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 2025-26
(For the batch admitted in 2024-25)
(R-24)

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-24)** :: B.E. ECE : THIRD SEMESTER (2025-26)

B.E (ECE) III – SEMESTER								
Course Code	Name of the Course	Scheme of Instruction Hours per Week			Scheme of Examination Duration in Hrs	Maximum Marks		Credits
		L	T	P		SEE	CIE	
THEORY								
U24PC310EC	Electronic Devices	3	1	-	3	60	40	**4**
U24PC320EC	Digital Logic Design	3	-	-	3	60	40	**3**
U24PC330EC	Signal Analysis and Transform Techniques	3	1	-	3	60	40	**4**
U24BS320MA	Partial Differential Equations and Numerical Methods	3	-	-	3	60	40	**3**
U24OE3XXXX	Open Elective - I	2	-	-	3	60	40	**2**
U24HS320EH	Skill Development Course-I: Communication Skills in English-I	1	-	-	2	40	30	**1**
U24BS330MA	Skill Development Course - II: Aptitude - I	1	-	-	2	40	30	**1**
U24HS030EH	Human Values and Professional Ethics - II	1	-	-	2	40	30	**1**
U24HS310EH	Critical Thinking	1	-	-	2	40	30	**1**
PRACTICALS								
U24PC311EC	Electronic Devices Lab	-	-	2	3	50	30	**1**
U24PC321EC	Digital Logic Design Lab	-	-	2	3	50	30	**1**
U24PC331EC	Signals and Systems Lab	-	-	2	3	50	30	**1**
	TOTAL	**18**	**2**	**6**		**610**	**410**	**23**
	GRAND TOTAL	**26**				**1020**		

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

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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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-24)** :: B.E. ECE : THIRD SEMESTER (2025-26)

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								
UB24ES310EC	Programming Techniques for Problem Solving	2	-	2	3	50	-	-
UB24BS300MA	Foundation to Engineering Mathematics	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								
U24ES310EC	Electronics Devices and Circuits	3	-	-	3	60	40	3
PRACTICALS								
U24ES311EC	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. (ECE) III - SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U24PC310EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To understand fundamental semiconductor carrier transport mechanisms and related physical principles. 2. To analyze the electrical behavior and modeling of PN junctions under different biasing conditions. 3. To explore applications of PN junctions and metal-semiconductor devices including special-purpose diodes. 4. To Study transistor-level device physics, including short-channel effects in modern MOSFETs. 5. To Learn CMOS fabrication steps and carrier transport models through TCAD simulations.	On completion of the course, students will be able to 1. Analyze carrier drift, diffusion, and recombination processes in semiconductors. 2. Interpret the I–V characteristics, capacitance, and transient behavior of PN junctions. 3. Apply PN junction and metal-semiconductor devices in practical circuits like rectifiers and regulators. 4. Analyze BJT and MOSFET device characteristics and explain short-channel effects and small-signal models. 5. Understanding of CMOS IC fabrication processes and TCAD-based modeling of carrier transport.

CO-PO/PSO Mapping

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

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, Short channel Effects in MOSFET.

UNIT - V :

IC fabrication process and Introduction to TCAD Simulation: Oxidation, diffusion, ion implantation, photolithography, Etching, Chemical vapor deposition, sputtering, twin-tub CMOS process, Introduction to Technology computer aided design tools, Carrier transport models: Drift-diffusion model, Thermodynamic model and Hydrodynamic model.

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. (ECE) III - SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U24PC320EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Understand the basic concepts of digital systems. 2. Design and Analyze Combinational Logic Circuits. 3. Design and Analyze Sequential Logic Circuits. 4. Learn language fundamentals of Verilog to simulate and synthesize digital circuits. 5. Model Digital Systems Using HDL, Simulate and Test Logic Circuits	On completion of the course, students will be able to 1. Evaluate the basic principles of digital systems, including binary arithmetic, Boolean algebra and logic simplification. 2. Demonstrate the design of combinational logic systems. 3. Describe the design of Sequential Circuits. 4. Illustrate Use of Hardware Description Languages to model, simulate, and implement digital circuits. 5. Demonstrate the models of Digital systems using HDL.

CO-PO/PSO Mapping

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

UNIT – I :

Logic Simplification and Combinational Logic Design: Review of Boolean Algebra, Consensus theorem and De Morgan's Theorem, SOP & POS forms, Minimization of switching functions: Karnaugh Map method (up to 5 variables),Logic function Realization using basic gates, 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, Comparators. Multiplexers,

Demultiplexers, and their applications, Implementations of Logic Functions using Decoders, Demultiplexers and Multiplexers, Quantum Logic Gates.

UNIT - III :

Sequential Logic Design: Latches and Flip flops, Ripple and Synchronous counters, Shift registers: Left shift and Right shift registers, Finite state machines, Introduction to PAL, PLA,FPGA.

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 Static Timing Analysis.

Learning Resources:

1. Morris Mano M. and Michael D. Ciletti, "Digital Design. With an Introduction to Verilog HDL ", 6th edition, Pearson 2018.
2. Parag K. LaLa Quantum computing: A Beginner's Introductions 1st edition
3. Samir palnitkar, "Verilog HDL: A Guide to Digital Design and Synthesis, "Second edition, Pearson 2008.
4. Charles H. Roth, Jr., Lizy Kurian John and Byeong Kil Lee "Digital Systems Design Using Verilog", First Edition.
5. https://onlinecourses.nptel.ac.in/noc22_ee110
6. https://onlinecourses.nptel.ac.in/noc25_ee180

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. (ECE) III - SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U24PC330EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To define and classify continuous 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. 4. To define and classify discrete time signals & systems 5. To determine the frequency domain characteristics of discrete time signals using various transform techniques.	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. 5. 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									2		3	3
CO2	3	3	2									2		3	3
CO3	3	3	2									2		3	3
CO4	3	3	2									2		3	3
CO5	3	3	2	3								2		3	3

UNIT - I :

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

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

UNIT - II :

Signal Representation by Continuous Exponentials: Introduction to Fourier Transform, Existence, Fourier transform of singularity functions and signals, Properties, Fourier transform of a periodic function.

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

UNIT - III :

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

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

UNIT - IV :

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

UNIT - V :

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

Learning Resources:

1. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.
2. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
3. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2 Ed.
4. Signals and Systems – A. Rama Krishna Rao – 2008, TMH.
5. https://onlinecourses.nptel.ac.in/noc19_ee07/preview (Principle of Signals and Systems by Prof. Aditya K Jagannatham)

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

For B.E. III - Sem., (CBCS) (For ECE Branch only)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U24BS320MA**
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 of 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 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 should 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. 3. Apply Numerical methods to interpolate data points with equal and unequal intervals. 4. Use Numerical techniques to 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			
CO2	3	2										1			
CO3	3	2										1			
CO4	3	2										1			
CO5	3	2										1			

UNIT - I:

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:

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS: Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation (Homogeneous)

UNIT - III:

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:

NUMERICAL SOLUTIONS OF ODE: Numerical Solutions of Ordinary Differential Equations of first order - Taylor's Series Method - Euler's Method -Modified Euler's Method - Runge-Kutta of 4th order (without proofs).

UNIT - V :

CURVE FITTING: Curve fitting by the Method of Least Squares - Fitting of Straight Line - Second order curve (Parabola) - Exponential curve ($y = ab^x$) - Correlation – Karl Pearson's Co-efficient of Correlation.

Text Books:

1. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics, Dr.B.S.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 Test: 90 Minutes

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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

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

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

L:T:P (Hrs./week) : 1:0:0	SEE Marks : 40	Course Code: **U24HS320EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	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									2	3		2			
CO2										3		2			
CO3									2	3		2			
CO4		2								3		2			

UNIT-1: Delightful Descriptions

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

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

UNIT-2: Formal Conversation Skills

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

2.1 Ask for Information

2.2 Give Information
2.3 Give Feedback
2.4 Seek Permission

UNIT-3: Technical Expositions and Discussions

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

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

UNIT-4: Rational Recap

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

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

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

Learning Resources:

1. They Say / I Say: The Moves That Matter in Academic Writing" – Gerald Graff & Cathy Birkenstein
2. HBR Guide to Persuasive Presentations" – Harvard Business Review
3. Technical Communication" – Mike Markel & Stuart Selber
4. The Only Academic Phrasebook You'll Ever Need" – Luiz Otávio Barros
5. 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 Test: 90 Minutes

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DEPARTMENT OF MATHEMATICS

Skill Development Course - II: Aptitude - I

SYLLABUS FOR B.E. 2/4 - III SEMESTER (Common to all branches)

L:T:P (Hrs./week) : 0:0:2	SEE Marks : 40	Course Code: **U24BS330MA**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	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.

CO-PO/PSO Mapping

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

UNIT-1: Quantitative Aptitude - Numerical Ability

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

UNIT-2: Quantitative Aptitude- Arithmetic Ability Foundation

2.1 Ratio proportions
2.2 Partnership
2.3 Ages

2.4 Allegations and mixtures
2.5 Averages

UNIT-3: Quantitative Aptitude- Word Problems Part 1
3.1 Percentages
3.2 Profit and loss

UNIT-4: Reasoning Ability- General Reasoning Part 1
4.1 Blood Relations
4.2 Number Series
4.3 Coding and decoding

UNIT-5: Quantitative Aptitude- Word Problems Part 2
5.1 Time and Work
5.2 Chain Rule
5.3 Pipes and Cisterns

Prescribed textbook for theory:

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

Suggested Reading

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

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

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

Duration of Internal Test: 90 Minutes

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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: **U24HS030EH**
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						2		3		1		2			
CO2						2		3		1		2			
CO3						2		3		1		2			
CO4						2		3	2	1		2			

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

Additional Reading

1. Akash Singh Rathore - On Constitution

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

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

Critical Thinking

SYLLABUS FOR B.E. III & IV SEMESTERS

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: **U24HS310EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

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

CO-PO/PSO Mapping

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

OVERVIEW:

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

UNIT-I: Fundamentals of Critical Thinking

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

1.1 Logic and Reasoning
1.2 Identifying Assumptions
1.3 Bias and Fallacies

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

UNIT-II: Analytical Thinking
Equips students to analyze information critically and draw conclusions based on solid evidence.
2.1 Evaluating Evidence
2.2 Drawing Logical Conclusions
2.3 Differentiating Facts from Opinions

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

UNIT-III: Problem-Solving Frameworks
Builds practical decision-making skills using structured, human-driven analytical tools.
3.1 Root Cause Analysis (5 Whys)
3.2 Decision Trees
3.3 SWOT Analysis

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

UNIT-IV: Applications of Critical Thinking

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

4.1 Case Studies

4.2 Group Discussions on Ethical Dilemmas

4.3 Critical Thinking in Action: Debating Complex Engineering Issues

Learning Outcomes:

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

Additional Reading:

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

LEARNING RESOURCES

learn.talentsprint.com

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Devices Lab

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

L:T:P (Hrs./week) : 0:0:2	SEE Marks : 50	Course Code: **U24PC311EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
1 To characterize diodes, BJTs experimentally. 2 To analyze diode applications circuits. 3 To characterize MOSFETs experimentally. 4 To simulate and evaluate PN junction and MOSFET using TCAD tools. 5 To simulate and evaluate electronic devices using EDA tools.	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 Use TCAD tools to design and analyze PN junction and MOSFET devices and implementation of course based projects using EDA tools.

CO-PO/PSO Mapping

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

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. Transistor as a Switch.
6. V-I Characteristics of different LEDs.
7. V-I Characteristics of photo transistor/diode.
8. Diode Clipper circuits.
9. Clamper circuits.
10. Design of Half wave and Full wave Rectifiers with and without Filters.

Cycle - II Experiments (Using TCAD Tool)

1. Design of p-n junction diode
2. Analysis of IV Characteristics for a p-n junction diode
3. Parametric analysis of p-n junction diode

New / Additional experiments planned

1. Design of MOSFET using TCAD.
2. Analysis of IV Characteristics of MOSFET.

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. TCAD tool can be used to do analysis on PN diode and MOSFET

Guidelines for course based projects:

- Batch size shall be 3 to 4 students per batch.
- Project topics may be chosen by the student with advice and approval from the faculty members offering the course.
- Students have to submit a one-page abstract in the beginning of project work
- Output of the course based project should be demonstrable / measurable / outcome based.
- Finalization of the project topics, batches formation and project review schedule should be completed by the end of week-2. Project work will be carried out by the students from week-3 onwards.
- One review will be conducted for evaluating the project from week-10 to week-13 as per the schedules announced.
- Students will give a 20 minutes presentation through power point presentation followed by a 10 minutes discussion.
- Students are required to submit project report.

The break-up of CIE:

1.	No. of Internal Test	:	1
2.	Marks earmarked for Course-based Project	:	05
3.	Marks earmarked for day-to-day lab class assessment	:	13
4.	Marks earmarked for lab internal test	:	12

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Digital Logic Design Lab

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U24PC321EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1 Understand the basic principles of Logic Gates. 2 Design and Analyse the functionality of Combinational Circuits. 3 Verify the behaviour of sequential Logic Circuits 4 Apply different models to write Verilog code. 5 Design FSMs using testbench and Analyse them.	On completion of the course, students will be able to 1 Describe the functionality of Logic Gates. 2 Evaluate the design of Combinational Circuit. 3 Analyse the given Sequential circuit for its specifications. 4 Write verilog code in different models to simulate and synthesize. 5 Demonstrate the output of FSMs.

CO-PO/PSO Mapping

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

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Signals and Systems Lab

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U24PC331EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To understand and apply Matrix operations in MATLAB. 2. To analyze and generate various continuous and discrete time signals in MATLAB. 3. To master various transform techniques in MATLAB. 4. To examine system response using convolution. 5. To understand the Sampling Theorem and aliasing in MATLAB.	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			2			3				1		3	3
CO2	3	3		2	2			3				1		3	3
CO3	3	3			2			3				1		3	3
CO4	3	3			2			3				1		3	3
CO5	3	3		2	2			3				1		3	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. Continuous time Convolution.

CYCLE - II Experiments

7. Laplace Transform and its properties.
8. Verification of Sampling Theorem.
9. Discrete time signal generation and operations.
10. Z – Transform and its properties.
11. Generation of signal using Vector Signal Generator (VSG).
12. Spectrum analysis using Network Analyzer.

New / Additional experiments planned

1. Spectrum analysis using Vector Network Analyzer (VNA).
2. Generation of Sine wave using Simulink.

Learning Resources/ Tools :

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

The break-up of CIE:

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Programming Techniques for Problem Solving

Bridge Course SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week): 2:0:2	SEE Marks : 50	Course Code: **UB24ES310EC**
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. Implement user defined classes using C++. 5. Demonstrate different features of OOP 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	3	3		2			2				1	3	1	1
CO2	3	3	3		2			2				1	3	1	1
CO3	3	3	3		2			2				1	3	1	1
CO4	3	3	3		2			2				1	3	1	1
CO5	3	3	3		2			2				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 and continue.

UNIT-II

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

Recursion-Recursive Functions.

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

Foundation to Engineering Mathematics

Bridge Course for B.E. III-Semester (CBCS) (Common to all branches)

L:T:P (Hrs./week): 2:0:0	SEE Marks: 50	Course Code: **UB24BS300MA**
Credits : -	CIE Marks: -	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: 1. Study the concepts of vector differentiation, Directional derivative, Divergence and Curl of a vector point function. 2. Understand the concepts of Descriptive Statistics. 3. Learn the basics of Set theory, Permutations and Combinations and Probability. 4. Understand the concept of Rank of a matrix, Echelon form, System of Linear Equations and Eigen Values and Eigen Vectors.	At the end of the course students will be able to: 1. Solve problems on fitting of a straight line to the given data and also to find co-efficient of correlation and to determine regression lines and their application problems. 2. Apply the concepts of Descriptive Statistics to calculate Mean, Median, Mode, Measures of Dispersion, Mean Deviation and Standard Deviation. 3. Solve the problems on Permutations, Combinations and Probability. 4. Compute the Rank of a matrix and Eigen values and Eigen vectors of a matrix.

CO-PO/PSO Mapping

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

UNIT – I :

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

UNIT - II :

DESCRIPTIVE STATISTICS: Mean-Median-Mode-Measures of Dispersion: Range-Mean Deviation-Standard Deviation

UNIT - III :

BASICS OF PROBABILITY: Basics concepts of set theory - Permutations & Combinations - Random event & Experiment-Sample space - Classical definition of Probability - Axioms of probability.

UNIT - IV :

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

Learning Resources:

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

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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: **U24ES310EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Introduce the fundamental principles of semiconductor devices including diodes, BJTs, FETs, MOSFETs, IGBTs, and their characteristics. 2. Provide a strong understanding of rectifier circuits, filters, and voltage regulation techniques for DC power supplies. 3. Develop the ability to analyze small-signal low-frequency models of Bipolar Junction Transistors in amplifier configurations. 4. Enable students to analyze and design small-signal low-frequency FET amplifier circuits using equivalent circuit models in various configurations. 5. Familiarize students with practical applications of diodes and special-purpose diodes in real-world electronic circuits.	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, power diode, BJT, FET, MOSFET and IGBT etc. 2. Analyze and design various rectifier circuits with and without filters for a regulated DC power supply. 3. Analyze the small signal low frequency Bipolar junction Transistor model in exact and approximate model. 4. Analyze the small signal low frequency Field effect transistor amplifiers in different configurations with the help of their equivalent circuits. 5. Illustrate the use of diode in practical applications and gain knowledge on special diodes

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: Introduction to PN junction Diode, Temperature dependence of V-I characteristics, PN junction as a rectifier, fullwave rectifiers, L, C, π – section filters, Regulation and Ripple characteristics. Power diode: Working and Characteristics, Zener diode: Breakdown mechanisms–Zener and Avalanche, Working and characteristics, Zener diode as a voltage regulator.

UNIT - II :

BJT circuits: BJT structure and modes of operation, Early effect, BJT input and output characteristics in CB and CE configurations. BJT as a switch. amplifier. BJT biasing techniques thermal runaway, operating point, bias stabilization circuits. BJT as an amplifier.

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 and CE amplifier configurations, Miller's theorem, RC coupled amplifier.

UNIT - IV :

Metal Oxide Semiconductor Field Effect Transistors: 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. IGBT, working and characteristics.

UNIT - V :

Special devices: Elementary treatment on the functioning of UJT, SCR, tunnel diode, varactor diode, photo diode, phototransistor, Schottky Barrier Diode.

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. Adel S. Sedra and Kenneth C. Smith "Micro Electronic Circuits theory and applications" 7th edition Oxford publications, 2017.
4. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", PHI, 11th edition 2015.
5. A.S. Sedraand K.C. Smith, "Microelectronic Circuits", Seventh Edition New York, Oxford University Press, 2014.
6. https://nptel.ac.in/courses/108102095/
7. 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 Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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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: **U24ES311EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Introduce practical skills in designing and testing various rectifier circuits with different filter combinations. 2. Develop the ability to set up and bias transistors for proper operation in amplifier circuits. 3. Enable students to extract and interpret device parameters from the static and dynamic characteristics of BJTs and FETs. 4. Equip students to measure and analyze the frequency response of RC-coupled BJT and FET amplifiers and compute their bandwidth. 5. Provide hands-on experience in analyzing the V-I characteristics of the Unijunction Transistor (UJT) and estimating its parameters.	On completion of the course, students will be able to 1. Design various rectifiers with different filter combinations. 2. Setup bias point in a transistor. 3. Estimate the parameters from BJT and FET characteristics. 4. Compute the bandwidth of RC coupled BJT and FET amplifiers from the frequency response. 5. Estimate the parameters from V-I characteristics of UJT.

CO-PO/PSO Mapping

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

Experiments

1. Zener diode as a Voltage Regulator
2. Design of Full wave Center tapped Rectifier with and without Filters.
3. Common Emitter characteristics of BJT and measurement of h-parameters
4. Applications of Cathode ray oscilloscope.
5. MOSFET Characteristics and measurement of its small signal parameters.

6. BJT biasing.

CYCLE - II Experiments

7. MOSFET biasing.
8. Analysis and band width calculation of Single stage RC coupled CE Amplifier.
9. Analysis and bandwidth calculation of Emitter follower.
10. Single stage MOSFET Common Source RC coupled Amplifier
11. Analysis and bandwidth calculation of Source follower.
12. Characteristics of UJT.

New / Additional experiments planned

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

Mini Project(s)

Designing of various basic applications using devices.

Learning Resources/ Tools :

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 internal tests	:	12
3.	Marks for day-to-day laboratory class work	:	18

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-24)** :: B.E. ECE : FOURTH SEMESTER (2025-26)

B.E (ECE) IV - SEMESTER								
Course Code	Name of the Course	Scheme of Instruction Hours per Week			Duration in Hrs	Scheme of Examination Maximum Marks		Credits
		L	T	P		SEE	CIE	
THEORY								
U24PC410EC	Electronic Circuits	3	1	-	3	60	40	**4**
U24PC420EC	Data Structures	3	-	-	3	60	40	**3**
U24PC430EC	Probability Theory and Stochastic Process	3	1	-	3	60	40	**4**
U24PC440EC	Electromagnetic Field Theory	3	1	-	3	60	40	**4**
U24OE4XXXX	Open Elective – II	3	-	-	3	60	40	**3**
U24BS430MA	Skill Development Course - III: Aptitude - II	1	-	-	2	40	30	**1**
U24PE410EC	Skill Development Course - IV: Technical Skills - I	1	-	-	2	40	30	**1**
PRACTICALS								
U24PC411EC	Electronic Circuits Lab	-	-	2	3	50	30	**1**
U24PC421EC	Data Structures Lab	-	-	2	3	50	30	**1**
U24PW419EC	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-I**.

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-24)** :: B.E. - ECE : FOURTH SEMESTER (2025 - 26)

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								
UB24HS410EH	English Language and Communication	2	-	-	3	50	-	-
PRACTICALS								
UB24HS411EH	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								
U24ES410EC	Analog Electronics Circuits	3	-	-	3	60	40	3
PRACTICALS								
U24ES411EC	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. (ECE) IV - SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U24PC410EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To introduce various biasing techniques of MOSFET 2. To understand and analyse multistage amplifiers 3. To understand and analyse feedback amplifiers 4. To interpret and design oscillators using MOSFET 5. To introduce different power amplifers	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									3		3
CO3	2	3	2	2									3		3
CO4	3	3	2			2							2	2	3
CO5	3	3	2			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 amplifiers. Differential amplifier: small signal and large signal analysis.

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. PaulR. Gray & RobertG. Meyer, Analysis and Design of Analog Integrated Circuits, John Wiley,3rd Edition
4. https://nptel.ac.in/courses/108106084
   (Analog Circuits, Dr. Nagendra Krishnapura, Dept of Electrical Engineering, IIT Madras).

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Data Structures

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U24PC420EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Understand space and time complexities for a given logic. 2. Describe the linear and nonlinear data structures. 3. Implement stack and queues using different data structures. 4. Implement different sorting techniques. 5. Use data structures to implement trees and graphs.	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. Represent a polynomial, Sparse Matrices and perform different operations. 3. Develop applications using stacks, queues and linked lists. 4. Implement different sorting algorithms and compare the performance. 5. Construct trees and graphs, and able to find the MST of a Graph.

CO-PO/PSO Mapping

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

UNIT – I :

Introduction to Data Structures: Introduction, Algorithm Analysis: Time and space complexities, Classification of Data Structures.

Functions: Recursion – Towers of Hanoi, generation of Permutations, Ackerman function, Review of dynamic memory allocation functions in C.

UNIT - II :

Arrays, Strings and Structures: Array Data Structure, Pointers, Library Functions of Strings, Pattern matching algorithm; structures, pointer to a structure and self-referential structure.

Polynomial: Construction and operations.

Sparse matrix: Introduction, Representation, transpose and different operations.

UNIT - III :

Stacks and Queues: Stacks and Queues using arrays, Circular Queues.

Stack Applications: Evaluation of Expressions, Infix to Postfix conversion, Evaluation of Postfix Expression.

Linked Lists: Introduction, types, definition, advantages; Singly Linked List, Operations on SLL: Insertion, deletion and traversal.

UNIT - IV :

Introduction to Doubly Linked Lists and Circular Linked Lists; Stack and Queue using Linked Lists.

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

UNIT - V :

Trees: Introduction, Binary Trees, Binary Tree Traversals, Introduction to Heaps, Heap Sort.

Binary Search trees (BST): Introduction and Operations.

Graphs: Introduction and terminology, representations, Minimum Spanning Tree (MST): Kruskal's and Prim's Algorithms.

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 Learning
3. https://ocw.mit.edu/courses/6-851-advanced-data-structures-spring-2012/

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Probability Theory and Stochastic Process

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

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U24PC430EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To familiarize the students in the concepts of: 1. Counting principles and concepts of probability. 2. Single random variables and operations that can be performed on them. 3. Multiple random varaibles and operations that can be performed on them. 4. Temporal characteristics of random process. 5. Spectral characteristics of random process and information theory in communication systems	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	2												2	
CO2	2	3												2	
CO3	2	3												2	
CO4	1	3		3								2		3	
CO5	1	3		3			3					2		3	

UNIT – I :

Probability: Principles of Counting, Permutations and combinations, Probability: Experiments and Sample Spaces, Introduction to probability, Relative Frequency, Discrete and Continuous Sample Spaces, Events, Sigma field, Independent Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, 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 Test: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electromagnetic Field Theory

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

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U24PC440EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To familiarize the students in the concepts of: 1. Introduce the fundamental principles governing electric and magnetic fields. 2. To understand the concept of electric work, potential, and energy stored due to different charge configurations. 3. Familiarize students with the concepts of magnetostatics and enable them to compute magnetic fields in various engineering scenarios. 4. To understand the formulation of Maxwell's equations and the propagation and reflection characteristics of electromagnetic waves in dielectric media. 5. To understand electromagnetic wave propagation in conductors and through material boundaries along with the basic principles of transmission lines.	On completion of the course, students will be able to 1. Apply the fundamental laws of electric field to analyse the electric fields due to various charge distributions. 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. Application of Maxwell's equations for time varying electromagnetic fields. 5. Analyze the characteristics of electromagnetic waves through conductors and material boundaries and the principles of transmission lines.

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		3	
CO5	3	3					3					2		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, Magneto motive force, Permeability, Self and mutual inductances, Evaluation of inductance of solenoid. Prediction of Electric and magnetic field components using AI tools.

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 and dielectric medium.

UNIT - V:

Wave Propagation in conductors, Skin Effect. Poynting's theorem, Reflection of EM waves at normal incidence, Reflection and Transmission through a Layered Medium.

Transmission lines: Primary and secondary constants, terminated lines: open circuit, short circuit, matched load. Campbell's equation, Application of Smith chart

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://archive.nptel.ac.in/courses/108/104/108104087/

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF MATHEMATICS

Skill Development Course - III: Aptitude - II

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

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: **U24BS430MA**
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.

CO-PO/PSO Mapping

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

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

Skills Development Course – IV: Technical Skills - I

Advanced Digital System Design

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

L:T:P (Hrs./week) : 1:0:0	SEE Marks : 40	Course Code: **U24PE410EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To introduce number systems and combinational logic elements such as multiplexers, decoders, and encoders, and their use in digital circuit design. 2. To explain the principles of sequential logic design, including latches, flip-flops, and finite state machines (Mealy and Moore), with methods for state minimization. 3. To analyze timing aspects of sequential circuits, understand setup/hold time, synchronization methods, and techniques for avoiding timing violations. 4. To develop skills in writing synthesizable Verilog code for combinational and sequential circuits, testbench creation, and performing code coverage analysis.	On completion of the course, students will be able to 1. Understand different types of number systems and apply them to in the design combinational circuits. 2. Design and analyze various sequential digital circuits. 3. Illustrate the need for Timing Constraints and Clock Synchronization. 4. Synthesize different combinational and Sequential circuits using Verilog HDL for the verification.

CO-PO-PSO Mapping

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

UNIT-I:

Number systems and combinational Logic: A unified treatment of unsigned and signed numbering systems used in computers; Multiplexer as a universal programming element; decoders and encoders; priority encoders and their variants; Case studies in combinational logic circuits.

UNIT-II:

Sequential logic: Construction of latch; construction of Flipflop from latch; Finite state machines – Types of FSMs – Mealy and Moore – minimization of state machines, design methods; Case studies in sequential logic circuits.

UNIT-III:

Timing aspect of sequential logic circuits – setup time, hold time and clock to output delay; how to overcome timing violations; max clock skew; synchronization of single-bit and multi-bit signals across clock domains; asynchronous and synchronous resets.

UNIT-IV:

Different ways of Verilog coding for Logic synthesis – coding style for combinational design blocks and sequential design blocks; blocking and nonblocking assignments; How to write simple test benches; Different types of code coverage.

Learning Resources:

1. Digital Design – Principles and Practices – by John F Wakerly; Pretnice Hall of India.
2. Fundamentals of digital logic with Verilog Design – by Brown and Vrasenic; McGraw Hill.
3. The art of Digital Design – by Franklin Prosser and David Winkel; Prentice Hall.

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Skills Development Course - IV: Technical Skills - I

Introduction to Protocols and their Applications

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

L:T:P (Hrs./week) : 1:0:0	SEE Marks : 40	Course Code: **U24PE410EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Comprehensive Understanding of Wi-Fi protocol standards 2. Getting familiarity with SiWx917 Hardware board 3. Implementing protocols with simplicity studio 4. Developing practical use cases with different sensors	On completion of the course, students will be able to 1. Understand Wi-Fi Protocols and standards 2. Get Practical Competence with SiWx917 hardware board and its programming aspects 3. Implement Advanced Wi-Fi Protocol features and battery life management techniques. 4. Building practical use cases with SiWx917 hardware board.

CO-PO-PSO Mapping

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

UNIT-I:

Introduction to Microcontrollers and Wi-Fi: Introduction to Microcontrollers, Inside SiWx917 Wireless SoC and the Wireless Pro Kit. Introduction to Computer Networks and Wi-Fi Technology Life Cycle. IEEE 802.11 Amendments and key players. OSI Networking Model and Wi-Fi in OSI Basics of SiWx917 GPIO.

Wi-Fi MAC Layer and Security: Wi-Fi MAC Layer: Wi-Fi Frame Format and Types, Carrier Sense and Medium Access. WLAN Connection Process Cryptography Fundamentals and WLAN Security (WPA, WPA2 and WPA3)

LAB Activities:

- Set up the SiWx917 development environment using Simplicity Studio.
- Embedded Application Build Process and Toolchain.

- Write a program to blink an LED using GPIO.
- Program the SiWx917 to scan for available Wi-Fi networks and connect to an open Wi-Fi network.
- Introduction to Wireshark
- Capture Wi-Fi frames using Wireshark to study WLAN connection process.
- Application to connect the SiWx917 to a secured network (WPA2/WPA3).

UNIT-II:

Microcontroller Peripherals and IP Networking: Serial Communication Peripherals: UART, I2C and SPI. IP Networking Concepts: IP Addressing, TCP, UDP, DHCP, DNS, SNTP.

Wi-Fi Physical Layer: Introduction to Digital Communications and Modulation. Coding and Modulation Schemes in Wi-Fi. Constellation diagram. PHY and RF Terminologies: Power, bandwidth, data rate, SNR, RSSI, link budget, path loss, ISI, channel utilization, spectral efficiency, PAPR. Basics of Multipath Channel and OFDM. Overview of OFDM Transceiver Architecture. Functional blocks of a Wireless router/AP

LAB Activities:

- I2C and SPI modules in SiWx917.
- Integrate a temperature sensor via I2C and send sensor data over Wi-Fi.
- Log the current time using SNTP along with the current temperature.

UNIT-III:

Wi-Fi Generations and Features: Overview of Wi-Fi generations (802.11a/b/g/n/ac). Key features and enhancements at PHY and MAC layers. Basics of Channel Bonding, MIMO, Spatial. Multiplexing and Cyclic Shift Diversity. Quality of Service in Wi-Fi. Fragmentation and Aggregation in Wi-Fi. Roaming in Wi-Fi. Wi-Fi 6/802.11ax Transmit Beamforming, OFDMA, MU-MIMO, BSS Coloring. Power Save Mechanisms in Wi-Fi. Target Wake Time in Wi-Fi 6

LAB Activities:

- Application to send low-priority (background) and high-priority (video) data streams.
- Analyze QoS tagging using Wireshark.
- Application to enhance throughput with 802.11n Aggregation.
- Analyze the Wi-Fi throughput with and without Aggregation.
- Application to create Wi-Fi Roaming scenario based on RSSI.

- Implement Legacy power save application using SiWx917.
- Application to demonstrate Target Wake Time Feature of Wi-Fi 6.
- Estimate Battery Life using power save mechanisms in SiWx917 using Energy Profiler.

UNIT-IV:

Building Real-World Applications with SiWx917: Practical use cases of Wi-Fi in IoT (smart homes, healthcare, etc.). Basics of MQTT Protocol.

LAB Activities:

- Build a Wi-Fi-enabled temperature monitoring system using MQTT with SiWx917.
- Implement the SiWx917 as a soft AP for local device connections.
- Firmware Update over Wi-Fi.

Learning Resources:

1. https://www.silabs.com/support/resources.p-wireless_wi-fi_siwx917-wireless-socs
2. https://docs.silabs.com/simplicity-studio-5-users-guide/5.3.0/ss-5-users-guide-overview/

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Skills Development Course – IV: Technical Skills - I

GUI Programming to Design and Test Electronic Applications

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

L:T:P (Hrs./week) : 1:0:0	SEE Marks : 40	Course Code: **U24PE410EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Develop hierarchical electronic applications that are scalable, readable, and maintainable to reduce development time and improve application stability. 2. To introduce the LabVIEW environment and explore its features for test, measurement, and control applications. 3. To equip students with the skills to create interactive user interfaces and use LabVIEW programming structures effectively. 4. To enable students to acquire, process, and store data using LabVIEW and NI myDAQ for real-time applications.	On completion of the course, students will be able to 1. Understand broad working knowledge of the LabVIEW environment. 2. Use building blocks of graphical programming for developing applications. 3. Create, test and debug electronic applications. 4. Use sequential and state machine programming concepts to implement complete applications, interface sensors and hardware using NI myDAQ and apply LabVIEW for real-time data acquisition and control tasks.

CO-PO-PSO Mapping

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

UNIT-I:

Introduction to LabVIEW: Importance of Test & Measurement, different types of electronic test equipment, Text-based programming versus graphical programming, installing LabVIEW, exploring components and features of LabVIEW, common types of LabVIEW applications.

UNIT-II:

Basic Building blocks of graphical programming: Variables and data types, decision-making structures, creating and leveraging structures, loops, creating user interface with charts, graphs and buttons, creating your first

application in LabVIEW, troubleshooting, testing and debugging VI design.

UNIT-III:

Modularity with SubVIs: SubVI design, implementing "subvi" for creating application using multiple windows, Accessing Files in LabVIEW, creating, writing, reading, deleting, sorting operations on files, Introduction to NI myDAQ for Data Acquisition System, sensor interfacing and signal manipulation using NI MyDAQ.

UNIT-IV:

State-Machine Architecture: Architecture of state machine, Sequential and state machine programming concepts, implementing complete application using state machine architecture, connecting and testing hardware, application development with NI myDAQ, Case studies based on real-time scenarios, course projects.

Learning Resources:

4. LabVIEW Course Manual.
5. LabVIEW for Everyone: Graphical Programming Made Easy and Fun, By Jeffrey Travis, Jim Kring.
6. Johnson, G., LabVIEW Graphical Programming, McGraw, Hill.

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Circuits Lab

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U24PC411EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To Design and simulate potential Divider biasing techniques of MOSFET 2. To design and conduct single and multistage amplifiers 3. To analyze and verify the characteristic parameters of various feedback amplifiers 4. To interpret and design oscillators using MOSFET 5. To conduct and compare efficiency of different power amplifers	On completion of the course, students will be able to: 1. Design different types of amplifiers with different operating point. 2. Elaborate different types of amplifiers with and without feedback 3. Analyze various types of transistor amplifiers. 4. Analyze various types of oscillators. 5. Compare the theoretical and practical performance characteristics and implement course project.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3					3	2				3		
CO2	3	3	3					3	2				3		
CO3	2	3	2	3				3	2				3		3
CO4	2	3		3	3			3	2				3		3
CO5	3		2		3			3	2		3	3	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. MOSFET characteristics
10. Design and Simulation of Common Source Amplifier.
11. Simulation of Differential Amplifier.
12. Simulation of Source Follower

New/Additional experiments planned

1. Design of tuned Amplifier.
2. Design and Implementation of Crystal oscillator.

Learning Resources:

1. Paul R.Gray & Robert G.Meyer, Analysis and Design of Analog Integrated Circuits, John Wiley, 3rd Edition.
2. Phillip E. Allen, Douglas Holberg, "CMOS Analog Circuit Design" oxford university press, 2nd Edition.

Guidelines for course based projects:

- Batch size shall be 3 to 4 students per batch.
- Project topics may be chosen by the student with advice and approval from the faculty members offering the course.
- Students have to submit a one-page abstract in the beginning of project work
- Output of the course based project should be demonstrable / measurable / outcome based.
- Finalization of the project topics, batches formation and project review schedule should be completed by the end of week-2. Project work will be carried out by the students from week-3 onwards.
- One review will be conducted for evaluating the project from week-10 to week-13 as per the schedules announced.
- Students will give a 20 minutes presentation through power point presentation followed by a 10 minutes discussion.
- Students are required to submit project report.

The break-up of CIE:

1.	No. of Internal Test	:	1
2.	Marks earmarked for Course-based Project	:	05
3.	Marks earmarked for day-to-day lab class assessment	:	13
4.	Marks earmarked for lab internal test	:	12

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Data Structures Lab

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U24PC421EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Design and analyze linear and nonlinear data structures. 2. Construct programs to work with Polynomials and Sparse Matrices 3. Acquire programming skills to implement sorting and searching techniques. 4. Understanding the concepts of Linked Lists 5. Use data structures to implement Trees and Graphs.	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	2	1		2			2				1	3	1	1
CO2	3	2	3		2			2				1	3	1	1
CO3	3	2	3		2			2				1	3	1	1
CO4	3	2	3	2	2			2				1	3	1	1
CO5	3	2	3	2	2			2				1	3	1	1

All the programming exercises will be implemented in Visual Studio Code (VSC) Platform

Programming Exercises

1. Implementation of 1D and 2D arrays and different operations.
2. Representation of Polynomial and performing Arithmetic operations
3. Programs on Sparse Matrices 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
8. Postfix Expression Evaluation.
9. Implementation of Bubble, Selection, Merge Sorts.
10. Implementation of Quick, and Insertion Sort.
11. Implementation of Binary Search Tree.
12. Implementation of Heap Sort.

New 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. https://ocw.mit.edu/courses/6-851-advanced-data-structures-spring-2012/

The break-up of CIE:

1.	No. of Internal Test	:	1
2.	Marks earmarked for day to day lab class assessment	:	18
3.	Marks earmarked for lab internal test	:	12

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mini Project - I

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U24PW419EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3

COURSE OBJECTIVES	COURSE OUTCOMES
1. To introduce students to the process of identifying and defining engineering problems through structured literature surveys. 2. To encourage analytical thinking for proposing feasible and innovative solutions to identified problems. 3. To develop foundational skills in designing, implementing, and testing basic engineering solutions. 4. To familiarize students with the use of current tools and technologies relevant to their project domain. 5. To promote teamwork and communication skills through the presentation and documentation of project work.	On completion of the course, students will be able to 1. Identify the problem through the literature survey 2. Propose a solution to address the problem 3. Design/Develop/Implement /Solve the problem and test the solution 4. Adapt to contemporary technologies 5. Demonstrate the work through presentation and documentation

CO-PO/PSO Mapping

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

English Language and Communication

SYLLABUS FOR B.E. IV - SEMESTER, **Bridge Course** for Lateral Entry Students

L:T:P (Hrs./week): 2:0:0	SEE Marks: 50	Course Code: **UB24HS410EH**
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 everyday conversations.

CO-PO/PSO Mapping

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

UNIT-1:

1.0: Communication & Functional English (12 hours)

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-2:

2.0: Listening (10 hours)

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

UNIT-3:

3.0: Writing (10 hours)

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

UNIT-4:

4.0: Grammar and Vocabulary (12 hours)

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

UNIT-5:

5.0: Reading (6 hours)

5.1 Prose text 'Yesterday was beautiful' by Roald Dahl

Prescribed textbook for theory:

1. Technical communication-Principles and Practice (2ndEdition2014)- 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 Black swan
3. Sunitha Mishra, C. Murali Krishna- Communication Skills for Engineers, Pearson, 2004.
4. M.Ashraf Rizvi - Effective Technical Communication. Tata McgrawHill, 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. IV - SEMESTER, **Bridge Course** for Lateral Entry Students

L:T:P (Hrs./week): 0:0:2	SEE Marks: 50	Course Code: **UB24HS411EH**
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 PowerPoint 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.

CO-PO/PSO Mapping

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

INTERACTIVE COMMUNICATION SKILLS LAB

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

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

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

Prescribed text book for laboratory:

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

Learning Resources:

1. Bala Subramanian: A 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 Electronics Circuits

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U24ES410EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Introduce the fundamental concepts and applications of non-linear wave-shaping circuits for signal conditioning and waveform modification. 2. Develop the ability to design and analyze multistage amplifier circuits to achieve desired performance in terms of gain, bandwidth, and stability. 3. Provide an understanding of feedback principles and their impact on the performance and stability of amplifier circuits. 4. Enable students to design and implement sinusoidal oscillator circuits capable of generating stable signals at required frequencies. 5. Familiarize students with the principles, design considerations, and performance characteristics of various types of power amplifiers used in practical electronic systems.	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 and Square wave inputs, clipping circuits for single level and two levels, clamping circuits.

UNIT - II:

Multi stage amplifiers using Mosfet: 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 feedback amplifier, Feedback topologies, Effect of negative feedback on input and output impedances, Voltage-series and Voltage-shunt feedbacks using mosfets.

UNIT - IV:

Oscillators: Barkhausen's criteria, RC type oscillators: RC phase shift oscillator, LC type oscillators: Hartley and Colpitt's oscillators, Crystal oscillators.

UNIT - V:

Power amplifiers: Classification of power amplifiers, Analysis of class A and class 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. Adel S. Sedra and Kenneth C. Smith "Micro Electronic Circuits theory and applications" 7th edition Oxford publications, 2017.
4. Robert L. Boylestad and Louis Nashel sky, "Electronic Devices and Circuit Theory", PHI,11th edition2015.
5. Jacob mill man and Taub: "Pulse, Digital and switching wave forms", McGraw hill, 2003.
6. https://nptel.ac.in/courses/108102095/
7. 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 Test: 90 Minutes

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

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: **U24ES411EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: 1. Introduce the principles of RC low-pass and high-pass circuits and enable students to design such circuits for different time constants, along with various types of clipper and clamper circuits. 2. Develop practical skills in designing and constructing multistage amplifier circuits and analyzing their frequency response characteristics. 3. Provide an understanding of small-signal amplifier behavior and the role of feedback in modifying amplifier performance. 4. Enable students to design and experimentally verify the operation of various sinusoidal oscillator circuits.	On completion of the course, students will be able to: 1. Design & Analyze RC Low pass and High pass Circuits for different time constants and to design different types of clippers and clampers. 2. Build a multi stage amplifier and find the frequency response of amplifier. 3. Analyze the small signal amplifiers behavior with and without feedback. 4. 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					2	1	2				2	
CO2	3	2	2					2	1	2				2	
CO3	3	2	2					2	1	2				2	
CO4	3	2	2					2	1	2				2	

CYCLE - I Experiments

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

7. Frequency response of Current series feedback amplifier using MOSFET
8. Frequency response of Current Shunt feedback amplifier using MOSFET

CYCLE - II Experiments

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 AB 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.
3. 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.	Marks earmarked for day to day lab class assessment	:	18
3.	Marks earmarked for lab internal test	:	12

Duration of Internal Test: 3 Hours

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

List of Open Elective-I Courses		
Department	**Code**	**Title**
Civil	U24OE310CE	Green Buildings
CSE	U24OE310CS	Introduction to Python Programming
CSE	U24OE320CS	Programming Essentials in Python (Stream: Artificial Intelligence & Machine Learning)
ECE	U24OE310EC	Mathematical Programming for Engineers
ECE	U24OE320EC	Introduction to Signals and Systems
ECE	U24OE340EC	Introduction to Signals and Systems (Stream: Communication Engineering)
MECH	U24OE320ME	Fundamentals of Unmanned Aerial Vehicles
MECH	U24OE310ME	Introduction to Industrial Robotics (Stream: Robotics)
IT	U24OE310IT	Fundamentals of Python Programming
IT	U24OE320IT	Computing using Python (Stream: AI&ML)
EEE	U24OE310EE	Non-Conventional Energy Sources
Chemistry	U24OE310CH	Corrosion Science and Technology
Physics	U24OE310PH	Fundamentals of Smart Materials and Applications
H&SS	U24OE320EH	Learning to Learn
	U24OE360EH	Constitution of India
	U24OE370EH	Introduction Journalism
H&SS	U24OE350EH	Introduction to Financial Services (Stream: Banking, Finance, Securities and Investments)
	U24OE310EH	Human resource Management for Engineers (Stream: Management Courses for Engineers)

Stream Based Open Electives

Name of the Branch	Stream and Eligible Branches	III Semester (2 Credits)	IV Semester (3 Credits)	V Semester (3 Credits)	VI Semester (3 Credits)
CSE	Artificial Intelligence & Machine Learning (All Branches except CSE & I.T)	Programming essentials in Python	Mathematical computing for AI & ML with Python	Fundamentals of Artificial Intelligence	Fundamentals of Machine Learning
ECE	Communication Engineering (CSE, EEE & I.T)	Introduction to Signals and Systems	Modulation Theory and Techniques	Introduction to Communication Systems	Introduction to Wireless Communication Technologies
MECH	Robotics (All Branches except Mech.)	Introduction to Industrial Robotics	Kinematics and Dynamics of Robotics	Drives and Control Systems for Robotics	Industry 4.O
I.T	AI&ML (All Branches except CSE & I.T)	Computing using Python	Essentials of Mathematics for Machine learning using Python	Introduction to Artificial Intelligence	Introduction to Machine Learning
Maths	Advanced Probability and Statistics (CSE, CSE-AIML& I.T)	Number Theory and Boolean Algebra	Algebraic Structure	Theory of Estimation and Inference Theory	Advanced Probability & Statistical Methods
H&SS	BFSI (Banking, Finance , Securities and Investments)	Financial Services	Fintech	Financial Analytics	Business Intelligence
	Management Courses for Engineers	Human resource Management for Engineers	Finance Management for Engineers	Marketing Management for Engineers	Strategic Management for Engineers

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

DEPARTMENT OF CIVIL ENGINEERING

GREEN BUILDINGS

(OPEN ELECTIVE-I) SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:60	Course Code: U24OE310CE
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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IBRAHIMBAGH, HYDERABAD – 500 031
Department of Computer Science & Engineering

INTRODUCTION TO PYTHON PROGRAMMING

(OPEN ELECTIVE-I)

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

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code : **U24OE310CS**
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

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

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

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

Iteration: while statement

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

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

Department of Computer Science & Engineering

PROGRAMMING ESSENTIALS IN PYTHON
Stream - Artificial Intelligence & Machine Learning
(OPEN ELECTIVE-I)
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code :**U24OE320CS**
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

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

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

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

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

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

Learning Resources:

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

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

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

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers

(General Pool: Open Elective - I)

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

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U24OE310EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO Mapping

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

UNIT - I : Introduction:

Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on-line help, file types.

MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file.

Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-

elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions

Script Files, Function Files, Debugging methods in MATLAB.

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

UNIT - III : Numerical Methods Using MATLAB

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

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

UNIT - IV : Nonlinear Equations

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

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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

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: **U24OE320EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To define and classify continuous time signals and systems. 2. To determine frequency domain characteristics of a signal with Fourier series and Fourier transform. 3. Understand Laplace transform and their properties for analysis of signals and systems. 4. To characterize discrete time signals and systems	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
CO2	3	3													2
CO3	3	3													2
CO4	3	2													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

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

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: **U24OE340EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To define and classify continuous time signals and systems. 2. To determine frequency domain characteristics of a signal with Fourier series and Fourier transform. 3. Understand Laplace transform and their properties for analysis of signals and systems. 4. To characterize discrete time signals and systems	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 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			3								1		2
CO2	3	3			3										2
CO3	3	3			3										2
CO4	3	2			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 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: U24OE320ME
Credits :02	CIE Marks:40	Duration of SEE:03Hours

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

CO-PO and CO-PSO mapping															
CO	PO mapping												PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	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:
Manufacturing and Analysis of UAV
Drone Manufacturing, Additive Manufacturing, Health Evaluation and Failsafe, Introduction to CAD; Design of UAV components; Structural Analysis using CAE; Aerodynamic Analysis using CFD; Manufacturing of the components of UAVs: 3D printing; Case studies;

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

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

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of 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: U24OE310ME
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.

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, HYDERBAD-500031,
DEPARTMENT OF INFORMATION TECHNOLOGY

FUNDAMENTLAS OF PYTHON PROGRAMMING

(GENERAL POOL STREAM: 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:**U24OE310IT**
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 basic knowledge on strings,lists and tuples. 3. Implement programs using dictionaries, and sets. 4. Implement OOP concepts in python.

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

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

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

UNIT – IV:

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

Files: Reading and writing files.

Learning Resources:

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

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

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

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

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

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

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

1	No. of Internal Tests:	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

With effect from Academic Year 2025-26 (R24)

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:**U24OE320IT**
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 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:**U24OE310EE**
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

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

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

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)
ACCREDITED BY NAAC WITH A++ GRADE
DEPARTMENT OF CHEMISTRY

CORROSION SCIENCE AND TECHNOLOGY

B E III SEMESTER

Instruction : 2 H/ Week	Semester End Exam Marks : 60	Subject Reference Code : OE310CH
Credits : 2	Continuous Internal Exam Marks : 40	Duration of semester End Exam : 3 Hours

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

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

UNIT-I: CHEMICAL AND ELECTROCHEMICAL CORROSION

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

UNIT-II: CORROSION CONTROL METHODS INHIBITORS AND ORGANIC COATINGS

A. Factors influencing corrosion

Nature of metal: Relative position of metal in galvanic series, over voltage, relative areas of anode & cathode and nature of corrosion product.
Nature of environment: temperature, pH and humidity.

B. Corrosion Control by Inhibitors and Organic Coatings

Corrosion Inhibitors: Anodic, Cathodic and vapor phase inhibitors.
Organic Coatings: Paints – constituents and their functions, vitreous enamel coatings, varnishes and lacquers.

UNIT-III: METALLIC COATINGS

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

UNIT-IV: CATHODIC PROTECTION AND SURFACE CONVERSION

Cathodic protection: Principle, sacrificial anodic protection (SAP), impressed current cathodic protection (ICCP). Application of cathodic protection for bridges, ship hulls and underground pipelines.
Surface conversion coatings: Carburizing, Nitriding, Cyaniding.

Books:

1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub, Co., New Delhi (2002)
2. S.S. Dara "A text book of engineering chemistry" S.Chand&Co.Ltd., New Delhi (2006).
3. O.G. PALANNA, Engineering Chemistry, TMH Edition.
3. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning
4. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).

Suggested Reading:

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

FUNDAMENTALS OF SMART MATERIALS AND APPLICATIONS

OPEN ELECTIVE COURSE

L : T : P	Credits	**CIE** Marks	**SEE** Marks	**SEE Duration**	**Course Code**
02: 0: 0	02	40	60	3 hours	**U24OE310PH**

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

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

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, B. Bhattacharya, Smart Material, Adaptive Structures & Intelligent Mechanical systems

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

LEARNING TO LEARN

(Open Elective) SYLLABUS FOR B.E. III SEMESTER

Instruction: 2 Hours	SEE: 60	Course code: U24OE320EH
Credits: 1	CIE: 40	Duration of SEE: 2 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to: 1. Introduce Computational Thinking concepts and relate them to basic coding principles. 2. Teach abstraction to focus on essential coding elements while ignoring unnecessary details. 3. Develop skills to design algorithms and write efficient code. 4. Solve real-world problems by combining coding skills with Computational Thinking principles.	At the end of the course the learners will be able to: - 1. Students will decompose coding problems into manageable sub-problems and represent them visually using flowcharts or pseudocode. 2. Students will implement abstraction by designing reusable functions and using appropriate data structures. 3. Students will write, debug, and optimize simple programs using structured algorithms. 4. Students will create mini coding projects demonstrating their ability to apply CT principles to real-world challenges.

Course Objectives:

- Strengthen students' problem-solving and coding abilities using Computational Thinking.
- Develop structured approaches to designing algorithms and writing efficient code.

UNIT 1: Foundations of Computational Thinking and Coding

1.1 Decomposition: Breaking Coding Problems into Smaller Steps
1.2 Pattern Recognition: Identifying Recurring Solutions in Code
1.3 Tools for CT: Flowcharts, Pseudocode, and Visual Problem Solving

UNIT 2: Problem-Solving with Abstraction

2.1 Basic Programming Constructs: Loops, Conditionals, and Variables
2.2 Simplifying Complex Problems: Identifying Core Logic
2.3 Abstraction in Function Design (Defining Input and Output)

UNIT 3: Algorithmic Thinking for Coding Efficiency
3.1 Writing Algorithms: Step-by-Step Logical Instructions
3.2 Data Structures as Abstractions: Arrays, Lists, and Dictionaries
3.3 Debugging and Optimization: Finding and Fixing Errors in Code

UNIT 4: Applying Computational Thinking to Real-World Problems
4.1 Problem Solving with Code: Building Mini Projects (e.g., a Calculator, Sorting Algorithms)
4.2 Case Studies: How Computational Thinking Solves Real-World Problems
4.3 Collaborative Problem Solving: Working in Teams to Tackle Coding Challenges

Methodology

1. **Hands-On Coding Labs:**
- Write simple Python programs to implement CT concepts.
- Examples: Fibonacci sequence generator, basic search algorithms.
2. **Case Studies and Examples:**
- Explore how CT principles (e.g., divide-and-conquer) solve problems like sorting or pathfinding.
- Case studies: Binary Search, Google Maps routing.
3. **Group Projects:**
- Teams design, code, and debug small projects, applying decomposition, abstraction, and algorithmic thinking.
4. **Assessments:**
- Online coding challenges (using HackerRank or similar platforms).
- Mid-term project: Write and optimize a simple algorithm (e.g., finding the largest number in an array).

Learning Resources

- **Books:**
  - "Think Like a Programmer" by V. Anton Spraul.
  - "Python Crash Course" by Eric Matthes.
- **Online Platforms:**
  - Codecademy, LeetCode, or Edabit for practice problems.

LEARNING RESOURCES

learn.talentsprint.com

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

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

Duration of Internal Tests : 90 Minutes

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

CONSTITUTION OF INDIA
BASIC FEATURES & FUNDAMENTAL PRINCIPLES
(Common to all branches) SYLLABUS FOR B.E. 2/4- III semester

Instruction: 2 per week	SEE:60	Course code: U24OE360EH
Credits:2	CIE:40	Duration of SEE:3 hours

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

CONSTITUTION OF INDIA – BASIC FEATURES & FUNDAMENTAL PRINCIPLES

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

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

Unit –III: Government: Union & State – Executive & Legislature, composition, powers and functions, Local Self Governments – Panchayat

Raj Institutions & Urban Local Bodies (Municipalities). Statutory Institutions: Elections-Election Commission of India, National Human Rights Commission, National Commission for Women.

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

Suggested Readings:

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

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

1	No. of Internal tests	:	2	Max. Marks	:	40
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 (A)
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO JOURNALISM
(Common to all branches) B.E. III SEMESTER

Instruction: 2 Hours	SEE: 60	Course code: U24OE370EH
Credits: 2	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
What the course aims to achieve: 1. To introduce students to the fundamentals of journalism and mass communication. 2. To develop skills in news writing, reporting, editing, and media production. 3. To explore the role and responsibilities of media in society and democracy. 4. To familiarize students with different types of media—print, broadcast, digital, and social. 5. To instill ethical standards and legal awareness in media practices.	What students should be able to demonstrate after the course: 1. Explain key concepts, history, and theories of journalism and mass communication. 2. Create accurate, clear, and engaging content for various media platforms. 3. Critically analyze the role of media in shaping public opinion and policy. 4. Use appropriate tools and technologies in media production and dissemination. 5. Apply journalistic ethics and understand media laws in professional practice.

UNIT-1: MASS COMMUNICATION: NATURE AND CONCEPT OF MASS COMMUNICATION

Defining Mass Communication - Nature - Functions and Scope of Mass Communication - Mass Communication as Distinct from Other Forms of Communication - Mass Communication and Mass Media: Advantages and Limitations - Process of Mass Communication - Interactive Communication- Mass Communication in a Democratic (and Developing) Nation

UNIT - 2: MASS MEDIA AND SOCIETY

Medium: Concept, Role and Functions – Scope of Media in the Indian Context – Classification of Media – Medium is the Message – Mass Media – Society and Development – Media Scene in India – Media Reach

UNIT –3: INTRODUCTION TO JOURNALISM AND PRINCIPLES OF JOURNALISM

Journalism: Definition and Functions – Role, Nature and Scope of Journalism in the Indian Context (Democracy, Secularism and Development) - Press as Fourth Estate.
Journalism as Information & Communication – Objectivity - Comment is free, Facts are Sacred - Its Discontents, Truthfulness, Humanness, Social Responsibility, Social Good – Qualities of a Journalist – Duties and Responsibilities of Journalist – Code of Ethics

UNIT – 4: TYPES OF JOURNALISM (MEDIA AND SUBJECT SPECIFIC)

Media Specific: Print Journalism, Broadcast Journalism, Cyber Journalism, Investigative Journalism, Photo Journalism, Global Media Journalism, Yellow Journalism - Subject Specific: Development Journalism, Environmental Journalism, Civic Journalism, Lifestyle Journalism, Business Journalism, Sports Journalism and Health Journalism

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 ENGNEERING (AUTONOMOUS)
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO FINANCIAL SERVICES

SYLLABUS FOR B.E-III SEMESTER (Stream based Open Elective)

Instruction: 2 Hrs/week	SEE Marks: 60	Course Code: U24OE350EH
Credits: 2	CIE Marks:40	SEE: 3 hrs.

Course Objectives: The course will enable learners:	Course Outcomes: On completion of the course, students will be able to:
1. To gain understanding of working of banking companies	Examine and classify banking operations
2. To comprehend the Risk aspects Insurance Companies	Analyze the Risks involved in Insurance Business
3. To understand the concepts and applications of Financial instruments	Evaluate and invest in different financial assets available in the market
4. To gain understanding of Financial Markets infrastructure	Analyze the working of financial markets

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

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

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

Unit IV: Securities (5 hours)
Derivatives – Meaning - Uses – Types of Derivatives – Forwards – Futures- Options – Recent Trends in Derivative Trading, Financial Market

Infrastructure Institutions – Nature and Functions of Stock Exchanges , Depositories and Clearing Houses

Learning Resources for students:
M Y Khan, Financial Services, 10th Edition, Tata Mcgraw Hill
References:
www.sebi.gov.in
www.rbi.org.in

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

1	No. of Internal tests	:	2	Max. Marks	:	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 ENGNEERING (AUTONOMOUS)

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

HUMAN RESOURCES MANAGEMENT

(STREAM BASED ELECTIVE) SYLLABUS FOR B.E

Instruction: 3 Hours	SEE: 60	Course code: U24OE310EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. To introduce the fundamental principles and functions of Human Resource Management. 2. To explore the processes of recruitment, selection, training, and performance management. 3. To understand employee motivation, engagement, and workplace behavior. 4. To familiarize students with labor laws, ethical issues, and HR policies. 5. To develop skills for effective people management in technical and organizational settings.	At the end of the course the learners will be able to: - 1. Explain key HRM functions and their strategic role in organizations. 2. Apply methods for effective recruitment, on boarding, training, and evaluation of employees. 3. Analyze factors influencing employee motivation, productivity, and job satisfaction. 4. Interpret and apply basic labor laws and ethical principles in HR practices. 5. Demonstrate interpersonal and managerial skills for leading diverse technical teams.

Unit 1 - Introduction

Introduction – Nature and Objectives of HRM – Scope of HRM – Evolution of HRM- Importance of HRM - Environment of HRM -External and Internal forces acting – Strategic HRM

Unit 2 – Human Resources Planning

Human Resources Planning – Nature and Importance of Human Resources Planning- Factors affecting H R Planning – Requisites for successful HR Planning – Nature of Job Analysis – Process of Job analysis – Methods of collecting data for Job Analysis

Unit 3 - Training and Development

Nature of Training and Development – Inputs in Training and Development – Gaps in Training – The Training Process – Impediments to effective training –Career Development – uniqueness in international training-

Unit 4 – Performance Management

Performance Appraisal process- challenges in performance appraisal – methods of performance appraisal – designing an effective performance appraisal system – Improving performance - Performance based incentives

Unit 5 – Contemporary Issues in HRM

Ethical Issues in HRM - Employee privacy issues and surveillance – workplace harassment - Employer branding–Green HRM – Managing global workforce- Motivation across Cultures.

Learning resources:-

Prescribed Textbook

Human Resources Management, V Edition, K Ashwatappa, McGraw Hill Publication,

Personnel Management, 31st Edition, V S P Rao, Himalaya Publications.

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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IBRAHIMBAGH, HYDERABAD – 500 031

List of Open Elective-II Courses		
Department	**Code**	**Title**
Civil	U24OE410CE	Solid Waste Management
CSE	U24OE410CS	Basics Of Java Programming
CSE	U24OE420CS	Mathematical Computing for AI&ML with Python (Stream: Artificial Intelligence & Machine Learning)
ECE	U24OE410EC	Sensors for Engineering Applications
ECE	U24OE420EC	Modulation Theory and Techniques
ECE	U24OE440EC	Modulation Theory and Techniques (Stream: Communication Engineering)
MECH	U24OE420ME	Operations Research
MECH	U24OE410ME	Kinematics and Dynamics of Robotics (Stream: Robotics)
IT	U24OE410IT	Object Oriented Programming using Java
IT	U24OE420IT	Essentials of Mathematics for Machine Learning using Python (Stream: AI&ML)
EEE	U24OE410EE	Mathematical Programming for Numerical Computation
MATHS	U24OE410MA	Numerical Methods
H&SS	U24OE450EH	Fintech (Stream: Banking, Finance, Securities and Investments)
H&SS	U24OE410EH	Finance Management for Engineers (Stream: Management Courses for Engineers)

Stream Based Open Electives

Name of the Branch	Stream and Eligible Branches	III Semester (2 Credits)	IV Semester (3 Credits)	V Semester (3 Credits)	VI Semester (3 Credits)
CSE	Artificial Intelligence & Machine Learning (All Branches except CSE & I.T)	Programming essentials in Python	Mathematical computing for AI & ML with Python	Fundamentals of Artificial Intelligence	Fundamentals of Machine Learning
ECE	Communication Engineering (CSE, EEE & I.T)	Introduction to Signals and Systems	Modulation Theory and Techniques	Introduction to Communication Systems	Introduction to Wireless Communication Technologies
MECH	Robotics (All Branches except Mech.)	Introduction to Industrial Robotics	Kinematics and Dynamics of Robotics	Drives and Control Systems for Robotics	Industry 4.O
I.T	AI&ML (All Branches except CSE & I.T)	Computing using Python	Essentials of Mathematics for Machine learning using Python	Introduction to Artificial Intelligence	Introduction to Machine Learning
Maths	Advanced Probability and Statistics (CSE, CSE-AIML& I.T)	Number Theory and Boolean Algebra	Algebraic Structure	Theory of Estimation and Inference Theory	Advanced Probability & Statistical Methods
H&SS	BFSI (Banking, Finance , Securities and Investments)	Financial Services	Fintech	Financial Analytics	Business Intelligence
	Management Courses for Engineers	Human resource Management for Engineers	Finance Management for Engineers	Marketing Management for Engineers	Strategic Management for Engineers

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

DEPARTMENT OF CIVIL ENGINEERING

SOLID WASTE MANAGEMENT

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

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:U24OE410CE
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, Gasification, RDF- recovery of energy from conversion products. Energy recovery systems, Solid waste disposal- Land farming, deep well injections, Landfills: Site selection, method, drainage and leachate collection systems, requirements and technical solutions.

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

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

Learning Resources:

1. P. A. Vesilind, Worrell W and Reinhart, "Solid Waste Engineering", Cengage Learning India Pvt. Ltd. 2nd Edition, 2016.
2. Tchobanoglous," Integrated Solid Waste Management", Mc-Graw Hill International, 1st Edition, New York, 2014.
3. Charles A. Wentz; "Hazardous Waste Management", McGraw Hill Publication, 1995.
4. CPHEEO, "Manual on Municipal Solid waste management", Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000.
5. A. D. Bhide and B. B. Sundaresan, "Solid Waste Management, Collection, Processing and Disposal",Nagpur. 2001.
6. https://archive.nptel.ac.in/courses/105/103/105103205/

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

1	No. of Internal Tests	: 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: **U24OE410CS**
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.

CO-PO and CO-PSO mapping

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

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

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

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

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

UNIT-IV: String Handling: String constructors, operations, character extraction, comparison, search, modification. 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)
ACCREDITED BY NAAC WITH 'A++' GRADE
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Department of Computer Science & Engineering

MATHEMATICAL COMPUTING FOR AI & ML WITH PYTHON

Stream- Artificial Intelligence & Machine Learning
(OPEN ELECTIVE-II)
(COMMON for CIVIL, ECE, EEE & MECH) SYLLABUS FOR B.E IV SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**U24OE420CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO and CO-PSO mapping

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

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT-V

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

Learning Resources:

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

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

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

Duration of Internal Test: 1 Hour 30 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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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: **U24OE410EC**
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

Modulation Theory and Techniques

(General Pool: Open Elective - II)

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

L:T:P (Hrs./week): 3:0:0	SEE Marks: 60	Course Code: **U24OE420EC**
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To Analyze different analog modulation techniques such as AM, DSB-SC, SSB, and VSB. 2. To explore Angle modulation and demodulation techniques. 3. To comprehend sampling and pulse modulation techniques. 4. To investigate digital transmission methods including ASK, FSK, and BPSK. 5. To Understand Information Theory and Source Coding.	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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Modulation Theory and Techniques

(Communication Engineering Stream: 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: **U24OE440EC**
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To Analyze different analog modulation techniques such as AM, DSB-SC, SSB, and VSB. 2. To explore Angle modulation and demodulation techniques. 3. To comprehend sampling and pulse modulation techniques. 4. To investigate digital transmission methods including ASK, FSK, and BPSK. 5. To Understand Information Theory and Source Coding.	On completion of the course, students will be able to 1. Analyze the power and transmission bandwidth of Amplitude and Frequency Modulated signals. 2. Familiarize the process of reproduction of base band signal. 3. Analyze various pulse analog and pulse digital Modulation Techniques. 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)
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 : U24OE420ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO and CO-PSO mapping															
CO	PO mapping												PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	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.

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

UNIT-III

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

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

UNIT-IV

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

UNIT-V

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

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

Learning Resources:

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

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

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

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT 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: U24OE410ME
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 manipulators.

UNIT-II

Differential Kinematics

Linear and angular velocity of links, Manipulator Jacobian for serial manipulators, Jacobian Singularities.

UNIT-III

Static Analysis: Force and moment balance.

Dynamics of serial manipulators

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

Unit-IV

Dynamics of serial manipulators

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

UNIT-V

Trajectory Generation

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

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

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

OBJECT ORIENTED PROGRAMMING USING JAVA

(GENERAL POOL : 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: **U24OE410IT**
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*
Explain the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, building simple GUI applications.	1. Understand fundamental concepts in Object oriented approach. 2. Develop object-oriented programs using the concepts of exception handling. 3. Demonstrate the usage of Java I/O streams to handle user input and output. 4. Design and develop GUI programs. 5. Develop applets for web applications.

UNIT- I

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

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

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

Interfaces: Defining interfaces, extending interfaces, implementing interfaces.

UNIT- II

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

UNIT- III

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

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

UNIT-V

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

Learning Resources:

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

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

1	No. of Internal Tests	:	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 Stream : Open Elective-II)
(Common for ECE, EEE, MECH & CIVIL) SYLLABUS FOR B.E IV-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U24OE420IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

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

Unit-1 Basics of Linear Algebra

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

Unit-2 Matrix

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

Unit-3 Vector Calculus

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

Unit 4 Probability Theory

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

Unit -5 Statistical Methods

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

Learning Resources:

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

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

1	No. of Internal Tests:	02	Max.Marks for each Internal 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 ELECTRICAL AND ELECTRONICS ENGINEERING

Mathematical Programming for Numerical Computation

Open Elective-II SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U24OE410EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: 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 graphicaldisplay. 3.Write scripts and functions to easily execute series of tasks in problem solving. 4.Use arrays, matrices and functions in Engineering applications 5.Design GUI for basic mathematical applications.

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

UNIT - I : Introduction:

Basics of MATLAB,MATLAB windows, Advantages of MATLAB,on- line help, file types.

MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating ,Saving and Executing a Script File, Creating and Executing a function file.

Programming Basics: Data types-Operators – Hierarchy ofoperations, Relational and logical operators, if-end structure, if- else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions

Script Files, Function Files, Debugging methods in MATLAB. **Graphics: Basic 2D plots:** Printing labels- grid and axes box- Entering text in a box- Axis control-Style options-Multiple plots- subplots-specialized 2D plots: stem-,bar,

hist, pi, stairs, loglog , semilog, polar, comet 3D plots: Mesh,Contour,Surf,Stem3,ezplot.

UNIT - III : Numerical Methods Using MATLAB

Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration.

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

UNIT - IV : Nonlinear Equations

System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions ployval and polyfit ,

cubic fit using least square method. Finding roots of a polynomial - roots function, Newton-Raphson Method.

UNIT - V :

Solution of Ordinary differential Equations(ODEs)-The 4th order Runge-kutta Method, ODE Solvers in MATLAB,Solving First – order equations using ODE23 and ODE45.

Structures and Graphical user interface(GUI): Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by RudraPratap, Oxfordpublications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt.Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition-Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Mathworks.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy SiauwAlexandreBayen,Elsevier-18th April2014.
5. https://nptel.ac.in/courses/103106118/2

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

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

Duration of Internal Tests :90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
Accredited by NAAC with A++ Grade
9-5-81, Ibrahimbagh, Hyderbad-500031
DEPARTMENT OF MATHEMATICS

NUMERICAL METHODS

(OPEN ELECTIVE) For B.E., IV - Semester – CBCS
(Common to CSE, CSE-AIML & IT Branches)

Instruction : 3 Hours per week	Sem. End Exam Marks : 60	Subject Reference Code : U24OE410MA
Credits : 3	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. Study various numerical methods to solve Algebraic and Transcendental equations. 2. Learn the methods to solve linear system of equations. 3. Understand the numerical methods in interpolation and extrapolation. 4. Understand the numerical methods in interpolation using central differences. 5. Understand numerical methods in solving ordinary differential equations.	1. Apply numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods 2. Solve linear system of equations using direct and iteration methods. 3. Use various numerical methods in interpolation and extrapolation. 4. Implement various numerical methods in interpolation using central differences. 5. Find numerical solutions of ordinary differential equations.

UNIT – I: (8 Hours)

SOLUTION OF ALGEGBRAIC AND TRANSCENDENTAL EQUATIONS:

Algebraic and Transcendental equations: Bisection method - Newton-Raphson method - Regula-Falsi method.

UNIT – II: (8 Hours)

SOLUTION OF SYSTEM OF LINEAR EQUATIONS:

Direct methods - Gauss elimination method - Factorization method - Iterative methods: Jacobi's method – Gauss-Seidel method - Ill-conditioned system of equations.

UNIT – III: (8 Hours)

NUMERICAL DIFFERENCES - I

Introduction to 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 DIFFERENCES - II

Central differences interpolation - Gauss's forwards and backward difference formulae - Stiriling's formula - Bessel's formula.

UNIT – V: (8 Hours)

NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta of 4th order (without proofs).

Text Books:

1. Numerical methods in engineering and science by B.S.Grewal, Khanna publishers
2. Advanced Engineering Mathematics by R.K.Jain & S.R.K.Iyengar, Narosa publishing house.

Reference Books:

1. Numerical Analysis by S.S.Sastry, PHI Ltd.

Online Resources:

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 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 ENGNEERING (AUTONOMOUS)
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO FINTECH

SYLLABUS FOR B.E-IV SEMESTER (Stream based Open Elective)

Instruction: 3 Hrs/week	SEE Marks: 60	Course Code: U24OE450EH
Credits: 3	CIE Marks:40	SEE: 3 hrs.

Course Objectives: This is a theory based paper :	**Course Outcomes:** At the end of the course the students will be able to:
Provides exposure to students regarding financial markets integrating Technology and financial services.	Apply the traditional methods and adopt to the digital methods now used in banks.
Creates awareness about Fintech (focus areas of leading technology companies)	Use digital wallets and digital currency more dexterously.
	Access bank accounts through chatbots in banking sector.

Unit I:

Financial Markets & Services - Capital Markets - Meaning, Features, Structure, instruments - Money markets – characteristics, structure of money market, instruments in money market financial institutions and their importance – Regulators in financial markets of major countries – US, UK and India.

Unit II:

Risk and Return - Concept of Risk – Types of Risks – Measurements of Risk - Risk – Risk Premium – Approaches to risk management – Returns – ExAnte – Ex post returns – Tax effect in Returns – Risk Return Tradeoff.

Unit III:

Overview of Fintech : Concept - Meaning - Evolution of Fintech - Significance - Drivers of fintech - Areas of Fintech - Fintech Opportunities and Challenges - Fintech users - Recent Developments in Fintech.

Unit IV:

Fintech in Banks -Traditional Vs Digital Banks - Neo Banks – Use of

technology for banking operations like lending, real time access to bank accounts – Chatbots in Banking – Payment systems concept and importance – Technology adoption in payment systems- Settlement Systems – Concepts – Technology in settlement systems – players in Payments and settlement Systems – Study of RBIs UPI and IMPS – Regtech Ecosystem.

Unit V :

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

Prescribed Textbook :

Introduction to Fintech, Ist Edition, Pearson publications

Reference Books :

Technology In Specific Financial Process
Cutting-Edge Technology, Pearson publications
Web link: https://amzn.in/d/8PvS87T

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGNEERING (AUTONOMOUS)
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO FINANCE MANAGEMENT FOR ENGINEERS

SYLLABUS FOR B.E - IV SEMESTER
(STREAM BASED ELECTIVE) W.E.F ACADEMIC YEAR 2025-26

Instruction: 3 Hours	SEE: 60	Course code: U24OE410EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

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

Background:

- This course is for Engineers
- Serves the purpose when these engineers become managers and entrepreneurs
- The focus is on Core Finance
- Prior requirement : Basic Arithmetic and Algebra
- Uniqueness – Introduction to International Finance

Unit -1: Introduction

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

Unit -2: Sources of Finance

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

Unit-3: Financial performance assessment

Ratio Analysis – Activity, Liquidity and Profitability Ratios - Du Pont Analysis –Budgeting and Variance Analysis – (Simple Numerical problems) – Cash flow from Operations , Financing and Investments (Only theory)

Unit -4: Project Finance

Importance of Project Finance - Project Cost and Means of Finance - Contents of a Project Report – Technical and Environmental Aspects – Commercial and Financial Viability - Projected Financials, NPV, IRR and PIof the project - Sensitivity Analysis

Unit-5: International Finance (Only Theory)

Difference between Domestic and International Finance - Currency exchange Rates regimes- Factors affecting currency exchange rates-Spot and Forward Rates - Currency Forwards, Futures and Swaps - Components of Balance of Payments.

LEARNING RESOURCES:-

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

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

1	No. of Internal tests	:	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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Academic Activity Planner / Calendar for the Academic Year 2025-26

S.No.	Date	Activities planned
1	02-08-2025	Introduction and objectives of CCA activities, Introduction of Techniche Proposal which mainly focuses on the development of technical skills in students through projects, workshops and technical talks in various domains.
2	23-08-2025	Guest lecture on Recent trends in industrial growth, Rohit Lingala, 2022, application developer II, Oracle (AI Agents)
3	30-08-2025	Awareness on Library learning Resources, by Mr. Ravi Kumar Librarian, VCE
4	06-09-2025	Extempore Contest for BE ECE (A, B & C) Sem-5 students) in association with IETE Students' Forum.
5	20-09-2025	Guest lecture on career guidance by Vinay garu, Dir SRE, Optum
6	27-09-2025	Poster Presentation on "IoT Solutions in Agriculture" for BE (ECE) Sem-3, Sem-5 and Sem-7 students in association with IETE Students' Forum (ISF)
7	18-10-2025	Invited talk by Professor C. Vanitha NIT-Warangal
8	25-10-2025	"Logical Wizard", A technical event conducted for 5th semester students of ECE (A, B & C) in association with IEEE SB VCE Unit.
9	01-11-2025	Guest lecture on skills need for career growth Manoj Kumar Infrastructure Engineer principal global services.
10	15-11-2025	Technical Essay Writing Competition for BE ECE (A, B & C) Sem-1 students on "Technology in Professional Ethics– need of the hour" in association with IETE Students' Forum (ISF)
11	22-11-2025	Technical Talk on "Introduction to FPGA" by Mr. Vamshi, Member of Technical staff, AMD, Hyderabad

S.No.	Date	Activities planned
12	03-01-2026	Guest Lecture on Internet of Things: From idea to prototyping Dr. Shyam Sunder Associate Professor, ECE, Osmania University
13	17-01-2026	Invited talk on contributions of DRDL for nation building – Prof. Arun Kumar, VCE, Hyderabad.
14	24-01-2026	Invited talk on Recent trends in industrial growth by Dr. K. Krishna Kishore Director AI-Powered Business Expansion, Houses of Companies- T-hub, Hyderabad.
15	31-01-2026	Invited talk on Artificial Intelligence and its impact on the world by – Mr. Karthik, Head – AI division, SignalLyaer, Hyderabad
16	07-02-2026	Technical talk by T. Pavan Kalyan Analog Design Engineer in MOSCHIP Technologies
17	21-02-2026	Hackerrank™ based coding contest "Hackathon 2026" for BE ECE Sem-1 students in association with IEEE SB.
18	28-02-2026	A Workshop on "Robotryst (Programming nodeMCU)"
19	07-03-2026	"Tech Lipi – A technical contest" for BE ECE (A, B & C) (Sem – 4) students in association with IETE Students' Forum
20	21-03-2026	Career guidance by V. Satya Sri Engineer at QUALCOMM, Hyderabad, Telangana,
21	28-03-2026	Guest Lecture on "Electronic Instrumentation and Various Test procedures" Mrs. Phani Madhuri, Deputy Manager, BEL, Hyderabad
22	04-04-2026	"Hardware circuit design Contest" in association with IEEE SB of VCE Unit.
23	18-04-2026	Guest lecture by Mr. Neeraj, Alumni VCE.
24	25-04-2026	Guest Lecture on "Importance of life skills for securing jobs", by Durga prasad Yaragunta, Trainer in sift skills and life skills, Editor in chief, Insight Publications pvt ltd Hyderabad