of ASK and BPSK using SIMULINK.

UNIT - V

Information Theory: Uncertainty, Information and entropy. Discrete memory less channels

Source Coding Techniques: Shannon-Fano coding, Huffman Coding

Lab activity: Entropy calculations using MATLAB

Learning Resources:

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

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

1. No. of Internal Tests	:	2	Max. Marks for each Internal 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)
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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: **U23OE410EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

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

Unit – I

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

Unit – II

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

Unit – III

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

Unit – IV

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

Unit – V

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

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 TRACK: OPEN ELECTIVE-II)
(Common for CIVIL, ECE, EEE & MECH)
SYLLABUS FOR B.E. IV SEMESTER

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

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

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

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

Essentials of Mathematics for Machine Learning using Python

(AI&ML TRACK : OPEN ELECTIVE-II)
(Common for CIVIL, ECE, EEE & MECH)
SYLLABUS FOR B.E. IV SEMESTER

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

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

UNIT – I:

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

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

Intro. to Scipy linear algebra.

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

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

UNIT – II:

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

Hypothesis testing basics, confidence intervals**.**

Applications: Expected estimations using samples (Stochastic Gradient Descent).

UNIT-III:

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

UNIT-IV:

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

UNIT V:

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

Learning Resources:

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

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

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

Duration of Internal Test: **90 Minutes**

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

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

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

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

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

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

UNIT-III

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

Dynamics of serial manipulators

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

Unit-IV

Dynamics of serial manipulators

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

UNIT-V

Trajectory Generation

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

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

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

OPERATIONS RESEARCH

(General Pool : Open Elective-II)

SYLLABUS FOR B.E. IV-SEMESTER

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

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

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

UNIT – I

Introduction: Definition and scope of operations research.

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

UNIT – II

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

UNIT-III

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

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

UNIT-IV

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

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

UNIT-V

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

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

Learning Resources:

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

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

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

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), 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: U23OE430EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

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

UNIT 1: 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 Introduction to Problem Solving - Changing Your Perspective
5.2 Limitations of Point of View
5.3 Considering others viewpoints

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

LEARNING RESOURCES

learn.talentsprint.com

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

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

1	No. of Internal tests	:	2	Max. Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

Duration of Internal Tests : 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: U23OE020EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to:	**At the end of the course the learners will be able to: -**
1. 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	**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
- Group
- Presentations
- Expert lectures
- Writing and Audio-visual lessons

ASSESSMENTS

- Online assignments
- Individual and

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	:	2	Max. Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

PHYSICS OE TRACKS (B.E-IV Semester)

MATERIALS SCIENCE FOR ENGINEERS
SYNTHESIS AND PROPERTIES OF MATERIALS

L : T : P	Credits	CIE		SEE		Course Code
		Marks	Exam Duration	Marks	Exam Duration	
03 :0 :0	3	30	90 min	60	3hours	**U24OE420PH**
CIE	Assignments (03)		Quizzes (03)	Internal Exams(01)		Total CIE Marks
Ave. Marks	5		5	30		40

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

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

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

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

.

UNIT III: Electrical Properties of Materials (8 hours)

The Boltzmann transport equation, Electrical conductivity, electrical conductivity at low temperatures, Matheissen's rule, Thermal conductivity, Widemann-Franz law, Hall-effect, Temperature variation of electrical conductivity

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

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

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

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

Optical properties: photoconductivity, optical absorption & transmission, energy band gap determination, photoluminescence, phosphorescence, electroluminescence.
Thermal properties: concept of phonons, thermal conductivity, specific heat, exothermic & endothermic processes.

References:

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

DEPARTMENT OF PHYSICS

PHYSICS OE TRACKS (B.E-IV Sem)

Semiconductor Physics and Device Applications
Basic Semiconductor Devices

L : T : P	Credits	CIE		SEE		Course Code
		Marks	Exam Duration	Marks	Exam Duration	
03 :0 :0	3	30	90 min	60	3hours	U24OE410PH
CIE	Assignments (03)		Quizzes (03)	Internal Exams(01)		Total CIE Marks
Ave. Marks	5		5	30		40

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

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

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

UNIT IV: BJT and Thyristor (8 hours)
BJT's – Construction and characteristics, Thyristor – Construction, working and characteristics, comparison of BJT and Thyristor, Heterojunction Bipolar junction transistor, Basics of gate turn-off thyristor (GTO), SiC based Bipolar Devices-Applications, Building a GaN Transistor-GaN Transistor Electrical Characteristics.

UNIT V: Fabrication Techniques (6 hours)
BJT fabrication: Diffused, point contact, fused or alloy and rate grown

techniques, molecular beam epitaxy (MBE), epitaxial vapour phase, Liquid phase growth.

References:

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

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Academic Activity Planner / Calendar for the Academic Year 2024-25

S.No.	Month	Activities planned
		ODD Semester
1	August	Introduction and objectives of CCA activities and Awareness on Library learning Resources by Mr. Ravi Kumar Librarian, VCE.
2	August	Poster Presentation on "IoT Solutions in Agriculture" in association with IETE Students' Forum (ISF)
3	August	Alumni lecture on "Pre-requisites for CAT Entrance" by Mr. Ajith, IIM Ahmedabad (2021)
4	August	Guest lecture on Being Professional a framework of Engineers mindset by Dr. T.P. Sashi Kumar, Former Scientist, Dept of Space, ISRO.
5	September	Guest lecture on "6G technologies and its challenges" by Dr. Humaira Nishat, Prof., ECE CVR College of Engineering
6	September	"Logical Wizard", A technical event conducted in association with IEEE SB VCE Unit.
7	September	Alumni lecture on "Carrier Guidance in Software Domain" by Mr. Manoj (2023), Traniee Engineer at Principal Global Solutions, Hyderabad
8	October	Guest Lecture on "Advanced Embedded Systems using STM32" by Dr. Thottempudi Pardhu, for V -sem students Assistant professor, BVRIT, HYD
9	October	Technical Essay Writing Competition "Technology in Professional Ethics– need of the hour" in association with IETE Students' Forum (ISF)
10	October	Alumni lecture "Carrier Guidance in product based companies" by Mr. Anudeep (2020) SAP Consultant at L&T.
11	October	Guest lecture on "Life Skills" by Mr. V.T. Shiva, Managing Director, RC All-Tech Power Systems Pvt. Ltd.
12	November	Hackerrank™ based coding contest "Hackathon 2024" for BE ECE Sem-III students in association with IEEE SB.
13	November	A Guidance program on "Career Opportunities after B.Tech" by Mr. S. Manimohan Trinath, GATE/ESE Trainer, motivational speaker
14	November	Hackerrank™ based coding contest "Hackathon 2024" for BE ECE Sem-1 students in association with IEEE SB.

15	November	Alumni lecture on Time Management by Keshava Murthy (1988) Freelancer Consultant, Mysuru
EVEN Semester		
16	January	Guest lecture on IOT implementation using node MCU by Dr. shyam sunder, Associate Professor, ECE Dept, Osmania University, HYD.
17	January	"Hardware circuit design contest" in association with IEEE SB of VCE Unit.
18	January	Alumni Technical talk" by N. Anagha (2023)
19	February	Guest Lecture Introduction to RF Design, Mr. Sourabh Joshi, Senior Team Lead, MathWorks, Hyderabad
20	February	"Tech Lipi – A technical contest" in association with IETE Students' Forum
21	February	Alumni lecture on "Career in ML and Data science" Mr. N Karthik Founding Engineer at Applied AI, Hyd.
22	March	Guest lecture on Communication related by Dr. Chayan Bhar, for VI-sem students Prof. NIT Warangal.
23	March	Guest Lecture on "Developing Business Models for Sustainability in Startup's" by Dr. B. Madhura, Assistant Professor ,School of Management Studies, Hyderabad
24	March	Poster Presentation on "AI & ML solutions for Societal Problems" in association with IETE Students' Forum
25	March	Alumni lecture "Carrier Guidance "by Mr. Shiva (2008) RPO, Vijayawada
26	April	Guest Lecture on "Alumini talk on how to get into core companies" by Mr. Neeraj (2022), Silicon Labs
27	April	Hackerrank™ based coding contest "Top Coder 2025" students in association with IEEE SB
28	April	Alumni lecture "Carrier Guidance" by Mr. Praneeth (2023), Hyundai Mobi's