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 2022-23
(For the batch admitted in 2021-22)
(R-21)

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 wireless communication systems.
PSO III	ECE students will be able to implement signal and image processing techniques for real time applications.

1. Attendance and Sessional marks requirements:

1	B.E(4yrs)	**Attendance:** Minimum aggregate attendance required to eligible to attend semester end exams is 75% and 65% with Medical Condonation respectively.
		Sessional Marks: Minimum aggregate of sessional marks required to become eligible for appearing semester end examinations is 40%

II. Promotion rules for B.E (4ydc) course

S.No.	Semester / Class	Conditions to be fulfilled
1	I-SEM TO II- SEM	Regular course of study of I-SEM and 40% aggregate CIE marks in I-SEM
2	II-SEM TO III SEM	a. Regular course of study of II SEM and
		b. 40% aggregate CIE marks in II-SEM
		c. Must have secured at least 50% of total credits prescribed for I and II SEMs together
3	III-SEM to IV-SEM	a. Regular course of study of III-SEM and
		b. 40% aggregate CIE marks in III-SEM
4	IV-SEM to V-SEM	a. Regular course of study of IV SEM
		b. 40% aggregate CIE marks in IV-SEM
		c. Passed in all the courses of I and II SEMs
		d. Must have secured at lest 50% of total credits prescribed for III and IV SEMs put together
5	V-SEM to VI-SEM	a) Regular course of study V-SEM b) 40% aggregate CIE marks in V-SEM
6	VI-SEM to VII-SEM	a. Regular course of study of VI SEM
		b. 40% aggregate CIE marks in VI-SEM
		c. Passed in all the courses of III and IV SEMs
		d. Must have secured at least 50% of total credits prescribed for V and VI SEMs put together

S.No.	Semester / Class	Conditions to be fulfilled
7	VII-SEM to VIII-SEM	a. Regular course of study of VII SEM b. 40% aggregate CIE marks in VII SEM
8	Eligibility to appear VIII-SEM exams	a. Regular course of study of VIII SEM and 40% aggregate CIE marks in VIII-SEM

III. Promotion rules for B.E (3 YDC) course (Lateral Entry)

S.No.	Semester / Class	Conditions to be fulfilled
1	III-SEM to IV-SEM	a. Regular course of study of III-SEM and
		b. 40% aggregate CIE marks in III-SEM
2	IV-SEM to V-SEM	a. Regular course of study of IV SEM
		b. 40% aggregate CIE marks in IV-SEM
		c. Must have secured at lest 50% of total credits prescribed for III and IV SEMs put together
3	V-SEM to VI-SEM	a) Regular course of study V-SEM b) 40% aggregate CIE marks in V-SEM
4	VI-SEM to VII-SEM	a. Regular course of study of VI SEM
		b. 40% aggregate CIE marks in VI-SEM
		c. Passed in all the courses of III and IV SEMs
		d. Must have secured at least 50% of total credits prescribed for V and VI SEMs put together
5	VII-SEM to VIII-SEM	a. Regular course of study of VII SEM b. 40% aggregate CIE marks in VII SEM
6	Eligibility to appear VIII-SEM exams	a. Regular course of study of VIII SEM and 40% aggregate CIE marks in VIII-SEM

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-21) :: B.E. - ECE : THIRD SEMESTER (2022-23)

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/D		SEE	CIE	
THEORY								
U21PC310EC	Electronic Devices	3	-	-	3	60	40	3
U21PC320EC	Digital Logic Design	3	1	-	3	60	40	4
U21PC330EC	Signal Analysis and Transform Techniques	3	1	-	3	60	40	4
U21BS320MA	Partial Differential Equations and Numerical Methods	3	-	-	3	60	40	3
U21OE3XXXX	Open Elective - I	2	-	-	3	60	40	2
U21HS320EH	Skill Development Course-I: Communication Skills in English-I	1	-	-	2	40	30	1
U21BS340MA	Skill Development Course-II : Aptitude - I	1	-	-	2	40	30	1
U21HS010EH	Human Values and Professional Ethics – II	1	-	-	2	40	30	1
PRACTICALS								
U21PC311EC	Electronic Devices Lab	-	-	2	3	50	30	1
U21PC321EC	Digital Logic Design Lab	-	-	2	3	50	30	1
U21PC331EC	Signals and Systems Lab	-	-	2	3	50	30	1
U21PC341EC	Electronic Workshop	-	-	2	3	50	30	1
	TOTAL	**17**	**2**	**8**	**-**	**620**	**410**	**23**
	GRAND TOTAL	**27**			**-**	**1030**		**-**

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

Note: B.E. (Regular) Students shall complete one NPTEL Certificate Course equivalent to 2 Credits weightage during their I to VI Semesters.
B.E. (Lateral Entry) Students shall complete one NPTEL Certificate Course equivalent to 2 Credits weightage during their III to VI Semesters.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-21) :: B.E. - ECE : THIRD SEMESTER (2022-23)

Bridge Course for ECE Lateral Entry Students								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			Credits
		Hours per Week			Duration in Hrs	Maximum Marks		
		L	T	P/D		SEE	CIE	
THEORY								
UB21ES310CS	Computer Programming	2	-	2	3	50	-	-
UB21BS300MA	Matrix Theory and Vector Calculus	2	-	-	3	50	-	-

COURSES OFFERED TO EEE								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			Credits
		Hours per Week			Duration in Hrs	Maximum Marks		
		L	T	P/D		SEE	CIE	
THEORY								
U21ES310EC	Electronics Engineering – I	3	-	-	3	60	40	3
PRACTICALS								
U21ES311EC	Electronics Engineering - I Lab	-	-	2	3	50	30	1

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Devices

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U21PC310EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To familiarize the students with various two terminal and three terminal electronic devices working and use in the design of real time electronic products. 2. To understand the students with fabrication process for Electronic devices.	On completion of the course, students will be able to 1. Understand the PN junction operation and distinguish between drift and diffusion currents. 2. Plot the electric field distribution across the junctions. 3. Employ PN- Junction diode as a circuit element. 4. Employ the mathematical models of semiconductor junctions and MOS transistors for circuits and systems. 5. Distinguish between properties of BJT and MOSFET with reference to packing density and power dissipation. 6. Illustrate the fabrication processes for CMOS inverter

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1											2		
CO2	3	1											2		
CO3	3	1	1		1		1		1				2		
CO4	3	1	1										2		
CO5	3	2					1						2		
CO6	3	1					1						2		

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

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

UNIT - II : PN Junction Characteristics:

Basic Structure of the pn Junction, Zero Applied Bias: Built-in Potential Barrier, Electric Field, Space Charge Width. Forward and Reverse Applied Bias. Junction Capacitance, Non-uniformly Doped Junctions.pn Junction

Current equation, I-V characteristics, Temperature Effects. Small-Signal Model of the pn Junction. Charge Storage and Diode Transients: The Turn-off Transient, the Turn-on Transient. Junction Breakdown: Avalanche and Zener breakdown.

UNIT - III : PN junction applications & Metal-Semiconductor:

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

UNIT - IV : Transistors:

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

UNIT - V : CMOS & Integrated circuit fabrication process:

CMOS as Invertor, CMOS invertor Switching characteristics.

Oxidation, diffusion, ion implantation, photolithography, Etching, Chemical vapor deposition, sputtering, twin-tub CMOS process.

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Digital Logic Design

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U21PC320EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

UNIT - I :

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

UNIT - II :

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

UNIT - III :

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

UNIT - IV :

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

UNIT - V :

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Signal Analysis and Transform Techniques

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U21PC330EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

UNIT - I :

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

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

UNIT - II :

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

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

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

UNIT - III :

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

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

UNIT - IV :

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

UNIT - V :

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF MATHEMATICS

Partial Differential Equations and Numerical Methods

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

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U21BS320MA**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

UNIT-I : (10 Hours)

Partial Differential Equations: Formation of first and second order Partial Differential Equations - Solution of First Order Equations – Linear Equation - Lagrange's Equation- Non-linear first order equations -Standard Forms.

UNIT-II: (10 Hours)

Applications of Partial Differential Equations: Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation – Two Dimensional Heat equation(Steady state condition).

UNIT-III: (10 Hours)

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

UNIT-IV: (12 Hours)

Numerical solutions of ODE: Numerical Differentiation -Interpolation approach- Numerical Solutions of Ordinary Differential Equations of first order - Taylor's Series Method - Euler's Method - Runge-Kutta of 4th order(without proofs).

UNIT-V:

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

Learning Resources:

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

Reference Books:

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

Online Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

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

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

L:T:P (Hrs./week) : 1:0:0	SEE Marks : 40	Course Code: **U21HS320EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:- 1. Get students proficient in both receptive and productive skills especially virtual. 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 this course, the student will be able to: 1. Introduce themselves effectively and converse in a formal environment especially in the online space 2. Write emails with appropriate structure and content 3. Use appropriate structure based on the content employing appropriate transitions in written and spoken communication 4. Paraphrase content and write an effective summary

CO-PO/PSO Mapping

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

UNIT-I: Delightful Descriptions

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

UNIT-2: Formal Conversation Skills

2.1 Ask for Information
2.2 Give Information

2.3 Give Feedback
2.4 Seek Permission

UNIT-3: Technical Expositions and Discussions

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

UNIT-4: Rational Recap

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

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

Learning Resources:

learn.talentsprint.com

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Skill Development Course-II : Aptitude-I

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 40	Course Code: **U21BS340MA**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

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

UNIT 1: QUANTITATIVE APTITUDE - NUMERICAL ABILITY

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

UNIT 2: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY FOUNDATION

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

UNIT 3: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 1

3.1 Percentages
3.2 Profit and loss

UNIT 4: REASONING ABILITY- GENERAL REASONING PART 1

4.1 Blood Relations
4.2 Number Series
4.3 Coding and decoding

UNIT 5: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 2

5.1 Time and Work
5.2 Chain Rule
5.3 Pipes and Cisterns

Prescribed textbook for theory:

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

Suggested Reading

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

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

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

Duration of Internal Tests: 90 Minutes

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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: **U21HS010EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

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

CO-PO/PSO Mapping

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

UNIT 1: NORMATIVE ETHICS & SOCIETAL ETHICS

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

1.1 Ethical Accountability
1.2 Society & Ethics
1.3 Rights & Responsibilities

UNIT-2: PROFESSIONAL ETHICS - NEED FOR ETHICAL CODES

This unit covers the code of Professional Ethics- it is designed to ensure that students learn the necessary skills that groom them to behave like employees should, one that is socially acceptable and respectful of one another. It establishes the rules for behavior and sends a message to every employee that universal compliance is expected.

2.1 Professional Ethics
2.2 Ethical Code
2.3 Flipped Classroom

UNIT-3: PRIVACY

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

3.1 Basics of Cyber Ethics
3.2 Privacy
3.3 Flipped Classroom

UNIT-4: MEDIA AND MEDICAL ETHICS

This unit covers Media and Medical ethics is the best division of applied ethics dealing with the specific ethical principles and standards of media (including broadcast media, film, theatre, the arts, print media and the internet) and medicine (practice of clinical medicine and related scientific research)

4.1 Media Ethics
4.2 Medical Ethics
4.3 Flipped Classroom

MODE of DELIVERY

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

Relevant Websites, CD's and Documentaries

- Value Education website, Http://www.universalhumanvalues.info UPTU website, Http://www.uptu.ac.in
- Story of stuff, Http://www.storyofstuff.com
- Al Gore, As Inconvenient Truth, Paramount Classics ,USA
- Charlie Chaplin, Modern Times, United Artists, USA
- IIT Delhi, Modern Technology-The Untold story-Anand Gandhi, Right Here Right Now, Cyclewala production.

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Devices Lab

SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs./week) : 0:0:2	SEE Marks : 50	Course Code: **U21PC311EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
To develop an understanding of the underlying concepts of Electronic devices so that they can use them for circuits and systems.	On completion of the course, students will be able to 1. Analyse the characteristics of diodes, BJT's and MOSFET's experimentally. 2. Employ Diode as a circuit element. 3. Design different rectifier circuits with various filter combinations. 4. Verify practically the response of optical devices.

CO-PO/PSO Mapping

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

Cycle - I Experiments

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

Cycle - II Experiments

1. Design of Half wave and Full wave Rectifiers with and without Filters.
2. Diode Clipper circuits.
3. Clamper circuits.
4. Transistor as switch. (BJT and MOSFET)

5. Optical device characteristics. (LED, Laser diode, Photo Diode, Photo Transistor and Optocouplers)
6. Seven segment LED Display

New / Additional experiments planned

1. Design of CMOS inverter layout in Micro wind tool
2. Measurement of Sheet resistance using 4-point method

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. Muhammed H Rashid, "SPICE for circuits and electronics using PSPICE", 2nd edition, PHI, 1995.

Tools:

1. PSPICE or Multisim may be used to facilitate analysis of characteristics of devices.
2. Micro wind tool can be used to draw CMOS Layout.

The break-up of CIE :

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

Duration of Internal Test : 3 Hours

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Digital Logic Design Lab

SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs./week) : 0:0:2	SEE Marks : 50	Course Code: **U21PC321EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

CYCLE - I Experiments

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

Note:

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

CYCLE - II Experiments

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

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

New / Additional experiments planned

1. Four bit CLA using Gates and its modelling.
2. Implementation of Semi Conductor Memory

The break-up of CIE :

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

Duration of Internal Tests: 3 Hours

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Signals and Systems Lab

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U21PC331EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

CYCLE - I Experiments

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

CYCLE - II Experiments

7. Convolution representation
8. The Laplace Transform and its properties

9. System response using Laplace transform
10. Fourier analysis of Discrete time signals and systems
11. Verification of Sampling theorem
12. Correlation between signals and systems

New / Additional experiments planned

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

Learning Resources / Tools :

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

The break-up of CIE :

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

Duration of Internal Tests: 3 Hours

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Workshop

SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U21PC341EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

Experiments

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

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

New / Additional experiments planned

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

Mini Project(s)

Learning Resources / Tools:

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

The break-up of CIE :

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

Duration of Internal Test : 3 Hours

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Computer Programming

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code :**UB21ES310CS**
Credits :--	CIE Marks : --	Duration of SEE : 3 Hours

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

UNIT-I

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

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

UNIT-II

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

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

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

UNIT-III

Recursion-Recursive Functions, Preprocessor Commands.

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

UNIT-IV

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

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

UNIT-V

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

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

Learning Resources:

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

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DEPARTMENT OF MATHEMATICS

Matrix Theory and Vector Calculus

SYLLABUS FOR B.E. III SEMESTER

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

L:T:P (Hrs./week): 2:0:0	SEE Marks :50	Course Code: **UB21BS300MA**
Credits : -	CIE Marks : -	Duration of SEE : 3 Hours

UNIT-I: (4 Hours)
DIFFERENTIATION & INTEGRATION

Differentiation of standard functions(Formulae) - Partial Derivatives – Derivative of Composite functions and Implicit functions - Chain Rule - Total Derivative

Integration - Elementary Integration – Integration of standard functions- Methods of Integration-Integration by substitution- Integration by parts.

UNIT – II (6 Hours)
VECTOR DIFFERENTIATION

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

UNIT – III (6 Hours)
VECTOR INTEGRATION

Line, Surface and Volume integrals- Green's Theorem – Gauss Divergence theorem - Stokes's Theorem. (all theorems without proof).

UNIT- IV(8 Hours)
MATRIX THEORY

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

Suggested Books:

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Engineering – I

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U21ES310EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

UNIT - I : Semiconductor Diodes and Rectifiers

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

UNIT - II : BJT circuits

BJT current components, Structure and I-V characteristics of a BJT, modes of transistor operation, Early effect, BJT input and output characteristics in CB, CE and CC configuration. BJT as a switch.BJT as an

amplifier. BJT biasing techniques thermal runaway, operating point, bias stabilization circuits.

UNIT - III : Small Signal analysis of Transistor Circuits

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

UNIT - IV : Filed effect transistors

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

UNIT - V : CRO & Special devices:

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Engineering – I Lab

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U21ES311EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

CYCLE - I Experiments

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

CYCLE - II Experiments

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

New / Additional experiments planned

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

Mini Project(s)

Designing of various basic applications using devices.

Learning Resources:

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

The break-up of CIE :

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

Duration of Internal Test : 3 Hours

III – Semester Open Electives

S.No.	Dept.	Course Code	Name of the Course	Credits
1	Civil	U21OE310CE	Green Buildings	2
2	CSE	U21OE310CS	Principles of Python Programming	2
3		U21OE320CS	Cyber Security	2
4	ECE	U21OE310EC	Introduction to Signals & systems	2
5		U21OE320EC	Principles of Communication Engineering	2
6	EEE	U21OE310EE	Non Conventional Energy Sources	2
7	IT	U21OE310IT	Introduction to Internet and Webpage Development	2
8		U21OE320IT	Introduction to Linux	2
9	Mechanical	U21OE310ME	Geometric Modelling	2
10		U21OE320ME	Introduction to Unmanned Aerial Vehicles	2
11		U21OE330ME	Basic Heat Transfer for Electronic Systems	2
12	Chemistry	U21OE310CH	Battery Science and Technology	2
13		U21OE320CH	Corrosion and its Prevention	2
14	H&SS	U21OE310EH	Learning to Learn	2
15	Mathematics	U21OE310MA	Linear Algebra	2
16	Physics	U21OE310PH	Smart Materials and Applications	2

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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DEPARTMENT OF CIVIL ENGINEERING

Green Buildings

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

L:T:P (Hrs./week): 2:0:0	SEE Marks: 60	Course Code: **U21OE310CE**
Credits: 2	CIE Marks: 40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are 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	Upon the completion of this course the students will be expected to: 1. Explain the principles of building planning, its bylaws and provide facilities for rainwater harvesting 2. Relate the need of Green Technology 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)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

Principles of Python Programming (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 :**U210E310CS**
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 2 Learn programming and solve problems using Python language	1 Design python programs using arithmetic expressions and decision making statements 2 Design modular python programs using functions 3 Develop programs using strings and list 4 Develop programs using tuples and dictionaries

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

Conditionals: Modulus operators, Boolean expressions, logical operators, conditional execution, 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)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Cyber Security (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 :**U210E320CS**
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 To safeguard from threats and infection spread through the internet	1 Explain the concepts of confidentiality, availability and integrity 2 Explain the basics of fraud techniques used by a hacker 3 Explore the common exploitation mechanisms and inspect data sniffing over the network 4 Determine the ways an organization attempts to discover threats.

UNIT-I: **CYBER SECURITY FUNDAMENTALS:** Network and Security concepts: Information assurance fundamentals, Basic Cryptography, Symmetric Encryption, Public key encryption, Digital Signature, Key Exchange Protocols, DNS, Firewalls, Virtualization.

UNIT-II: ATTACKER TECHNIQUES AND MOTIVATIONS: How hackers cover their tracks, Tunneling techniques, Fraud Techniques: Phishing, Smishing, Vishing and Mobile Malicious Code, Rogue Antivirus, Click Fraud, Threat Infrastructure: Botnets, Fast-Flux, Advanced Fast-Flux.

UNIT-III: EXPLOITATION: Techniques to gain foothold: Shell code, Integer overflow, Stack based buffer overflow, Format String Vulnerabilities, SQL Injection, Web Exploit Tools, Misdirection, Reconnaissance, and Disruption Methods

UNIT-IV:**MALICIOUS CODE, DEFENSE & ANALYSIS TECHNIQUES:** Self-replicating replicating code, Worms, Viruses, Evading Detection and Elevating Privileges: Obfuscation, Spyware, Token Kidnapping, Memory Forensics, Honeypots, Malicious code naming, Intrusion detection systems

Learning Resources:

1. James Graham, Ryan Olson, Rick Howard, "Cyber Security Essentials", Auerbach Publications , CRC Press, 2011
2. Mike Shema, "Anti-Hacker Tool Kit (Indian Edition)", Mc Graw Hill, 2014
3. Cyber Security - Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunit Belpure, Publication Wiley , 2011
4. https://www.edx.org/micromasters/ritx-cybersecurity
5. https://www.coursera.org/specializations/cyber-security
6. http://nptel.ac.in/courses/106105031/
7. https://www.netacad.com/courses/security/introduction-cybersecurity

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

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

Duration of Internal Tests : 90 Minutes

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

Introduction to Signals & Systems (Open Elective - I)

SYLLABUS FOR B.E. III – SEMESTER (for CSE & IT)

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U21OE310EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
4. Define and classify continuous and discrete time signals and systems. 5. Determine frequency domain characteristics of continuous and discrete time signals.	On completion of the course, students will be able to 1. Analyze basic signals and systems in continuous and discrete time domain 2. Apply the properties of different transformation techniques to analyze continuous time domain signals and systems in frequency domain 3. Determine the response of an LTI system using Convolution 4. Apply the properties of different transformation techniques to convert a discrete time domain signal to frequency domain

CO-PO-PSO Mapping

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

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 transforms: Introduction, existence, properties, magnitude and phase spectrums.

Laplace transforms: Introduction, existence, Laplace transform of basic elementary signals, properties, inverse Laplace transforms

UNIT - III

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.

UNIT - IV

LTI Systems: Introduction to continuous and discrete time LTI systems, properties, impulse response, convolution, causality, stability, transfer function.

Z-transform: Introduction, existence, Z-transform of basic elementary signals, properties, inverse Z-transforms.

Applications: Basic network Analysis, Servo Motor

Learning Resources:

1. P. Ramakrishna Rao, Signals and Systems,McGraw 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
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Principles of Communication Engineering (Open Elective - I)

SYLLABUS FOR B.E. III – SEMESTER (for EEE, CSE & IT)

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U21OE320EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Distinguish analog and digital Modulation techniques used in various Communication systems.	On completion of the course, students will be able to 1. Analyze the power and transmission bandwidth of Amplitude and 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.

CO-PO-PSO Mapping

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

UNIT - I

Amplitude Modulation: Introduction to Modulation, Need for Modulation, Ordinary Amplitude Modulation – Modulation index, Side bands, AM Power, Double Side Band Suppressed Carrier Modulation, Single Side Band Modulation, Vestigial Side Band Modulation, AM demodulation, Applications of AM.

UNIT - II

Angle Modulation: Angle Modulation fundamentals, Frequency Modulation – Modulation index and sidebands, Narrowband FM, Wideband FM, Principles of Phase Modulation, Frequency Modulation verses Amplitude Modulation, FM demodulation, Frequency Division Multiplexing,

Applications of FM.

UNIT - III

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

Digital Communication Techniques: Quantization, Digital Transmission of Data, Parallel and Serial Transmission, Data Conversion, Time Division Multiplexing, Pulse Code Modulation, Delta Modulation.

UNIT - IV

Transmission of Binary Data in Communication Systems: Digital Codes, Principles of Digital Transmission, Transmission Efficiency, Modem Concepts and Methods – FSK, BPSK, Error Detection and Correction.

Learning Resources:

1. Louis E. Frenzel, Principles of Electronic Communication Systems, 3rd Edition. 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	:	2	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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DEPARTMENT OF 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:**U21OE310EE**
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students 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.	On completion of the course, students will be able to 1. Demonstrate the generation of electricity from various Non-Conventional sources of energy and solar power generation 2. Illustrate the generation of energy from wind and generation of energy from waste 3. Demonstrate the generation of energy by biomass and fuel cells 4. Illustrate the ocean and geo thermal energy generation

UNIT-I: Introduction and Solar Energy:

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

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

UNIT-II: Wind Energy and Waste to Energy:

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

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

UNIT-III: Biomass Energy and Fuel Cells:

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

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

UNIT-IV: Ocean Energy and Geothermal Energy:

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

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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DEPARTMENT OF INFORMATION TECHNOLOGY

Introduction to Internet and Web page Development

(Open Elective-I) SYLLABUS FOR III-SEMESTER (for other Branches)

L:T:P(Hrs./week): 2:0:0	SEE Marks : 60	Course Code :**U21OE310IT**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Acquire basic skills for designing static Web Applications using HTML, CSS , Java script and Bootstrap	On completion of the course, students will be able to 1. Design a static web page using HTML 2. Design a web page with styling using CSS. 3. Use JavaScript for creating web pages with client side validation. 4. Develop Web Application using Bootstrap Library.

UNIT – I:

Introduction to Internet: World Wide Web, Web Browsers, Web Servers, URL, HTTP, TCP Port.

HTML: Standard HTML document structure, Basic Tags and attributes, Images, Hypertext
Links, Lists, Tables, Frames, HTML Forms.

UNIT – II:

CSS: Benefits of CSS, CSS properties and syntax, CSS selectors, In-line style sheets, Internal Style sheets and External Style sheets.

XML: The Syntax of XML, XML Document Structure, XML Schema and DTD.

UNIT – III:

JavaScript: Introduction, Basics of JavaScript-variables, data types and operators, Control Structures, Arrays, Functions, Events and Event handling.

UNIT – IV:

Bootstrap: The Grid system, Layout components: Tables, Images, alerts, buttons, badges, progress bars, cards, drop downs, pagination, Collapse, Navbar, forms, inputs, carousel.

Learning Resources :

1. Web Technologies", 7th Edition, Uttam K.Roy,2012.
2. "Internet & World Wide Web How to Program", 5/e, Paul J. Deitel, Harvey M. Deitel, Abbey Deitel,2012.
3. https://getbootstrap.com

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

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

Duration of Internal Tests : 90 Minutes

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

DEPARTMENT OF INFORMATION TECHNOLOGY

Introduction to Linux

(Open Elective – I) SYLLABUS FOR –III SEMESTER
(Common for CIVIL, ECE, EEE & MECH)

L:T:P(Hrs./week): 2:0:0	SEE Marks :60	Course Code : **U21OE320IT**
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Acquire basic skills for using Linux operating system.	On completion of the course, students will be able to 1. Install Linux operating system and use desktop environment. 2. Identify and use Linux utilities to create and manage simple file processing operations. 3. Organize directory structures with appropriate security. 4. Configure and use Linux shell.

UNIT – I:
Introduction to Linux, Installing Linux, Running Linux from USB Drive, Understanding X Windows System and Desktop, Navigating through Linux Desktop and Managing files. Understanding Linux file system, listing files and directory attributes, Making files and directories, Listing and changing permissions and ownership.

UNIT – II:
Understanding the Linux Shell, Understanding aliases, Using the shell from console or terminals, using command history and tab completion, Connecting and expanding commands, Creating aliases, Making shell settings permanent, Using man pages and other documentation.

UNIT – III:
Introduction to Shell Scripting: Reading input from the user, logical operators, Arithmetic operators, Environment variables, Read-only variables, command line arguments, working with arrays.

UNIT – IV:

Decision Making: Conditional constructs, Functions: Introduction to functions, passing arguments, sharing of data, declaration of local variables, returning information from functions, running functions in the background, creating a library of functions

Learning resources:

1. Introduction to Linux – A Hands On Guide, MachteltGarrels.
2. Ganesh SanjivNaik, Learning Linux Shell Scripting, Packt Publishing, 2015. Open Source Community
3. https://linuxjourney.com/
4. https://nptel.ac.in/courses/117106113/

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

Geometric Modelling

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

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U21OE310ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The objective of this course is to understand wire-frame modelling & transformations, surface, solid modelling and assembly modelling techniques.	*On completion of the course, students will be able to* 1 identify various Wire frame modelling entities and their representations. 2 interpret synthetic curve representations and various 2D transformations for geometric model by matrix approach. 3 development of various surfaces using surface modelling. 4 analyze various solid models using various solid modelling schemes and Study various Assembly constraints, Assembly tree and develop few assembled models.

UNIT-I: INTRODUCTION TO CAD

product life cycle, conventional design and computer aided design.
Wire Frame Modelling: wire frame entities and their definitions. Interpolation and approximation of curves. Concept of parametric and non–parametric representation of circle and helix curves, demonstration of 2D geometry through CAD software.

UNIT-II: SYNTHETIC CURVES

Parametric representation of cubic spline, Bezier and B– spline curves, continuity, properties and characteristics of splines. Concepts of NURBS, synthetic curves demonstration.
2D transformation and their mathematics: Translation, scaling, rotation, Homogeneous co-ordinates, Concatenated transformations.

UNIT-III: SURFACE MODELING

Analytical surfaces: Definitions of planar, surface of revolution, Tabulated cylinder. Synthetic surfaces: Cubic and Bezier surfaces, visualization of different surfaces.

UNIT-IV: SOLID MODELLING

C– rep and B– rep and feature instancing, Octree encoding, spatial enumeration, cell decomposition, sweeping approaches. Euler's representation of solid models, creation of solid model in CAD software.

ASSEMBLY MODELING: Assembly constraints, assembly tree, top down assembly, bottom up assembly, development of a history tree for a simple assembly, demonstration of simple assembly.

Learning Resources:

1. Ibrahim Zeid, “CAD/CAM- Theory and Practice”, McGraw-Hill Inc. New York, 2011.
2. Steven Harrington, “Computer graphics: a programming approach”, McGraw-Hill, 1987.
3. David Rogers, J. Alan Adams, “Mathematical elements for computer graphics”, McGraw Hill, 1990.
4. McConnell, J. J. “Computer graphics theory into practice”, Jones and Bartlett Publishers, 2006.

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

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

Duration of Internal Test: 1 Hour 30 Minutes

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

Department of Mechanical Engineering

INTRODUCTION TO UNMANNED AERIAL VEHICLES
(Open Elective-I) SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U21OE320ME**
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

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

Unit-I: Introduction to UAV

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

Unit-II: Basics of Flight

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

Unit-III: UAV Elements, Navigation and Guidance

Components: Arms, motors, propellers, electronic speed controller (ESC), flight controller; Propulsion; Data Link; Sensors and Payloads: GPS, IMU, Light Detection and Ranging (LiDAR), Imaging cameras, Classification of payload based on applications; Hyper-spectral sensors; Laser Detection and Range (LADAR); Synthetic Aperture Radar (SAR); Thermal cameras;

ultra-sonic detectors; Case study on payloads. Introduction to navigation systems and types of guidance; Mission Planning and Control.

Unit-IV: Design & Simulation of UAV

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

Learning Resources:

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

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

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

Duration of Internal Test: 1 Hour 30 Minutes

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

Basic Heat Transfer for Electronic Systems

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

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U21OE330ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The objective of this course is to study the basic laws of thermodynamics and the cooling of electronic equipment along with basic modes of heat transfer	*On completion of the course, students will be able to* 1 understand and apply the first and Second laws of thermodynamics to various engineering problems. 2 formulate heat conduction problems in rectangular, cylindrical and spherical coordinate system by transforming the physical system into a mathematical model. 3 to determine heat transfer coefficient in forced and free convection heat transfer. 4 analyse heat transfer processes involved in cooling of electronic components

UNIT-I: BASIC THERMODYNAMICS

Basic Concepts-System, Types of Systems, Control Volume, Surrounding, Boundaries, Universe, Macroscopic and Microscopic viewpoints, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi–static process; Zeroth Law of Thermodynamics, First and Second laws of Thermodynamics. Numerical problems.

UNIT-II: heat transfer: Conduction

Heat Transfer – Different Modes, governing laws and application to heat transfer: Fourier, Newton, Stefan–Boltzmann laws; general heat conduction equation - Steady state one-dimensional heat conduction through slabs, hollow cylinders and spheres. Concept of thermal resistance in series and parallel (composite systems), contact resistance, overall heat transfer coefficient. Critical radius of insulation. Heat transfer with and without internal heat generation. Numerical problems.

UNIT-III: Heat transfer: Convection

Extended surfaces: Fins - Applications of fins, Fin Equation, Fin Effectiveness and Efficiency. Convection Heat Transfer: Heat transfer coefficient - Forced and Natural Convection in Electronic Devices,non

dimensional numbers - Nusselt number, Reynolds number, Grashoff number and Prandlt number, forced and free convection correlations - flat plates and cylinders. Numerical problems.

UNIT-IV: COOLING OF ELECTRONIC EQUIPMENT

Needs & Goals; Temperature effects on different failure modes; Electronic equipment for airplanes, missiles, satellites and spacecraft; electronic equipment for ships & submarines; electronic equipment for communication systems and ground support system; chassis and circuit boards cooling.

Learning Resources:

1. P.K. Nag, “Engineering Thermodynamics”, Tata Mc Graw Hill, 4th Edition, 2008.
2. YunusCengel& Boles, “Thermodynamics – An Engineering Approach”, TMH New Delhi, 2008.
3. Sachadeva R.C., “Fundamentals of Engineering Heat and Mass Transfer”, New Age International (P) Ltd Publishers, New Delhi, 2010.
4. Dave S. Steinberg, "Cooling Techniques for Electronic Equipment", Second Edition, John Wiley & Sons, 1991.
5. YunusCengel&Afshin J Ghajar, “Heat and Mass Transfer: Fundamentals & its Applications”, Mc Graw Hill, 5th Edition, 2013.

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

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

Duration of Internal Test: 1 Hour 30 Minutes

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

DEPARTMENT OF CHEMISTRY

Battery Science and Technology

SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code: **U21OE310CH**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	**At the end of the course students should be able to:**
1. Introduce the various terms to understand the efficiency of batteries.	1. Discuss the construction, electrochemistry, technology and applications of selected primary batteries
2. Know the relevant materials required for the construction of primary and secondary batteries.	2. Discuss the construction, electrochemistry, technology and applications of few secondary batteries
3. Familiarize with the reactions involved during charging and discharging processes.	3. Explain the working principle, electrochemistry, technology and applications of prominent fuel cells
4. Emphasise the need of fuel cells and the concept of their construction and functioning.	4. Evaluate different batteries or fuel cells in order to select a suitable battery or fuel cell for a given application

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

UNIT-I: BATTERIES – FUNDAMENTALS

Introduction and types of batteries: Primary and secondary.

Battery characteristics: Free energy change, electromotive force of battery, ampere - hour, capacity, power, power density, energy density, efficiency, cycle life, tolerance to service conditions, performance characteristics.

UNIT-II: PRIMARY BATTERIES

Construction, chemistry and technology of Zinc - Air Battery, Zinc - HgO battery and their applications.

Primary lithium batteries: Soluble cathode cells, solid cathode cells - Lithium manganese dioxide, solid electrolyte cells- Lithium polymer

electrolyte battery - Applications. Reserve battery - Electrochemistry of perchloric acid cell - applications.

UNIT-III: SECONDARY BATTERIES

Construction, chemistry and technology of maintenance free lead acid battery (MFLA), valve regulated lead acid battery (VRLA), absorbed glass mat lead acid battery (AGMLA) - comparision between lead acid battery and VRLA along with advantages - Construction, electro chemistry and applications of Nickel - Cadmium battery, Nickel metalhydride battery.
Lithium ion batteries: Construction, chemistry and applications of liquid organic electrolyte cells, polymer electrolyte cells, lithium ion cells.

UNIT- IV: FUEL CELLS

Introduction, classification based on temperature and nature of electrolyte. Working principle, components, applications and environmental aspects of alkaline fuel cell (AFC) - Hydrogen - Oxygen alkaline fuel cell, Molten carbonate fuel cell (MCFC), Polymer electrolyte membrane fuel cell (PEMFC), Solid oxide fuel cell (SOFC).

Books:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai and Pub, Co., New Delhi (2002)
2. S. S. Dara "A text book of engineering chemistry" S. Chand and Co. Ltd. New Delhi (2006).
3. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.
4. Chemistry of Engineering Materials by R. P. Mani and K. N. Mishra, CENGAGE learning.
5. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 2008.

Suggested Reading:

1. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.
2. Derek Pletcher and Frank C. Walsh, "Industrial Electrochemistry", Chapman and Hall, New York, 1993.

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

3. Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF CHEMISTRY

Corrosion and its Prevention

SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code: **U21OE320CH**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES:
The course will enable the students to: 1. Acquaint with the causes and factors influencing the rate of corrosion 2. Understand the different types of corrosion like dry, wet and galvanic corrosion and their relative impact 3. Familiarize with various preventive methods of corrosion such as cathodic protection, use of inhibitors, coatings, etc. 4. Familiarize with industrial coating methods like electroplating, electrolessplating.	**At the end of the course students should be able to:** 1. Explain different types of corrosion and factors that affect corrosion and passivation of metals. 2. Select a suitable metallic coating, organic coating and inhibitors for corrosion control of the equipment in a given application. 3. Discuss the principles and applications of cathodic protection and surface conversion coatings for corrosion control. 4. Apply the knowledge of various methods of corrosion control to suggest a solution for corrosion control of a given equipment in a given industrial application.

CO-PO MAPPING FOR CORROSION AND ITS PREVENTION

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

UNIT-I: CHEMICAL AND ELECTROCHEMICAL CORROSION

Introduction - gravity, cause, chemical and electrochemical corrosion, Pilling – Bed worth rule, effect of nature of oxide layer on rate of chemical corrosion. Galvanic corrosion, electrochemical series and galvanic series. Formation of anodic and cathodic areas, Differential aeration corrosion -pitting, waterline corrosion, crevice corrosion, stress corrosion andcorrosion fatigue. Passivation of metals, polarization curve of passivating metals, effect of pH and potential for iron (pourbaix diagram) and the polarization curve of iron.

Factors influencing corrosion

a. Nature of metal: Relative position of metal in galvanic series, over voltage, relative areas of anode and cathode and nature of corrosion product.
b. Nature of environment: Temperature, pH, humidity and dissolved oxygen.

UNIT-II: CORROSION CONTROL BY METALLIC COATINGS

Metallic coatings: Types - anodic and cathodic. Pre treatment of surface of base metal. Methods of application of metallic coatings: Hot dipping- galvanization - applications of galvanized RCC steel bars. Cladding, electro plating and electroless plating- Principle and their differences. Electroplating of Cu and Cr on Fe, electroless plating of Ni and Cu on insulators, Preparation of printed circuit board (PCB) by electrolessplating.

UNIT-III: CORROSION CONTROL BY ORGANIC COATINGS AND INHIBITORS

Organic Coatings: Paints – constituents and their functions. Vitreous enamel coatings. Varnishes. Super hydrophobic and self healing coatings. Epoxy coatings on RCC steel bars- impervious coatings.
Corrosion inhibitors: Anodic, cathodic and vapour phase inhibitors.

UNIT-IV: CORROSION CONTROL BY CATHODIC PROTECTION AND SURFACE MODIFICATION

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 and Co. Ltd., New Delhi (2006).
3. Shasi Chawla, “Text Book of Engineering Chemistry”, Dhanpat Rai Publishing Company, New Delhi (2008).
4. Wiley Engineering chemistry, Wiley India pvt Ltd, II edition.
5. Chemistry in engineering and technology by J. C. Kuriacose and Rajaram.

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.

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

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

Duration of Internal Tests: 90 Minutes

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Learning to Learn

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

Instruction: 2 Hours	SEE: 60	Course code: U21OE310EH
Credits: 2	CIE: 40	Duration of SEE: 3 Hours

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

OVERVIEW:

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

UNIT 1: STUDY SKILLS

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

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

UNIT 2: Chunking

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

We'll also explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving.

2.1 Knowledge Chunking
2.2 Skill and Will
2.3 Sleep and Learning

UNIT 3: Procrastination and Memory

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

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

UNIT 4: Renaissance Learning and Unlocking Your Potential

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

4.1 Psychology of Goal Setting
4.2 Criteria for Goal Setting
4.3 Steps in Goal Setting
4.4 Visioning
4.5 Strategy & Action Plan
4.6 Goal Progress Review

LEARNING RESOURCES

learn.talentsprint.com

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

1	No. of Internal tests	:	2	Max. Marks	:	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)
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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

Linear Algebra

Open Elective-I for Civil, EEE, ECE, Mech of B.E. III SEMESTER

L: T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:**U21OE310MA**
Credits:2	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: 1. **Study** the concept of Vector Spaces and understand the meaning of Basis and Dimension of a vector Space and Co-ordinates. 2. **Understand** the meaning of Linear transformation, properties. 3. **Understand** Range and Kernel, Rank-Nullity and Matrix of Linear Transformation. 4. **Understand** Inner Product Spaces, Orthonormal sets, Gram-Schmidt's Orothogonalization process.	At the end of the course students will be able to: **1. Solve the** problems on Vector Spaces and determine the Basis and Dimension of a Vector Space and find the Co-ordinates. 2. **Determine** Linear Transformation, Range and Kernel and Matrix of Linear Transformation. **3. Determine** Range and Kernel, Rank-Nullity and Matrix of Linear Transformation. 4. **Determine** distance, orthogonal, orthonormal sets and construct orthonormal basis based on Gram-Schmidt's Orothogonalization process.

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

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

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

theorem (without Proof)- Matrix of Linear Transformation.

UNIT – IV (8 classes)

Inner Product Spaces-The Dot Product on R and Inner Product Spaces, Orthonormal Bases, Orthogonal Complements- Gram-Schmidt's Orthonormolization process.

Learning Resources:

1. Introduction to Linear Algebra with Application, Author : Jim Defranza, Daniel Gagliardi, Publisher : Tata McGraw-Hill

2. An Introduction to Linear Algebra, V.Krishna Murthy, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd

Reference Books:

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

Online Resources:

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

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

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

Smart Materials and Applications

SYLLABUS FOR B.E. III - SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code: **U21OE310PH**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

UNIT I: PIEZO AND FERRO MATERIALS (8 hours)

Piezo electric effect and inverse piezoelectric effect, Piezo electric materials, Structure of Quartz crystal, Piezoelectric oscillator, Magnetostriction, Magnetostriction oscillator, piezo-electric sensors, applications of Piezo-electric materials.

Characteristics and properties of ferro-electric materials, Curie-Weiss law, applications of Ferro electric materials

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

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

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

UNIT III: SHAPE MEMORY MATERIALS (8 hours)

Introduction to shape memory alloys (SMA)- Shape Memory Effect (SME), Austenite, Martensite phases, Properties and characteristics SMAs**,** Super

elasticity, one-way and two way shape memory effects, Properties of Ni-Ti shape memory alloy, Cu-based shape memory alloys, and their applications, Applications of SMAs.

UNIT-IV: (6 hours)

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031.
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-21) :: B.E. - ECE : FOURTH SEMESTER (2022-23)

B.E (ECE) IV – SEMESTER								
Course Code	Name of the Course	Scheme of Instruction Hours per Week			Scheme of Examination Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U21PC410EC	Electronic Circuits	3	-	-	3	60	40	3
U21PC420EC	Electromagnetic Field Theory	3	-	-	3	60	40	3
U21PC430EC	Probability Theory and Stochastic Process	3	1	-	3	60	40	4
U21BS440EC	Data Structures	3	-	-	3	60	40	3
U21OE4XXXX	Open Elective – II	3	-	-	3	60	40	3
U21BS440MA	Skill Development Course – III : Aptitude-II	1	-	-	2	40	30	1
U21PE410EC	Skill Development Course – IV : Technical Skills-I	1	-	-	2	40	30	1
PRACTICALS								
U21PC411EC	Electronic Circuits Lab	-	-	2	3	50	30	1
U21PC421EC	Data Structures Lab	-	-	2	3	50	30	1
U21PW419EC	Mini Project - I	-	-	2	3	50	30	1
	TOTAL	**17**	**1**	**6**		**530**	**350**	**21**
	GRAND TOTAL	**24**				**880**		
Left over hours will be allocated for : Sports / Library / Mentor – Mentee Interaction / CC / RC / TC / ECA / CCA								
Note: B.E. (Regular) Students shall complete one NPTEL Certificate Course equivalent to 2 Credits weightage during their I to VI Semesters. B.E. (Lateral Entry) Students shall complete one NPTEL Certificate Course equivalent to 2 Credits weightage during their III to VI Semesters.								

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-21) :: B.E. - ECE : FOURTH SEMESTER (2022 - 23)

Bridge Course for ECE Lateral Entry Students

Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
UB21HS410EH	English Language Communication	2	-	-	3	50	-	-
PRACTICALS								
UB21HS411EH	English Language Communication Skills Lab	-	-	2	3	50	-	-

COURSES OFFERED TO EEE

Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U21ES410EC	Electronics Engineering - II	3	-	-	3	60	40	3
PRACTICALS								
U21ES411EC	Electronics Engineering - II Lab	-	-	2	3	50	30	1

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Circuits

SYLLABUS FOR B.E. IV - SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U21PC410EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To familiarize the students with design and working of various wave-shaping circuits and analyze concepts of positive and negative feedback in amplifiers.	On completion of the course, students will be able to 1. Design the Q-point of given transistor in linear region. 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	2	
CO2	2	3	2										3	2	
CO3	2	2	3										3	2	
CO4	3	3	1										2	2	
CO5	3	3	1										2	1	

UNIT - I : Transistor Biasing

Transistor Biasing: Operating point, Biasing Techniques, Thermal runaway problem, Small signal low frequency h-parameter model for BJT, h-parameter model of CE amplifier, FET biasing, low frequency small signal model of FET, transistor as an amplifier.

UNIT - II : BJT and MOSFET applications

Small signal amplifiers: Classification of amplifiers, BJT and MOSFET high frequency equivalent circuits, Mid-band analysis in single and multistage amplifiers. Low frequency and high frequency analysis of single and multistage RC coupled and transformer coupled amplifiers. Darlington amplifier and Differential amplifier.

UNIT - III : Feedback amplifiers

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

UNIT - IV : Oscillators

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

UNIT - V : Large signal amplifiers

BJT as large signal audio amplifier, Classes of operation, Harmonic distortion, power dissipation, efficiency calculations. Design considerations of transformer coupled and transformer less push-pull 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. Robert L. Boylestad, "Electronic Devices and Circuit Theory", 11th Edition, Pearson New International Edition, 2014.
4. J. Millman and A. Grabel, “Microelectronics”, 2nd edition, Tata McGraw-Hill Education Pvt. Ltd, 2001.
5. A.S. Sedra and K.C. Smith, “Microelectronic Circuits”, 7th edition, Oxford University Press, 2014.
6. https://nptel.ac.in/courses/108102097/ (Introduction to Electronic circuits, Prof. S.C. Dutta Roy, Dept of Electrical Engineering, IIT Delhi).
7. https://nptel.ac.in/courses/108102095/ (Analog Electronic Circuits**,** Prof. S. C. Dutta Roy, Dept of Electrical Engineering, IIT Delhi).

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

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

Duration of Internal Tests: 90 Minutes

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

Electromagnetic Field Theory

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U21PC420EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

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 of charge, sheet charge and volume charge distributions.

UNIT - II :

Electric flux, flux density, Gauss's Law and application, Energy and potential, Potential field of system of charges, 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 equation.

UNIT - III :

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

UNIT - IV :

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

UNIT - V :

Wave Propagation in Dielectrics, Poynting's theorem and Wave Power, Propagation in good conductors, Skin Effect. Reflection of Uniform Plane waves at normal incidence and oblique incidence.

Transmission lines: Primary and secondary constants, terminated lines: open circuit, short circuit, matched load.

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Probability Theory and Stochastic Process

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 3:1:0	SEE Marks : 60	Course Code: **U21PC430EC**
Credits : 4	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

UNIT - I : Probability

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

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

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

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

UNIT - III : Multiple Random Variables and operations

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

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

UNIT - IV : Random Processes – Temporal Characteristics

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

UNIT - V : Random Processes – Spectral Characteristics

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

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Data Structures

SYLLABUS FOR B.E. IV - SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U21BS440EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

UNIT-I:

Basic concepts: Algorithm Specification- Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations.

Arrays: Arrays - ADT, Polynomials, Sparse matrices, Strings-ADT, Pattern Matching.

UNIT-II:

Stacks and Queues: Stacks, Stacks using dynamic arrays, Queues, Circular Queues using dynamic arrays, A Mazing Problem, Evaluation of Expressions – Evaluating Postfix Expression, Infix to Postfix.

Linked Lists: Singly Linked Lists and Chains, Linked Stacks and Queues, Polynomials, Operations for Circularly linked lists, Equivalence Classes, Sparse matrices, Doubly Linked Lists.

UNIT-III:

Trees: Introduction, Binary Trees, Binary Tree Traversals, Heaps, Binary Search trees (BST): Definition, Searching a BST, Insertion into a BST, Deletion from a BST.

UNIT-IV:

Graphs: The Graph ADT, Elementary graph operations, Minimum Cost Spanning Trees - Kruskal's Algorithm, Prim's Algorithm.

Sorting: Insertion Sort, Quick sort, Merge sort, Heap sort, Sorting on Several Keys, List and Table Sorts.

UNIT-V:

Hashing: Introduction**,** Static Hashing: Hash tables, Hash functions, Overflow handling.

Efficient Binary Search Trees: AVL Trees, Red-Black Trees, Splay Trees.

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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

Skill Development Course-III: Aptitude-II

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: **U21BS440MA**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

UNIT 1: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -1

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

UNIT 2: REASONING ABILITY- LOGICAL REASONING

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

UNIT 3: REASONING ABILITY- NON VERBAL REASONING

3.1 Figure Series
3.2 Directions
3.3 Clocks
3.4 Calendars

UNIT 4: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -2

4.1 Mensuration Part -1
4.2 Mensuration Part -2
4.3 Logarithms

UNIT 5: QUANTITATIVE APTITUDE- ENGINEERING MATHEMATICS

5.1 Permutations and combinations
5.2 Probability

Prescribed textbook for theory:

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

Suggested Reading

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

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

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

Duration of Internal Tests: 90 Minutes

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

Electronic Circuits Lab

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U21PC411EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

CYCLE - I Experiments

1. BJT transistor biasing techniques.
2. FET transistor biasing techniques.
3. Frequency response of single stage and multi-stage RC-Coupled amplifiers using BJT.
4. Frequency response of single stage and multi-stage RC-Coupled amplifier using MOSFET.
5. Frequency response of Voltage series feedback amplifier.
6. Frequency response of Current Shunt feedback amplifier.

CYCLE - II Experiments

7. Design of Oscillators: RC Phase shift, Hartley and Colpitts.
8. Design of tuned Amplifier.
9. Design of Power amplifiers: Class – A and Class – B.
10. Analysis & Design of circuits using PSPICE (Minimum of five experiments).

New / Additional experiments planned

1. Implementation of Darlington Amplifier using Multisim
2. Implementation of Differential Amplifier using Multisim

Mini Project(s)

Design of simple real-time application electronic circuits.

Learning Resources / Tools :

1. Robert Diffenderfer, "Electronic Devices Systems and Applications", Cengage Learning India Private Limited, 2010.
2. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, "Basic Electronics, A Text - Lab Manual", 7thEdition, TMH 2001.

The break-up of CIE:

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

Duration of Internal Tests: 3 Hours

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Data Structures Lab

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U21PC421EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

CO-PO/PSO Mapping

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

Programming Exercise:

1. Implementation of Formula based representation.
2. Implementation of Singly Linked List, Doubly Linked List and Circular Linked List.
3. Implementation of Polynomial Arithmetic using Linked List.
4. Implementation of String Matching algorithms.
5. Implementation of Stacks, Queues.(Using both Arrays and Linked Lists).
6. Implementation of Infix to Postfix Conversion, Postfix Expression Evaluation.
7. Implementation of Recursive and Iterative Traversals on Binary Tree.

8. Implementation of Binary Search Tree.
9. Implementation of Operations on Binary Tree (Delete Entire Tree, Copy Entire Tree, Mirror Image, Level Order, Search for a Node etc.)
10. Implementation of Traversal on Graphs.
11. Implementation of Selection, Merge, Quick, Heap, and Insertion Sort.
12. Implementation of Binary Search and Hashing.

Learning Resources:

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

The break-up of CIE :

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

Duration of Internal Tests: 3 Hours

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

Mini Project - I

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U21PW419EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3

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

CO-PO/PSO Mapping

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

Note: CO1 & CO2 must be mapped with one of the relevant PSOs based on the domain of the project with 3.
CO4 can be mapped to appropriate PSO with level 2.

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: To be evaluated by the Internal Examiner as per the following:

Assesment-1 : [5 Marks]

Review of problem selection & abstract to be conducted in week-2.

Assesment-2: [10 Marks]

Review of project design & initial phase of implementation and to be conducted in week-7.

Assesment-3: [15 Marks]

Review of final implementation, presentation and report to be conducted in week-15.

Semester End Examination(SEE) – 50 marks: To be evaluated by the External Examiner

Evaluation guidelines for Semester End Examination (SEE):

Power Point Presentation		[5 Marks]
Demonstration of the application		[25 Marks]
Innovation	: 05 Marks	
Implementation	: 15 Marks	
Understanding	: 05 Marks	
Project Report		[10 Marks]
Viva Voce		[10 Marks]

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

English Language Communication

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

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code: **UB21HS410EH**
Credits : -	CIE Marks : -	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Course will enable the Learners to: 1. Converse effectively in various context. 2. Listen for general and specific comprehension and write paragraphs. 3. Understand the elements of a good paragraph 4. Speak appropriately in daily conversations	At the end of the course the students will be able to : 1. Use language in appropriate contexts 2. Listen for global comprehension and infer meaning from spoken discourses. 3. Write paragraphs coherently. 4. Use phrases, essential vocabulary and polite expressions in every day conversations.

UNIT-1 1.0: Communication & Functional English

1.1 Role and Importance of Communication, Process of Communication, Non-verbal communication, barriers to Communication, overcoming barriers.

Conversational phrases: greetings, introductions, apology, compliments, agreeing and disagreeing, polite forms in everyday conversations.

UNIT-2 2.0: Listening

2.1 Importance of listening, Active listening

UNIT-3. 3.0: Writing

3.1 Paragraph writing, coherence and cohesion.

UNIT-4 4.0: Grammar and Vocabulary

4.1 Common Errors, one word substitutes, collocations.

UNIT-5 5.0: Reading

5.1 Prose text- Our Own Civilization-CEM Joad.

Prescribed textbook for theory:

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

Suggested Reading:

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

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

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

English Language Communication Skills Lab

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **UB21HS411EH**
Credits : -	CIE Marks : -	Duration of SEE : 3 Hours

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

ELCS – Component - INTERACTIVE COMMUNICATION SKILLS LAB

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

Debate: Understanding the differences between a debate and a group discussion, essentials of debate, concluding a debate.

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

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

Prescribed textbook for laboratory:

Speak Well: Jayshree Mohanraj, Kandula Nirupa Rani and Indira Ballellapati – Oriented Black Swan.

Longman Dictionary of Contemporary English – 6th Edition, 2020. (The students will be given the PDF format).

Learning Resources:

1. Balasubramanian: A textbook of English phonetics for Indian students, Macmillan, 2008.
2. Priyadarshini Patnaik: Group discussion and interviews, Cambridge University Press India private limited 2011.
3. Daniel Jones: Cambridge English Pronouncing Dictionary – A Definitive guide to contemporary English Pronunciation.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Engineering - II

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U21ES410EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To familiarize the student with the analysis & design of feedback amplifiers, oscillators, multistage amplifiers and power amplifiers. 2. To understand the operation and design of linear and non-linear wave shaping circuits. 3. To study and analyze the frequency response of amplifier circuits.	On completion of the course, students will be able to 1. Analyze and design various feedback and multistage amplifiers. 2. Design a sinusoidal oscillators. 3. Analyze drift compensation techniques and differential amplifiers. 4. Design and analyze linear wave shaping circuits. 5. Design and analyze various non-linear wave shaping Circuits.

CO-PO/PSO Mapping

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

UNIT - I : Wave-Shaping Circuits

RC low pass and high pass circuit, response to step, pulse, Ramp and square wave inputs, Clipping circuits for single level and two levels, clamping circuits.

UNIT - II : Multi stage amplifiers

Cascading amplifier stages, classification of amplifiers, frequency responses of RC coupled amplifiers, Transformer coupled amplifiers, effect of cascading on band width.

D.C. Amplifiers: Problems of D.C amplifiers, Drift Compensation techniques, Differential amplifiers, importance of CMRR.

UNIT - III : Feedback amplifiers

Concept of Feedback, General characteristics of negative feedback

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

UNIT - IV : Oscillators

Barkhausen criterion, RC oscillators, Wien bridge, phase shift, LC Hartley and Colpitts oscillator, Crystal oscillators (BJT only), frequency stability of oscillator.

UNIT - V : Power amplifiers

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

Learning Resources:

1. Jacob Millman and Christos C. Halkias, Satyabratajit "Electronics Devices and Circuits", McGraw hill, 3rd edition, 2010.
2. Jacob Millman and Christos C. Halkias, Chetan D Parikh, "Integrated Electronics" Mc Graw Hill, 2009.
3. Robert L.Boylestad and Louis Nashelsky,"Electronic Devices and Circuit Theory", PHI, 11th edition 2015.
4. A. S. Sedra and K. C. Smith, "Microelectronic Circuits", Seventh Edition New York, Oxford University Press, 2014.
5. Jacob millman and Taub: "Pulse, Digital and switching wave forms", Mc Graw 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 Tests: 90 Minutes

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronics Engineering – II Lab

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U21ES411EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To develop an understanding of the underlying concepts of analog electronic circuits including feedback amplifiers, power amplifiers & oscillators, and design linear wave shaping and non-linear wave shaping circuits.	On completion of the course, students will be able to 1. Build a multi stage amplifier and find the frequency response of amplifier. 2. Analyze the small signal amplifiers behavior with and without feedback. 3. Design and verify the functioning of various sinusoidal oscillators. 4. Design & Analyze RC Low pass and High pass Circuits for different time constants for various non-sinusoidal inputs. 5. Design different types of clippers and clampers 6. Examine the characteristics of a difference amplifier.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3					1						1
CO2	3	3	3	3					1						1
CO3	3	2	3	3					2						1
CO4	3	2	3	3					1						1
CO5	3	2	3	1					1						1
CO6	3	2	2	1					1						1

CYCLE - I Experiments

1. Frequency response of Two stage amplifier
2. Frequency response of Voltage series feedback amplifier
3. Frequency response of Voltage Shunt feedback amplifier
4. Frequency response of Current series feedback amplifier
5. Frequency response of Current Shunt feedback amplifier

6. Design of Hartley Oscillator
7. Design of Colpitt's Oscillator

CYCLE - II Experiments

8. Design of RC Phase Shift oscillator.
9. Transformer coupled Class A power amplifier
10. Class B Power amplifier
11. Linear wave shaping-Integrator & Differentiator
12. Clipping circuits
13. Clamping Circuits

New Experiments

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

Mini Project(s)

Designing of various applications using devices.

Learning Resources:

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

The break-up of CIE :

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

Duration of Internal Tests: 3 Hours

IV – Semester Open Electives

S.No.	Dept.	Course Code	Name of the Course	Credits
1	Civil	U21OE410CE	Disaster Management	3
2	CSE	U21OE410CS	Introduction to Software Engineering	3
3	CSE	U21OE420CS	Fundamentals of object oriented programming	3
4	ECE	U21OE410EC	Mathematical Programming for Engineers	3
5		U21OE420EC	Introduction to Communication Systems	3
6	EEE	U21OE410EE	Mathematical Programming for Numerical Computation	3
7	IT	U21OE410IT	Introduction to Object Oriented Programming	3
8		U21OE420IT	Introduction to Scripting Languages	3
9	Mechanical	U21OE410ME	Optimization Methods	3
10	H&SS	U21HS430EH	Critical Thinking	3

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DEPARTMENTOF CIVILENGINEERING

Disaster Management

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

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U21OE410CE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

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

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

Human induced hazards: Chemical industrial hazards, major power breakdowns, traffic accidents, etc. UNEP initiative- Ecosystem based disaster risk reduction (Eco-DRR) and Partnership of Environment and Disaster Risk Reduction (PEDDR)

UNIT-V

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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Department of Computer Science & Engineering

INTRODUCTION TO SOFTWARE ENGINEERING
(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 : **U210E410CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES		**COURSE OUTCOMES** *On completion of the course, students will be able to*	
1	understand the concepts involved in the lifecycle of software development	1	Explain the software development lifecycle models for software system development.
2	learn the best practices to be employed for the design, and testing of a software project.	2	Learn the requirement process steps in software process model.
		3	Analyze the structural design models in object oriented system.
		4	Analyze the behavioral design models used in object oriented system.
		5	Identify verification and validation methods in a software engineering project at various phases of SDLC .

UNIT-I:
Introduction to Software Engineering:
A generic view of Process: Software Engineering, Process Framework, CMMI, Process Patterns, Process Assessment.
Process Models: Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process.
An Agile view of Process: What is an Agile Process, Agile Process Models- SCRUM, XP.

UNIT-II: Requirements Engineering: A bridge to Design and Construction, Requirements Engineering Tasks, Initiating Requirements Engineering Process, Eliciting Requirements, Negotiating Requirements, Validating Requirements.

UNIT-III:

Object oriented Modeling & design using UML: Introduction to UML.

Structural Modeling: Classes and Advanced Classes, Relationships ,Common Mechanisms, Class Diagrams, Interfaces, Types and Roles.

UNIT-IV:

Behavioural Modelling: Interactions, Interaction diagrams, Use Cases, Use Case Diagrams, Activity diagrams, State Machines, State chart Diagrams.

Architectural Modelling: Artifacts, Artifact diagrams, Deployment diagrams.

UNIT-V:

Testing Strategies: A Strategic approach to software testing ,Strategic issues, Test strategies for Conventional software, O-O Software, Validation testing, System testing, the art of debugging.

Testing Tactics: Software testing fundamentals, Black box and White box testing, Basis path testing, Control Structure, O-O testing methods, Testing for specialized environments, architectures and Applications testing patterns.

Learning Resources:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, 6th Edition (2005), Tata McGrawHill.
2. Grady Booch, James Rumbagu, Ivor Jacobson, The Unified Modeling Language-User guide, (Covering UML 2.0) ,2nd Edition Pearson Education, India 2007.
3. Pankaj Jalote, An Integrated Approach to Software Engineering, 3rd Edition (2005), Narosa Publishing House.
4. http://nptel.ac.in/courses/106101061/
5. http://istqbexamcertification.com/what-is-a-software-testing/
6. http://agile.csc.ncsu.edu/SEMaterials/UMLOverview.pdf

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)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING
(OPEN ELECTIVE-II)
SYLLABUS FOR B.E. V-SEMESTER
(COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **U21OE420CS**
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.	1 Adopt the fundamentals of Object oriented system development for developing a application.
2 Design GUI using existing Java classes and interfaces.	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.
	5 Design GUI for a java application using AWT classes.

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

UNIT-V: Applet: Applet Class, Applet architecture
Event Handling: The Delegation Event Model, Event Classes, Source of Events, Events Listener Interfaces
GUI Development: AWT: Classes, Working with Graphics, Frames, Menu, Layout Managers**.**

Learning Resources:

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

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

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

Mathematical Programming for Engineers (Open Elective)

SYLLABUS FOR B.E. IV – SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U21OE410EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide fundamental knowledge of programming language for solving problems.	On completion of the course, students will be able to 1. Generate arrays and matrices for numerical problems solving. 2. Represent data and solution in graphical display. 3. Write scripts and functions to easily execute series of tasks in problem solving. 4. Use arrays, matrices and functions in Engineering applications 5. Design GUI for basic mathematical applications.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	3	-	-	-	-	-	-	-	-	2	3
CO2	-	2	-	-	3	-	-	-	-	-	-	-	-	2	3
CO3	1	1	2	2	3	-	-	-	-	-	-	-	-	2	3
CO4	1	2	-	-	3	-	-	-	-	-	-	-	-	2	3
CO5	-	1	1	1	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, 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 4^{th} order Runge-kutta Method, ODE Solvers in MATLAB, Solving First –order equations using ODE23 and ODE45.

Structures and Graphical user interface using app Designer: 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 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	:	3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Communication Systems (Open Elective)

SYLLABUS FOR B.E. IV – SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U21OE420EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Distinguish between Amplitude and Frequency modulation methods and their application in Communication Receivers 2. Explain why multiplexing methods are necessary in communications and compare FDM with TDM 3. Compare and contrast FSK and BPSK modulation schemes employed in digital data transmission 4. Draw the block diagrams of different types of communication systems and explain their operation	On completion of the course, students will be able to 1. Identify the Radio frequency spectrum and the bands of different types of radio systems 2. Analyze the power, efficiency and transmission bandwidth of Amplitude and Frequency Modulated signals. 3. Convert the Radio frequency to Intermediate frequency and explain the operation of Superheterodyne Receiver. 4. Compare and contrast Frequency Division Multiplexing and Time Division Multiplexing used in the Communication systems 5. Detect and correct errors present in bit stream data using parity check 6. Explain the basic principles of different types of communication systems.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1													
CO2	3														
CO3	3	1													
CO4	3														
CO5	2	1													
CO6	3														

UNIT - I :

Introduction to Electronic Communication: Communication systems, Types of Electronic Communication, Modulation and Multiplexing, The Electromagnetic Spectrum, Bandwidth, Communication Applications, Gain and Attenuation definitions

Amplitude Modulation Fundamentals: AM concepts, Modulation Index and Percentage of Modulation, Sidebands and the Frequency Domain, AM Power

UNIT - II :

Fundamentals of Frequency Modulation: Basic principles of Frequency Modulation, Principles of Phase Modulation, Modulation Index and Sidebands, Noise – Suppression Effects of FM, Frequency Modulation verses Amplitude Modulation.

Communication Receivers: Basic Principles of Signal Reproduction, Superheterodyne Receivers, Frequency Conversion, Intermediate Frequency and Images, Noise.

UNIT - III :

Digital Communication Techniques: Digital Transmission of Data, Parallel and Serial Transmission, Data Conversion, Pulse Modulation.

Multiplexing and De-multiplexing: Multiplexing Principles, Frequency Division Multiplexing, Time Division Multiplexing, PCM Multiplexing.

UNIT - IV :

Transmission of Binary Data in Communication Systems: Digital Codes, Principles of Digital Transmission, Transmission Efficiency, Modem Concepts and Methods – FSK, BPSK, Error Detection and Correction

UNIT - V :

Different Types of Communication Systems: Microwave Concepts, Optical Principles, Optical Communication System, Satellite Communication Systems, Satellite Orbits, Cellular Telephone Systems, Bluetooth and Wi-Fi basics.

Learning Resources:

1. Louis E. Frenzel, Principles of Electronic Communication Systems, 3rd Edition. Tata Mcgraw Hill.
2. Wayne Tomasi, Electronic Communications Systems, 5th Edition, Pearson Education.
3. https://nptel.ac.in/syllabus/syllabus.php?subjectId=117102059
4. https://nptel.ac.in/courses/117101051/12

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 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:**U21OE410EE**
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 graphical display. 3. Write scripts and functions to easily execute series of tasks in problem solving. 4. Use arrays, matrices and functions in Engineering applications 5. Design GUI for basic mathematical applications.

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, 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 4^{th} 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 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 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)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY

Introduction to Object Oriented Programming

(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: **U21OE410IT**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

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

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

UNIT- IV

Introducing AWT working with Graphics: AWT Classes, Working with Graphics.

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

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

Duration of Internal Tests : 90 Minutes

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

Introduction to Scripting Languages

(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 :**U21OE420IT**
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
This course will enable the students to acquire basic skills for writing python scripts.	On completion of the course, students will be able to 1. Write a python script to solve a basic problem using structured programming constructs 2. Write a python script to solve a basic problem using object oriented programming constructs 3. Create and use python modules 4. Handle file related operations 5. Encode and decode strings

UNIT – I

Introduction to Python, running a python script, writing comments, using variables, operators, strings and text, format specifiers , printing information. passing command line arguments, prompting users, parameters, unpacking variables.

UNIT – II

Decision making : if and else if, repetition : while loops and for loops, lists, operations on list , tuples, operations on tuples, sets, operations on sets, dictionaries, operations on dictionaries.

UNIT – III

Defining functions, passing arguments to functions, returning values from functions, Exception handling.

UNIT – IV

Modules, Classes and Objects, is – a relationship: inheritance, has-a relationship : composition.

UNIT – V

File handling, serialization using JSON and pickle, encoding and decoding.

Learning Resources

1. Allen B. Downey, Think Python, 2nd Edition, Green Tea Press
2. "Learning Python", 5th Edition, O'reilly
3. https://www.python.org
4. https://nptel.ac.in/courses/106106182/

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VASAVI COLLEGE OF ENGINEERING (Autonomous)
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DEPARTMENT OF MECHANICAL ENGINEERING

Optimization Methods

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

Instruction: 3Hours/week	SEE Marks : 60	Course Code: **U21OE410ME**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

UNIT-I

Optimization-An overview

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

UNIT-II

Advanced topics in Linear programming

Special cases in simplex method, Duality in LPP, Differences between primal and dual, shadow prices, Dual simplex method, Revised simplex method.

UNIT-III

Transportation Model

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

Project Scheduling

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

UNIT-IV

Non linear programming problems

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

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

UNIT-V

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

Learning Resources:

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

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Duration of Internal Test: 90 Minutes

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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

COURSE NAME- CRITICAL THINKING

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

Instruction: 3 Hours	SEE: 60	Course code: U21HS430EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

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

UNIT 1: COMPONENTS OF CRITICAL THINKING

1.1 Applying Reason
1.2 Open Mindedness
1.3 Analysis
1.4 Logic

UNIT 2: NON-LINEAR THINKING

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

UNIT 3: LOGICAL THINKING

3.1 Ask the Right Questions
3.2 Organize Data

3.3 Evaluate Information
3.4 Draw Conclusions

UNIT 4: INFER MEANING FROM INFORMATIVE TEXTS

4.1 Making Assumptions
4.2 Watch out for Bias
4.3 Ask Clarifying Questions
4.4 SWOT Analysis

UNIT 5: PROBLEM SOLVING

5.1 Identifying Inconsistencies
5.2 Trust your Instincts
5.3 Asking Ask?

METHODOLOGY

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

LEARNING RESOURCES

learn.talentsprint.com

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

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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