

**VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Ibrahimbagh, Hyderabad-31 Approved
by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

**Sponsored by
VASAVI ACADEMY OF EDUCATION
Hyderabad**



**SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR
B.E. (EEE) III and IV Semesters
With effect from 2024-25
(For the batch admitted in 2023-24)
(R-23)**



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Phones: +91-40-23146030, 23146031

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

Empowering Future Engineers in Electrical & Electronics Engineering with Technological Excellence and Human Values.

DEPARTMENT MISSION

To Arm Aspiring Engineers with Cutting-Edge Technology and Cultivate Holistic Development, Fostering a Synergy of Knowledge and Values for a Brighter Future.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Graduates will acquire technical competence to analyze, design and solve engineering problems in the field of Electrical and Electronics Engineering and use modern engineering tools, techniques and software.

PEO 2: Graduates will be able to acquire necessary skills and obtain employment and will be productive in the professional practice of Electrical and Electronics Engineering and related fields.

PEO 3: Graduates will be sensitive to professional and social contexts, committed to ethical action and engaged in lifelong learning skills.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: EEE students will be able to design, analyze Power Systems & Electrical Machines to solve complex engineering problems.

PSO 2: EEE students will be able to design and analyze Electrical and Power Electronic Circuits.

PSO 3: EEE students will be able to use and apply modern software tools and techniques related to Electrical Engineering.

B.E. (EEE) PROGRAM OUTCOMES (PO's)	
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.
P10	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, and give and receive clear instructions.
P11	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.
P12	Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

With effect from the Academic Year 2024-25

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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

B.E (EEE) III Semester									
Course Code	Name of the Course	Scheme of Instruction			Duration Hrs	Scheme of Examination		Credits	
		Hours per Week				SEE	CIE		
		L	T	P/D					
THEORY									
U23BS310MA	Transform Techniques and Partial Differential Equations	3	-	-	3	60	40	3	
U23ES310EC	Electronic Devices and Circuits	3	-	-	3	60	40	3	
U23PC310EE	Electromagnetic Field Theory	3	1	-	3	60	40	4	
U23PC320EE	Electrical Network Analysis	3	1	-	3	60	40	4	
U23OE3X0XX	Open Elective-I	2	-	-	3	60	40	2	
U23HS320EH	Skill Development Course-I (Communications Skills-I)	1	-	-	2	40	30	1	
U23BS360MA	Skill Development Course-II (Aptitude-I)	1	-	-	2	40	30	1	
PRACTICALS									
U23ES311EC	Electronic Devices and Circuits Lab	-	-	2	3	50	30	1	
U23PC321EE	Electrical Network Analysis Lab	-	-	2	3	50	30	1	
ECA-I		-	-	-	-	-	-	-	
CCA-I		-	-	-	-	-	-	-	
Library/Sports/Mentor- Mentee Interaction		-	-	-	-	-	-	-	
Total		16	02	4		480	320	20	
Grand Total		22				800		20	

B.E students shall complete one NPTEL Certificate equivalent Course of 8 weeks equivalent to 2 Credits by the end of VI semester.

DEPARTMENT OF MATHEMATICS

**Transform Techniques & Partial Differential Equations
 (Civil, EEE & Mechanical only)**

SYLLABUS FOR B.E. III SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: U23BS310MA
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
<ol style="list-style-type: none"> 1. Understand the definition and properties of the Laplace transform. 2. Understand the definition and properties of the inverse Laplace transform. 3. Study the concept of Fourier series and its applications. 4. Learn the formation Partial Differential Equations and solution of linear and non-linear first order partial differential equations. 5. Study the applications of Partial Differential equations. 	<ol style="list-style-type: none"> 1. Evaluate Laplace transform of functions and apply Laplace transforms to evaluate integrals. 2. Find Inverse Laplace transforms of functions and apply the Laplace transform to solve linear differential equations. 3. Compute Fourier coefficients and find Fourier series of a function. 4. Formulate the Partial differential equations and solve the linear and non-linear first order Partial differential equations. 5. Solve the one-dimensional wave equation, one-dimensional heat equation, and two-dimensional heat equation under steady-state conditions.

UNIT-I

Laplace Transforms:

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

UNIT-II

Inverse Laplace Transforms:

Introduction to Inverse Laplace transforms - Properties of Inverse Laplace Transform-First shifting theorem - Second Shifting theorem -Change of scale theorem - Multiplication with s^n - Division by s -Convolution Theorem (without proof)- Application of Laplace transforms to higher order linear differential equation with Constant Coefficients.

UNIT –III

Fourier series:

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

UNIT –IV

Partial Differential Equations:

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

UNIT-V

Applications of Partial Differential Equations:

Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation – Two-Dimensional Heat equation (steady state condition).

Text Books:

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

Reference Books:

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

With effect from the Academic Year 2024-25

Online Resources:

1. https://onlinecourses.nptel.ac.in/noc24_ma17/preview
2. https://onlinecourses.nptel.ac.in/noc24_ma37/preview

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

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

DEPARTMENT OF ELECTRICAL COMMUNICATION ENGINEERING

Electronic Devices and Circuits
 SYLLABUS FOR B.E. III SEMESTER

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

COURSE OBJECTIVES	COURSE OUTCOMES
<ol style="list-style-type: none"> 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. 	<p>On completion of the course, students will be able to</p> <ol style="list-style-type: none"> 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.

UNIT-I: Semi conductor Diodes and Rectifiers

P-n junction as a rectifier, V-I characteristics, temperature dependence of V-I characteristics, Break down of junctions–Zener and Avalanche, half wave, full wave, bridge rectifiers, L,C, π –section filters, Regulation and Ripple characteristics.

UNIT-II: BJT circuits

BJT current components, Structure and I-V characteristics of a BJT, modes of transistor operation, Early effect, BJT input and output characteristics in CB, CE and CC configuration. BJT as a switch. BJT as an amplifier. BJT biasing techniques thermal runaway, operating point, bias stabilization circuits.

UNIT-III: Small Signal analysis of Transistor Circuits

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

UNIT-IV: Field effect transistors

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

UNIT-V: CRO & Special devices:

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

Learning Resources:

1. Jacob Millman and Christos C. Halkias, Satyabratajit "Electronics Devices and Circuits", McGraw Hill, 3rd edition, 2010.
2. Jacob Millman and Christos C. Halkias, Chetan D Parikh, "Integrated Electronics" McGraw Hill, 2009.
3. Robert L. Boylestad and Louis 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 Test: 90 minutes

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Electromagnetic Field Theory

SYLLABUS FOR B.E. III SEMESTER

L:T: P (Hrs/Week):3:1:0	SEE Marks: 60	Course Code: U23PC310EE
Credits: 4	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
To impart the fundamentals and applications of Electromagnetic fields such that student will be able to understand, develop, and design various engineering applications involving electromagnetic fields	<ol style="list-style-type: none">1. Evaluate electric field intensity and electric potential due to different charge configurations using Coulomb's Law and Gauss's Law in different coordinate systems.2. Determine electric field intensity in different materials applying boundary conditions, Laplace's and Poisson's Equations.3. Compute magnetic field intensity and magnetic force due to different current configurations using Biot Savart's Law and Ampere's Law and determine Inductance of different geometries.4. Determine electromotive force using Faraday's law and illustrate the concepts of Electromagnetic Compatibility5. Comprehend the wave propagation in different materials, Skin depth, loss angle and estimate the power transmitted using Poynting theorem

UNIT I:

Review of Vector Algebra & Calculus: Vector algebra-addition, subtraction, components of vectors, scalar and vector multiplications, three orthogonal coordinate systems (rectangular, cylindrical and spherical), Conversion of a Point & vector from one coordinate system to another. Vector calculus: differentiation, integration, vector operator del, gradient, divergence and curl; Divergence and Stoke's theorem

Static Electric Field: Coulomb's law, Electric field intensity, Electrical field Intensity due to point, Line, Surface and Volume charge distributions, Gauss's law and its applications, Absolute Electric potential, potential difference, Calculation of potential differences due to different configurations.

UNIT II:

Conductors, Dielectrics and Capacitance:

Electric field in conductors, Electric field in Dielectrics, Electric dipole, Dipole moment, Polarization, Permittivity of dielectric materials, E and V due to dipole, Boundary conditions of perfect dielectric materials, Capacitance, Capacitance of parallel plate, co-axial and spherical capacitors, Electrostatic Energy and Energy density. Poisson's equation, Laplace's equation, Solution of Laplace and Poisson's equation, Application of Laplace's and Poisson's equations. Current and current density, Ohms Law in Point form, Continuity equation $\nabla \cdot \mathbf{j} = -\frac{\partial \rho}{\partial t}$

UNIT III:

Static Magnetic Fields: Biot-Savart's Law, Magnetic field intensity due to line of current, sheet of current, magnetic field intensity inside a solenoid. Ampere Law, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials. Magnetic Dipole and Dipole moment.

Magnetic Forces, Materials and Inductance: Force on a moving charge, Force on a differential current element, Force between differential current elements, Nature of magnetic materials, Magnetization and permeability, Magnetic boundary conditions, Magnetic circuits, inductances (Solenoid and Toroid) and mutual inductances.

UNIT IV:

Time Varying Fields and Maxwell's Equations: Faraday's law for Electromagnetic induction, Motional Electromotive forces, Displacement current, Point form of Maxwell's equation, Integral form of Maxwell's equations.

With effect from the Academic Year 2024-25

Electromagnetic Interference and Compatibility (Theoretical Aspects only):

Introduction to electromagnetic interference and electromagnetic compatibility (EMI & EMC) – sources and characteristics of EMI – control techniques of EMI – Grounding – Shielding – Filtering

UNIT V:

Electromagnetic Waves: Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form, Wave equation in Phasor form, Plane waves in free space and in a homogenous material. Wave equation for a conducting medium, Plane waves in lossy dielectrics, Propagation in good conductors, Skin effect, and Poynting theorem.

Learning Resources:

1. M. N. O. Sadiku, "Elements of Electro magnetics", Oxford University Publication, 6th edition September 2015.
2. W. Hayt, "Engineering Electro magnetics", McGraw Hill Education, 9th edition 2020.
3. A. Pramanik, "Electromagnetism - Theory and applications", PHI Learning Pvt. Ltd, New Delhi, 2009.
4. A. Pramanik, "Electromagnetism-Problems with solution", Prentice Hall India, 2014.

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

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

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
 9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Electrical Network Analysis
 SYLLABUS FOR B.E. III SEMESTER

L:T: P (Hrs/Week):3:1:0	SEE Marks: 60	Course Code: U23PC320EE
Credits: 4	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objective of Electrical Network Analysis is to provide the Knowledge on transient and steady state analysis of electrical circuits, Resonance, coupled circuits and two port network parameters. Also provide the Laplace approach to analyse electrical networks.	On completion of the course, students will be able to At the end of this course, students will demonstrate the ability to 1. Analyse the transient and steady-state response of first order and second order electrical circuits. 2. Apply and analyse the resonance in electrical circuits 3. Analyse the coupled circuits. 4. Analyse the two port networks. 5. Apply Laplace transforms to analyse the electrical circuits

Unit I: Solution of First order networks

Introduction, Terminology: Time constant, natural response, forced response; The source free RC circuit, Source free RL circuit, Singularity functions, Step response of an RC circuit, Step response of an RL circuit.

Unit II: Solution of Second order networks

Introduction, Finding initial and final values, The Source free series RLC circuit, Source free parallel RLC circuit, Step response of a series RLC circuit, Step response of a parallel RLC circuit, General second order circuits.

Unit III:

Dual networks. Resonance and Magnetically Coupled Circuits

Duality and dual networks; series and parallel resonances; Mutual inductance, energy in a coupled circuit, Mutual coupled circuits, Dot Convention in coupled circuits, Linear transformer , Ideal Transformer.

Unit IV: Two Port Networks

Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port networks.

Unit V: Electrical Circuit Analysis Using Laplace Transforms:

Review of Laplace Transform: Definition, properties; Inverse Laplace Transform; Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, Circuit element models, Analysis of transformed network with initial conditions. Transfer function representation, Poles and Zeros.

Learning Resources:

1. C. K. Alexander and M. N. O. Sadiku, "Fundamentals of Electric Circuits", Tata McGraw Hill Education, 2013.
2. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", Tata McGraw Hill Education, 2013.
3. D. Roy Choudhury, "Networks and Systems", New Age International Publications, 1998.
4. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.
5. K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 1999.

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

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

Duration of Internal Test: 90 minutes

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VASAVI COLLEGE OF ENGINEERING
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9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

Department of Humanities and Social Sciences

Skill Development Course-I
(Communication Skills in English-I)

SYLLABUS FOR B.E. III SEMESTER

L:T: P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code: U23HS320EH
Credits: 1	CIE Marks: 30	Duration of SEE :2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: <ol style="list-style-type: none">1. Get students proficient in both receptive and productive skills especially2. Enable students to understand the importance and method of exchanging information in a formal space- both written and spoken3. Introduce students to an ideal structure for a presentation and discussion- individually and in groups4. Develop and improve reading skills needed for college work and reproduce the content based on the situational need.	At the end of the course the learners will be able to: - <ol style="list-style-type: none">1. Introduce themselves effectively and converse in a formal environment especially in the online space2. Write emails with appropriate structure and content3. Use appropriate structure based on the content employing appropriate transitions in written and spoken communication4. Paraphrase and Summarise in Spoken and written formats

Unit 1: Delightful Descriptions

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

With effect from the Academic Year 2024-25

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
<ul style="list-style-type: none">- Case Studies- Demonstration- Presentations- Expert lectures - Writing and Audio-visual lessons	<ul style="list-style-type: none">- Online assignments- Individual and Group

Learning Resources:

[learn.talentsprint.com](https://www.learn.talentsprint.com)

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

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

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

DEPARTMENT OF MATHEMATICS

**Skill Development Course-II : Aptitude - I
(Common to CIVIL, EEE, ECE & MECH)**

SYLLABUS FOR B.E. III – SEMESTER

L:T:P (Hrs./week) : 1:0:0	SEE Marks : 40	Course Code: U23BS360MA
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

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

UNIT 1: QUANTITATIVE APTITUDE - NUMERICAL ABILITY

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

**UNIT 2: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY
FOUNDATION**

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

With effect from the Academic Year 2024-25

UNIT 3: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 1

- 3.1 Percentages
- 3.2 Profit and loss

UNIT 4: REASONING ABILITY- GENERAL REASONING PART 1

- 4.1 Blood Relations
- 4.2 Number Series
- 4.3 Coding and decoding

UNIT 5: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 2

- 5.1 Time and Work
- 5.2 Chain Rule
- 5.3 Pipes and Cisterns

Prescribed textbook for theory:

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

Suggested Reading

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

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

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

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Electronic Devices and Circuits Lab
SYLLABUS FOR B.E. (EEE) III – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: U23ES311EC
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To develop an understanding of the characteristics of Electronic devices and circuits with Qualitative approach	On completion of the course, students will be able to 1. Estimate the parameters from V-I characteristics of different diodes. 2. Design various rectifiers with different filter combinations. 3. 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.

CYCLE - I Experiments

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

CYCLE - II Experiments

8. BJT biasing.
9. Analysis and bandwidth calculation of Single stage RC coupled CE Amplifier.
10. Analysis and bandwidth calculation of Emitter follower.

With effect from the Academic Year 2024-25

11. Single stage FET Common Source RC coupled Amplifier
12. Analysis and bandwidth calculation of Source follower.
13. Characteristics of UJT.

New / Additional experiments planned

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

Mini Project(s)

Designing of various basic applications using devices.

Learning Resources:

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

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: 3 Hours			

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Electrical Network Analysis Lab

SYLLABUS FOR B.E. III SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: U23PC321EE
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	On completion of the course, students will be able to
The objective of Electrical Networks Laboratory is to provide Under Graduate Engineer a thorough understanding on the behavior of electrical networks with hands-on experience, so that the student will acquire in depth knowledge on network analysis, network elements, resonance and coupled circuits to analyze and apply electrical engineering problems.	<ol style="list-style-type: none">1. Analyze the Step response of first order and second order circuits.2. Understand and analyze the characteristics of resonance in electrical circuits.3. Understand and analyze the Coupled circuits.4. Evaluate two-port network parameters5. Apply simulation tools for analyze electrical networks.

List of the Experiments:

1. Step response of first order R-L and R-C circuits.
2. Step response of series R-L-C circuits.
3. Characteristics of Series resonance
4. Characteristics of Parallel resonance
5. Polarity test in coupled circuits and testing of transformer.
6. Determination of impedance and admittance parameters of a two port network

With effect from the Academic Year 2024-25

7. Determination of hybrid parameters and transmission parameters a two port network.
8. Simulation of Sinusoidal steady state response for R-L and R-C circuits.
9. Simulation of Step response of R-L, R-C and R-L-C circuits.
10. Simulation of resonant circuits- Characteristics and analysis
11. Simulation of two port networks- Determining z , y , h and ABCD parameters.
12. Simulation of Step response for a second order system with addition of poles and zeros

Virtual Lab Experiments:

- Analog Signals, Network and Measurement Virtual Laboratory
- Link: <https://asnm-iitkgp.vlabs.ac.in/List%20of%20experiments.html>

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: 3 Hours			

With effect from the Academic Year 2024-25

**OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN
B.E. III SEMESTER (2024-25)**

Dept	Title	Code	credits
Civil	Green Buildings	U23OE310CE	2
CSE	Programming Essentials In Python (Stream Based)	U23OE320CS	2
CSE	Introduction To Python Programming (General Pool)	U23OE310CS	2
IT	Object Oriented Programming using Java	U23OE310IT	2
IT	Computing using Python	U23OE320IT	2
Mech.	Introduction to Industrial Robotics (Stream: Robotics)	U23OE310ME	2
Mech.	Fundamentals of Unmanned Aerial Vehicles (General Pool)	U23OE320ME	2
Maths	Complex Variables	U23OE310MA	2
ECE	Mathematical Programming for Engineers (General Pool)	U23OE320EC	2
ECE	Introduction to Signals and Systems (General Pool)	U23OE340EC	2
Chem.	Polymeric Materials	U23OE310CH	2
Phy.	Fundamentals of smart materials and applications	U24OE310PH	2
Phy.	Materials Science For Engineers Fundamentals of Materials Science	U24OE330PH	2
Phy.	Semiconductor Physics And Device Applications ESSENTIALS OF SEMICONDUCTOR PHYSICS	U24OE320PH	2
H&SS	Learning to Learn	U23OE310EH	2
H&SS	Mastering Leadership	U23OE340EH	2

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF CIVIL ENGINEERING
GREEN BUILDINGS (Open Elective-I)
SYLLABUS FOR B.E. III-SEMESTER

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

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
<ol style="list-style-type: none">1. Learn the principles of planning and orientation of buildings.2. Environmental implications of natural and building materials along with green cover3. Acquire knowledge on various aspects of green buildings	<ol style="list-style-type: none">1. Explain the principles of building planning, its bylaws and provide facilities for rainwater harvesting.2. Analyse the aspects of energy, water and waste management in buildings.3. Understand the concepts of green building technologies.4. Understand rating systems of GRIHA IGBC and LEED.

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

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

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

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

studies

Learning Resources:

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

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

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

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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

Department of Computer Science & Engineering

PROGRAMMING ESSENTIALS IN PYTHON

Stream - Artificial Intelligence & Machine Learning

(OPEN ELECTIVE-I)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III-SEMESTER

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

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

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

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

Iteration: while statement

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

Recursion

With effect from the Academic Year 2024-25

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING(Autonomous)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

**INTRODUCTION TO PYTHON PROGRAMMING
(OPEN ELECTIVE-I)**

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

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code : U23OE310CS
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

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

Iteration: while statement

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

With effect from the Academic Year 2024-25

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			

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY
OBJECT ORIENTED PROGRAMMING USING JAVA
(GENERAL TRACK : OPEN ELECTIVE-I)
(Common for CIVIL, ECE, EEE & MECH)
SYLLABUS FOR B.E. III SEMESTER

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

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
Explain the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, building simple GUI applications.	<ol style="list-style-type: none">1. Understand fundamental concepts in Object oriented approach.2. Develop object-oriented programs using the concepts of exception handling and multi threading.3. Demonstrate the usage of Java I/O streams to handle user input and output.4. Design and develop GUI programs.

UNIT- I

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

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

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

Interfaces: Defining interfaces, extending interfaces, implementing interfaces.

UNIT- II

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

UNIT- III

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

With effect from the Academic Year 2024-25

String, StringBuffer, System

UNIT- IV

Introducing Awt, Awt Controls:

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

Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, Check box Group, Choice Controls, Using Lists, Managing Scroll Bars, Using Text Field, Using Text Area, Understanding Layout Managers, Menu bars and Menus, Dialog Boxes, File Dialog, Exploring the controls, Menus ,and Layout Managers.

Learning Resources:

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

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

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

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTING USING PYTHON
(AI&ML TRACK: OPEN ELECTIVE-I)
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks :60	Course Code: U23PC320IT
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Acquire problem solving skills for writing python scripts	<ol style="list-style-type: none">1. Understand the fundamentals of python and implement control structures.2. Understand string, lists and tuples and perform the key operations on these data containers.3. Implement dictionaries and set operations in python.4. Implement OOP concepts in python.

UNIT – I:

Introduction to Python: Features of Python, variables and identifiers, operators and expressions.

Decision making and repetition: if, if else, nested if-else and else if, while loops and for loops, nested loops, break, continue, pass

Functions: Definition, function call, more on defining functions, recursive functions.

Unit – II:

Strings: Introduction, accessing strings, basic operations, string slice, String function and methods, Regular Expressions.

Lists: Introduction, Operations on lists, nested list, list methods, list comprehension.

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

UNIT – III:

Set: Introduction, Set operations.

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

UNIT – IV:

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

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

Learning Resources:

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

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

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

Duration of Internal Test: **90 Minutes**

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

Introduction to Industrial Robotics(Open Elective-I)
(Stream: Robotics)

SYLLABUS FOR B.E.III-SEMESTER

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

COURSE OBJECTIVE	COURSE OUTCOMES
The objective of the course is to	On completion of the course, students will be able to
study industrial robot components, configuration, sensors, drives, applications and programming through experiential learning.	<ol style="list-style-type: none">1 explain configuration of industrial robots and summarize various applications.2 interpret various elements of the industrial robots3 Develop methodology to represent position and orientation of industrial robot links in spatial coordinate system.4 classify various sensors used in industrial robots and interface between the human user and an industrial robot using various programming languages.

UNIT-I

ROBOT BASICS

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

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

ROBOT APPLICATIONS

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

UNIT-II

ROBOT ELEMENTS

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

UNIT-III

ROBOT COORDINATE SYSTEMS

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

UNIT-IV

ROBOT SENSORS

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

Robot programming

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

Learning Resources:

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

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05
	Duration of Internal Test:	90 Minutes		

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

Department of Mechanical Engineering

FUNDAMENTALS OF UNMANNED AERIAL VEHICLES

(General Pool)

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

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

COURSE OBJECTIVE	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
The objective of this Course is to understand the features of UAV, elements, navigation and guidance of UAV and to design and simulate UAV	<ol style="list-style-type: none">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

With effect from the Academic Year 2024-25

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

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05
	Duration of Internal Test:	90 Minutes		

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
 9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF MATHEMATICS
COMPLEX VARIABLES
(Open Elective)
For B.E.,III - Semester – CBCS
(For CIVIL, EEE, ECE & MECH only)

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code: U23OE310MA
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: <ol style="list-style-type: none"> 1. Understand the Analytic functions, conditions and harmonic functions. 2. Evaluate a line integral of a function of a complex variable using Cauchy's integral formula, and how to 3. Evaluate Taylor's and Laurent Series. 4. Understand the Cauchy's residue theorem 	On completion of the course, students will be able to <ol style="list-style-type: none"> 1. Apply the condition(s) for a complex variable function to be analytic and/or harmonic and to construct an Analytic function. 2. Evaluate complex integrals by Cauchy's theorem and Cauchy's Integral formula 3. Identify the singularities of a function and to expand a given function as a Taylor's / Laurent's series. 4. Evaluate complex integrals by Cauchy's Residue theorem

UNIT – I(8 classes)

DIFFERENTIATION OF COMPLEX FUNCTION

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

UNIT – II (6 classes)

INTEGRATION OF COMPLEX FUNCTION

Complex Integration- Cauchy's Theorem(with proof) - Cauchy's Integral

With effect from the Academic Year 2024-25
Formula(with proof) - Evaluation of integrals by Cauchy's Integral formula.

UNIT – III(6 classes)

SERIES OF COMPLEX FUNCTIONS

Power series - Taylor's Series - Laurent's Series (without proofs) –Zero and singularities of complex function.

UNIT – IV(8 classes)

RESIDUES

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

Learning Resources:

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

Online Resources:

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

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

1. No. of Internal Tests	: 2	Max. Marks for each Internal 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 Test: 90 minutes

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers

(General Pool: Open Elective - I)

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

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

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able 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

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.

With effect from the Academic Year 2024-25

UNIT - III : Numerical Methods Using MATLAB

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

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

UNIT - IV : Nonlinear Equations

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

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

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by RudraPratap, 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 Siau Alexandre Bayen,Elsevier-18th April 2014.
5. <https://nptel.ac.in/courses/103106118/2>
6. <https://www.udemy.com/numerical-methods/>

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

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

Duration of Internal Test: 90 minutes

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Signals and Systems
(Communication Engineering Stream: Open Elective-I)
SYLLABUS FOR B.E. III-SEMESTER (CSE, AI&ML, EEE& IT branches)

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

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

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 nonlinear, time invariant and time variant.

Lab Activity: Generation of elementary signals in MATLAB.

UNIT-II

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

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

With effect from the Academic Year 2024-25

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

UNIT-III

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

Lab activity: Obtaining system response using Laplace transforms in MATLAB

UNIT-IV

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

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

Lab activity: Generation of elementary signals in MATLAB.

Learning Resources:

1. P. Ramakrishna Rao, Signals and Systems, McGraw Hill, 2008.
2. Alan V. Oppenheim, Alan S. Willsky and S. Hamid Nawab, Signals and Systems, 2nd ed., PHI, 2009.
3. Nagoorkani, 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 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 Test: 90 minutes

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF CHEMISTRY

POLYMERIC MATERIALS

Open Elective (General Pool)

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code: U23OE310CH
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to::	On completion of the course, students will be able to
1.To familiarize with various types of polymers 2. To acquaint with different methods of polymerization. 3.To converse the different polymerization techniques 4. To familiarize with various high performance/ specialty polymers.	1. Classify the polymers. 2. Analyze the different polymerization methods and their mechanisms. 3. Discuss the polymerization techniques used for the selected polymers. 4. Discuss the synthesis, properties and applications of selected polymers.

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

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

UNIT-II: POLYMERIZATION: (7h)

Initiators- Types of Initiators, Thermal Decomposition of Initiators, Redox Initiation, Photochemical Initiation, Initiation by Ionizing Radiation, Pure Thermal Initiation, Other Methods of Initiation, Initiator Efficiency, Definition -Mechanism - Cage Effect.Step-Reaction (Condensation) Polymerization, Polymerization Mechanisms- Mechanism of Stepwise

With effect from the Academic Year 2024-25
Polymerization, Radical Chain (Addition) Polymerization, Chain
Polymerization, Ionic and Coordination Chain (Addition) Polymerization,
Cationic Polymerization, Anionic Polymerization, Copolymerization -
Mechanisms of Copolymerization, Block and Graft Copolymers

UNIT-III: TECHNIQUES OF POLYMERIZATION: (7h)

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

UNIT-IV: COMMERCIAL & HIGH-PERFORMANCE POLYMERS: (7h)

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

Requirements for High-Temperature Polymers.

Synthesis, properties and applications of

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

Text Books:

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

Learning Resources:

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

With effect from the Academic Year 2024-25

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

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF PHYSICS

FUNDAMENTALS OF SMART MATERIALS AND APPLICATIONS

(Open Elective)

B.E. III Semester

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code: U24OE310PH
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to::	On completion of the course, students will be able to
<ol style="list-style-type: none">1. To introduce various types of smart materials used in engineering.2. Grasp the concepts of piezo and ferroelectric materials.3. Learn fundamentals of pyro and thermoelectric materials4. Gain knowledge on shape memory alloys	<ol style="list-style-type: none">1. Identify various smart materials and their significant applications.2. Summarize various properties and applications of piezo and ferroelectric materials.3. Apply fundamental principles of pyro and thermoelectricity in relevant fields of engineering.4. Explain types of shape memory alloys and their properties and applications

UNIT I: INTRODUCTION TO SMART MATERIALS (6 hours)

Characteristics of metals, polymers and ceramics. Introduction to smart materials, need for smart materials, Classification of smart materials, Components of a smart System, Applications of smart material, role of smart materials in developing intelligent systems and adaptive structures.

UNIT II: PIEZO AND FERRO ELECTRIC MATERIALS (8 hours)

Piezo electric effect and inverse piezoelectric effect, Piezo electric materials, Structure of Quartz crystal, piezoelectric oscillator, Magnetostriction, Magnetostriction oscillator, piezo-electric sensors, applications of Piezo-electric materials. Characteristics and properties of ferroelectric materials, Curie-Weiss law, applications of Ferro electric materials.

With effect from the Academic Year 2024-25

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

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

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

UNIT IV: SHAPE MEMORY MATERIALS (8 hours)

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

Learning Resources:

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

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

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF PHYSICS

MATERIALS SCIENCE FOR ENGINEERS
FUNDAMENTALS OF MATERIALS SCIENCE

(Open Elective)

B.E. III Semester

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code: U24OE330PH
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

UNIT I: Atomic structure and Chemical Bonding (8 hours)

Structure of the atom, The quantum states, Forces between atoms, Ionization potential, Electron affinity and electronegativity. Bond energy, Bond type and Bond length. Types of Bonds-Ionic, Covalent, Metallic bonding, Hydrogen bond, Vander-walls bond, Cohesive energy of ionic crystals, Madelung constant.

UNIT II: Atomic Packing (6 hours)

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

UNIT III: Diffusion in Solids (8 hours)

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

UNIT-IV: Strengthening Mechanisms (6 hours)

Solidification of metals and alloys, cooling curves, concepts of nucleation and growth, Heat transfer associated in nucleation and growth, Homogeneous and

With effect from the Academic Year 2024-25

Heterogeneous nucleation, Structure of metal ingots, Construction of binary alloys, Formation of alloy phases, viz. Solid solutions – substitutional and interstitial, intermetallic compounds.

References:

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

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF PHYSICS

PHYSICS OE TRACKS (B.E-III Semester)
Semiconductor Physics and Device Applications
ESSENTIALS OF SEMICONDUCTOR PHYSICS

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code: U24OE320PH
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

UNIT I: Basics of Quantum Mechanics (8 Hrs)

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

UNIT II: Semiconductors: Energy Band and Charge Carriers (6 Hrs)

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

UNIT-III: Growth of Semiconductors (6 Hrs)

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

UNIT IV: Carrier Transport in Semiconductors (6 Hrs)

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

With effect from the Academic Year 2024-25

References:

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

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

LEARNING TO LEARN (**Open Elective**)

SYLLABUS FOR B.E.III-SEMESTER

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

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: <ol style="list-style-type: none">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, prioritize and carry out tasks based on goals and priority.	At the end of the course the learners will be able to: - <ol style="list-style-type: none">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

With effect from the Academic Year 2024-25

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

LEARNING RESOURCES

learn.talentsprint.com

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

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
MASTERING LEADERSHIP (Open Elective)

SYLLABUS FOR B.E.III-SEMESTER

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

COURSE OBJECTIVES	COURSE OUTCOMES
<p>The course will enable the learners to:</p> <ol style="list-style-type: none"> 1. Develop self-awareness, assess personal strengths, and set goals for leadership growth. 2. Foster inclusive teamwork by leveraging diverse talents and viewpoints. 3. Apply rational decision-making models and critical thinking to engineering challenges. 4. Manage time efficiently, balance priorities, and integrate continuous improvement practices. 5. Integrate competence-building, self-development, and ethical leadership into engineering leadership roles. 	<p>At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none"> 1. Create a personalised leadership development plan, showcasing self-awareness and goals for growth. 2. Demonstrate the ability to lead inclusive teams, leveraging diverse talents and viewpoints. 3. Employ innovative problem-solving techniques to tackle complex technical issues. 4. Demonstrate efficient time management skills, balancing priorities and integrating continuous improvement. 5. Integrate competence-building, self-development, and ethical leadership principles into their engineering leadership roles.

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

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

Unit 2: Communication and Team Collaboration (6 hours)

- 2.1 Active listening, empathy, and conflict resolution
- 2.2 Enhancing Personal and Team Performance

With effect from the Academic Year 2024-25

- 2.3 Leveraging strengths within a team for optimal performance
- 2.4 Constructive feedback and coaching for skill development
- 2.5 Techniques for fostering a collaborative and high-performing team

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

- 3.1 Rational decision-making models and critical thinking
- 3.2 Strategies for innovative problem-solving in engineering projects
- 3.3 Self-Supervision and Ethical Leadership
- 3.4 Reflecting on personal leadership decisions and their impact
- 3.5 Balancing ethical considerations with technical challenges
- 3.6 Cultivating a culture of integrity and accountability within teams

Unit 4: Leading Change and Project Management (6 hours)

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

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

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

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

1. No. of Internal Tests	:	2	Max. Marks 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

With effect from the Academic Year 2024-25

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

B.E (EEE) IV Semester									
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			Credits	
		Hours per Week			Duration in Hrs	Maximum Marks			
		L	T	P/D		SEE	CIE		
THEORY									
U23BS410MA	Numerical Methods, Probability and Statistics	3	-	-	3	60	40	3	
U23ES410EE	Data Structures using C	3	-	-	3	60	40	3	
U23ES410EC	Analog Electronic Circuits	3	-	-	3	60	40	3	
U23PC420EE	DC Machines & Transformers	3	1	-	3	60	40	4	
U23OE4X0XX	Open Elective-II	3	-	-	3	60	40	3	
U23BS440MA	Skill Development Course-III (Aptitude-II)	1	-	-	2	40	30	1	
U23PE430EE	Skill Development Course-IV (Technical Skills-I)	1	-	-	2	40	30	1	
U23HS030EH	Human Values and Professional Ethics -II	1	-	-	2	40	30	1	
PRACTICALS									
U23ES411EC	Analog Electronic Circuits Lab	-	-	2	3	50	30	1	
U23ES411EE	Data Structures using C Lab	-	-	2	3	50	30	1	
U23PC421EE	DC Machines & Transformers Lab	-	-	2	3	50	30	1	
CCA-II		-	-	-	-	-	-	-	
Remedial/Tutorial/CC		-	-	-	-	-	-	-	
Library/Sports/Mentor- Mentee Interaction		-	-	-	-	-	-	-	
Total		18	01	06		570	380	22	
Grand Total		25				950		22	

B.E students shall complete one NPTEL Certificate equivalent Course of 8 weeks equivalent to 2 Credits by the end of VI semester

DEPARTMENT OF MATHEMATICS
Numerical Methods, Probability and Statistics

SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: U23BS410MA
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
<ol style="list-style-type: none"> 1. Understand the concepts of interpolation and to learn various methods for interpolating data points and approximating functions. 2. Learn numerical techniques for approximating derivatives and solving first-order ordinary differential equations. 3. Understand random variables and its probability distributions 4. Study the concept of hypothesis testing employed for small samples. 5. Understand the principles of curve fitting using the method of least squares and the concept of correlation. 	<ol style="list-style-type: none"> 1. Apply numerical methods to interpolate data points with equal and unequal intervals. 2. Use numerical techniques to approximate derivatives of functions at given points and solve first-order ordinary differential equations. 3. Differentiate between discrete and continuous random variables and apply various probability distributions to solve practical problems 4. Formulate Null and Alternative Hypotheses and apply the tests of hypothesis for small samples. 5. Apply the method of least squares to fit various curves to the given data and Calculate Karl Pearson's coefficient of correlation.

UNIT –I(08 Hours)

Interpolation:

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

UNIT –II(08 Hours)

Numerical Solutions of ODE:

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

UNIT-III(08 Hours)

Probability Distribution:

Random Variables - Discrete and Continuous Random Variables – Mass and density functions – Distribution functions - Definitions of Mean, Median, Mode and Variance – Continuous Distributions - Normal Distribution – Properties - Standard Normal variate.

UNIT-IV(10 Hours)

Test of Hypothesis:

Introduction -Testing of Hypothesis- Null and Alternative Hypothesis -Errors- -Level of Significance – Confidence Intervals-Tests of Significance for small samples - t- test for single mean - F- test for comparison of variances - Chi-square test for goodness of fit.

UNIT-V (08 Hours)

Curve Fitting:

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

Text Books:

- 1 Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
- 2 Higher Engineering Mathematics, Dr.B.S. S Grewal 40th Edition, Khanna Publishers.
- 3 Probability, Statistics and Random Processes, T. Veera Rajan, Tata McGraw Hill Education Private Ltd.

Reference Books:

- 1 Advanced Engineering Mathematics, Kreyszig E, 8th Edition, John Wiley & Sons Ltd, 2006.
- 2 A text book of Engineering Mathematics by N.P.Bali& Manish Goyal, Laxmi Publication.
- 3 Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand& sons, New Delhi.

Online Resources:

- 1 https://onlinecourses.swayam2.ac.in/cec24_ma19/preview
- 2 https://onlinecourses.nptel.ac.in/noc24_ma39/preview

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

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

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DATA STRUCTURES Using C

SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: U23ES410EE
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	COURSE OUTCOMES On completion of the course, students will be able to
Implement linear data structures Stacks, Queues and Linked Lists and the non-linear data structures Trees, Binary Search Trees and Graphs.	<ol style="list-style-type: none">1. Explain importance of Recursion, ADTs, Performance Analysis and dynamic allocation of arrays2. Apply Stack concepts in certain specific applications.3. Apply Queue concepts in certain specific applications.4. Apply the concepts of Linked Lists for implementation of certain tasks including implementation of Stacks and Queues. Demonstrate an understanding of Trees, Binary Search Trees and basic operations in Graphs.

Unit I

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

Arrays: Arrays – Dynamically allocated Arrays – 1D and 2D

Unit II

Stacks: Stack Abstract Data Type, Representation of a Stack using Arrays — Implementation of Stack Operations - Stack Applications: Infix to postfix Transformation - Evaluating Arithmetic Expressions.

Unit III

Queues: Queue Abstract Data Type- Representation of a Queue using array - Implementation of Queue Operations - Applications of Queues – Circular Queues.

Unit IV

Linked List: Introduction — Singly Linked list -Operations on a singly linked list -Dynamically Linked Stacks and Queues -Doubly linked list-Operations on a doubly linked list.

Unit V

Trees: Introduction, Binary Trees, Binary Tree Traversals
Binary Search trees (BST): Definition, Searching a BST, Insertion into a BST, Deletion from a BST. **Graphs:** The Graph ADT, Elementary graph operations – Depth First Search (DFS), Breadth First Search (BFS).

Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press.
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, 2nd Edition (2002), Pearson.
3. Kushwaha D. S and Misra A.K, Data Structures A Programming Approach with C, Second Edition(2014), PHI.,
4. Gilberg R. F and Forouzan B. A, Data Structures: A Pseudocode Approach with C, Second Edition(2007), Cengage Learning
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press
7. YedidyahLangsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI
8. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fa11-2011/lecture->

With effect from the Academic Year 2024-25

videos

9. [http://nptel.ac.in/courses/ 106106127/](http://nptel.ac.in/courses/106106127/)
10. <http://www.nptel.ac.in/courses/106102064>

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

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF ELECTRICAL COMMUNICATION ENGINEERING

Analog Electronic Circuits
SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: U23ES410EC
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

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

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. Directed Coupled (DC) Amplifiers, drawbacks of DC amplifiers, Drift Compensation techniques.

UNIT - III : Feedback amplifiers

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

UNIT - IV : Oscillators

With effect from the Academic Year 2024-25
Barkhausen criterion, RC type oscillators: RC phase shift and Wien bridge oscillators, LC type oscillators: Hartley and Colpitt's oscillators, Crystal oscillators (BJT only), frequency stability of oscillator.

UNIT - V : Power amplifiers

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DC MACHINES & TRANSFORMERS

SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):4:0:0	SEE Marks: 60	Course Code: U23PC420EE
Credits: 4	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
To study the concepts of magnetic circuits, principles, performances and applications of electromechanical energy conversion devices like D.C machines and Transformers which are used in many industries	<ol style="list-style-type: none">1. Analyze the concepts of magnetic circuits, evaluate the stored and converted energy and also exerted force in electromechanical energy conversion devices.2. Identify and analyze the operation of dc Generators.3. Analyze the operation and characteristics of DC motors.4. Analyze the single phase transformer operation and characteristics.5. Analyze three phase transformer operation and different configurations.

UNIT –I

Magnetic circuits, Electromagnetic force and torque:

Visualization of magnetic fields produced by a bar magnet and a current carrying coil - through air and through a combination of iron and air; influence of highly permeable materials on the magnetic flux lines. B-H curve of magnetic materials; Field energy and mechanical force, Direction of mechanical force developed, Flow of energy in electro-mechanical devices, singly excited and multiply excited systems

UNIT –II

DC Machines:

Basic construction of a DC machine, magnetic structure - stator yoke, stator poles, pole-faces or shoes, air gap and armature core, Armature windings- Simple lap and wave windings, Brush position, Classification of DC Machines.

DC Generators:

Generated EMF, Types of field excitations – separately excited, shunt, series and compound, voltage build-up in a shunt generator, critical field resistance and critical speed, Internal and External characteristics, Armature reaction, Theory of commutation, compensating windings, inter poles, parallel operation.

UNIT –III

DC Motors:

Generation of electromagnetic torque, torque-speed characteristics of separately excited, shunt, series and compound motors. Application of motors, Starting and speed control methods of DC motors. Testing of DC Motors, Losses and efficiency, Swinburne's test, Hopkinson's test, Field test for series motors, Retardation test.

UNIT –IV

Transformers:

Constructional features, Classification of transformers, Principle of operation, Ideal transformer, Transformer on 'No load' and 'On load', Vector diagram, Equivalent circuit, Polarity test, O.C & S.C tests, Sumpner's test, Regulation & efficiency, condition for maximum efficiency, All day efficiency, Separation of losses.

UNIT –V

Auto transformer, Realization of auto transformer from two winding transformer, Tap Changing Transformers: Concept of tap changing, on-load and off-load tap changers. Three Phase Transformers: Realization of 3-phase transformer from 3 single phase transformers, Three phase transformers connections Y-Y, Δ - Δ , Δ -Y, Y- Δ , V-V and Scott connections, tertiary Parallel Operation.

Suggested Books:

1. Dr. P.S. Bhimbra, Electrical machinery, 7th edition (2011), Khanna Publications, Delhi

With effect from the Academic Year 2024-25

2. Fitzgerald, Kingsley, Umans, Electric Machinery, 6th edition (2002), Tata McGraw Hill Publications New Delhi
 3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013.
 3. D.P Kothari and I.J Nagrath, Electrical Machines, 1st edition (2006), Tata McGraw Hill Publications, Sigma series, New Delhi
 4. Dr. P.S. Bhimbra, Generalized Electrical Machines, 5th edition (1991), Khanna Publications, Delhi
 5. J. B Gupta, Theory and performance of electrical machines, 15th edition (2015), S. K. Kataria & Sons publications, New Delhi
 6. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
 7. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
 8. H. Cotton, Electrical Technology, 7th edition (2005), CBS publishers, New Delhi
 9. Stephen. J. Chapman: Electric Machinery Fundamentals, 4th edition (2005), McGraw Hill, Singapore
 10. John Hindmarsh, Electric Machines and their Applications, Pergamon Press, London, 1977.
 11. <http://www.nptelvideos.in/2012/11/electrical-machines-i.html>
 12. <http://ieeexplore.ieee.org/search/searchresult.jsp?queryText=Electrical%20Machinery&newsearch=true>
- Online resources: <http://nptel.ac.in/courses/>; <http://ocw.tufts.edu>;
<http://ocw.upm.es>; www.open.edu/openlearn/

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

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF MATHEMATICS
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: U23BS440MA
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- 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

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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 Test: 90 minutes

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Skill Development-IV: Technical Skills-I
SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code: U23PE430EE
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours
COURSE OBJECTIVES		COURSE OUTCOMES

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

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

Duration of Internal Test: 90 minutes

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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Human Values and Professional Ethics -II

SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code: U23HS030EH
Credits: 1	CIE Marks: 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: <ol style="list-style-type: none">1. Create an awareness on the interrelation between Society, Ethics and Human Values2. Understand how ethical dilemmas apply to real life scenarios3. Develop ethical human conduct and professional competence4. Understand the role of good ethical practices and apply it in a project	At the end of the course the learners will be able to: - <ol style="list-style-type: none">1. Identify ethical risks in everyday life and in societies that can lead to unethical choices, such as structures that diffuse responsibility or a group that has collectively de-stigmatized unethical behaviour2. Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, and the objective presentation of data.3. Assess their own ethical values and the social context of problems and articulate what makes a particular course of action ethically defensible4. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

UNIT1 - NORMATIVE ETHICS & SOCIETAL ETHICS

This unit deals with normative ethics, the branch of moral philosophy, or ethics, concerned with criteria of what is morally right and wrong. It includes the formulation of moral rules that have direct implications for what human actions,

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institutions, and ways of life should be like. This unit also covers societal ethics which is the systematic reflection on the moral dimensions of social structures, systems, issues, and communities.

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

UNIT 2 - PROFESSIONAL ETHICS - NEED FOR ETHICAL CODES

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

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

UNIT 3 - PRIVACY

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

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

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

UNIT 4- Engineering Ethics for Future Innovators

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

- 4.1 Safety and Public Welfare
- 4.2 Sustainability and Environmental Impact

4.3 The Ethics of New Technologies

MODE of DELIVERY

<ul style="list-style-type: none">• Questionnaires• Quizzes• Case-studies• Observations and practice• Home and classroom assignments	<ul style="list-style-type: none">• Discussions• Skits• Short Movies/documentaries• Team tasks and individual tasks• Research based tasks• Viva
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Relevant Websites, CD's and Documentaries

- <https://plato.stanford.edu/>

Learning Resources:

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

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

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

Duration of Internal Test: 90 minutes

DEPARTMENT OF ELECTRICAL COMMUNICATION ENGINEERING

Analog Electronic Circuits Lab
 SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: U23ES411EC
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

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

CYCLE - I Experiments

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

CYCLE - II Experiments

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

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New Experiments

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

Learning Resources:

- 1 PaulB.Zbar,AlbertP.Malvino,MichaelA.Miller,“BasicElectronics,AText–LabManual”,7th Edition,TMH2001.
- 2 PaulB.Zbar,IndustrialElectronics,AText-LabManual,3rdEdition,TMH 1990.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: 3 Hours			

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DATA STRUCTURES Using C Lab

SYLLABUS FOR B.E. IV SEMESTER

Common for ECE and EEE

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: U23ES411EE
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

Each Department will conduct under Technical Skills

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
Design and implement various linear and non-linear data structures with their practical applications.	<ol style="list-style-type: none">1. Perform operations on Abstractions like stacks, queues, linked lists.2. Implement problems involving Trees.3. Implement problems involving Binary Search Trees.4. Implement problems involving Graphs.

Programming Exercise:

- 1) Program using Arrays, Pointers & Dynamic Memory Allocation.
- 2) Menu driven program that implements Stacks using arrays for the following operations
 - a) Create
 - b) push
 - c) pop
 - d) display
- 3) Menu driven program that implements Queues using arrays for the following operations
 - a) Create
 - b) insert
 - c) deIete
 - d) display
- 4) Menu driven program that implements Circular Queues for the following operations
 - a) create
 - b) Insert
 - c) deIete
 - d) display
- 5) Implementation of Infix to Postfix Conversion
- 6) Implementation of evaluation of postfix expression.
- 7) Implementation of Singly Linked List.
- 8) Implementation of Stacks using Singly Linked List.

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- 9) Implementation of Queues using Singly Linked List.
- 10) Implementation of Doubly Linked List.
- 11) Implementation of Binary Tree Traversals (Inorder, Preorder, Postorder, Level Order)
- 12) Implementation of Binary Search Tree Traversals (Inorder, Preorder, Postorder, Level Order) and search.
- 13) Implementation of Graphs Traversals – DFS and BFS.

Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition(2002), Pearson
3. Kushwaha D. Sand Misra A.K, Data structures A Programming Approach with C, Second Edition(2014), PHI.,
4. Gilberg R. F and Forouzan B. A, Data structures: A Pseudocode Approach with C, Second Edition(2007), Cengage Learning
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press
7. Yedidyah Langsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI
8. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos>
9. <http://nptel.ac.in/courses/106106127/>
10. <http://www.nptel.ac.in/courses/106102064>

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test:	3 Hours		

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DC Machines & Transformers Lab

SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: U23PC421EE
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
To expose the students to practical experiments of DC machines and single-phase and three-phase transformers.	1. Test the performance of various DC generators. 2. Test the performance of various DC motors. 3. Test the performance of single phase transformers. 4. Test the performance of a 3-phase transformer 5. Identify various connection of 3-phase transformer.

List of Experiments:

1. Magnetization characteristics of a self excited D.C. generator
2. Load characteristics of D.C Shunt Generator
3. Load characteristics of D.C Compound generator
4. Performance characteristics of a DC shunt motor
5. Performance characteristics of D.C Compound motor
6. Performance characteristics of D.C Series motor
7. Retardation Test, Dynamic Braking of DC Shunt Motor
8. Speed control and Swinburn's Test on DC shunt motor
9. Open circuit and short circuit test on a 1-phase transformer
10. Separation of core losses in a Single Phase transformer
11. Sumpner's test on two identical transformers
12. Estimation of efficiency of DC Machine by Hopkinson test.

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13. Three phase to Two phase conversion (Scott Connection)
14. Heat run test on Three phase transformer.
15. Polarity Test and estimation of self and mutual inductance of a 1-phase transformer

Virtual Lab Experiments:

- To perform speed control of DC motor by using Ward- Leonard Method of speed control
- To study the Load Characteristics of DC shunt generator

From the above experiments, each student should perform at least 10 (Ten) experiments.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: 3 Hours			

With effect from the Academic Year 2024-25
**OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN
 B.E. IV SEMESTER (2024-25)**

Dept	Title	Code	credits
Civil	Solid Waste Management	U23OE410CE	3
CSE	Basics Of Java Programming (General Pool)	U23OE410CS	3
CSE	Mathematical Computing For Ai & MI With Python (Stream- Artificial Intelligence & Machine Learning)	U23OE420CS	3
ECE	Sensors for Engineering Applications	U23OE410EC	3
IT	Introduction To Database Management Systems	U23OE410IT	3
IT	Essentials of Mathematics for Machine Learning using Python	U23OE420IT	3
Mech.	Kinematics and Dynamics of Robotics (Stream: Robotics)	U23OE410ME	3
Mech.	Operations Research (General Pool)	U23OE420ME	3
H&SS	Critical Thinking	U23OE430EH	3
H&SS	Technical Writing And Professional Presentations	U23HS020EH	3
Phy.	Materials Science For Engineers Synthesis And Properties Of Materials	U24OE420PH	3
Phy.	Semiconductor Physics And Device Applications Basic Semiconductor Devices	U24OE410PH	3

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
 9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF CIVIL ENGINEERING
SOLID WASTE MANAGEMENT (Open Elective-II)
SYLLABUS FOR B.E.IV-SEMESTER

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

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

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

UNIT- II: Storage of solid waste, Collection of Solid Waste: Primary and secondary collection, type of waste collection systems- Hauled and Stationary collection system, Waste handling and Processing: unit

With effect from the Academic Year 2024-25
operations used for separation and processing, materials recovery,
Transfer and Transport of solid waste, transfer station.

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

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

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

Learning Resources:

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

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

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Tests	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING(Autonomous)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

**BASICS OF JAVA PROGRAMMING
(OPEN ELECTIVE-II)**
SYLLABUS FOR B.E. IV-SEMESTER
(COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U23OE410CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
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.

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.

With effect from the Academic Year 2024-25

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

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

UNIT-IV: String Handling: String constructors, operations, character extraction, comparison, search, modification. StringBuffer, methods, StringBuilder, StringTokenizer

Util: Date, Calendar, Random, Timer, Observable

IO: Files and Directories, I/O Classes and Interfaces, Byte Streams classes and Character Stream classes

Learning Resources:

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

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

1	No. of Internal Tests:	<input type="text" value="02"/>	Max.Marks for each Internal Tests:	<input type="text" value="30"/>
2	No. of Assignments:	<input type="text" value="03"/>	Max. Marks for each Assignment:	<input type="text" value="5"/>
3	No. of Quizzes:	<input type="text" value="03"/>	Max. Marks for each Quiz Test:	<input type="text" value="5"/>

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2024-25

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

MATHEMATICAL COMPUTING FOR AI & ML WITH PYTHON

Stream- Artificial Intelligence & Machine Learning

OPEN ELECTIVE-II

(COMMON for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E IV SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code :U23OE420CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

UNIT-I

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

UNIT-II

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

UNIT-III

Data Visualization: Introduction to matplotlib, Data exploration with matplotlib-

With effect from the Academic Year 2024-25

Loading the data, Pie chart, Scatter plot, Box Plot, Bar Chart, 3D plot.

UNIT-IV

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

UNIT-V

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

Learning Resources:

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

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

1	No. of Internal Tests:	<input type="text" value="02"/>	Max.Marks for each Internal Tests:	<input type="text" value="30"/>
2	No. of Assignments:	<input type="text" value="03"/>	Max. Marks for each Assignment:	<input type="text" value="5"/>
3	No. of Quizzes:	<input type="text" value="03"/>	Max. Marks for each Quiz Test:	<input type="text" value="5"/>

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Sensors for Engineering Applications

(General Pool: Open Elective - II)

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

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

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

UNIT - I

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

UNIT – II

With effect from the Academic Year 2024-25

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

UNIT – III

Thermal and Optical Sensors temperature – temperature difference – heat quantity. Thermometers for different situations – thermocouples thermistors – color pyrometry. light intensity - wavelength and color - light dependent resistors, photodiode, phototransistor, CCD, CMOS sensors. Radiation intensity, particle counter – Gieger Muller counter (gas based), Hallide radiation detectors.

UNIT – IV

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

UNIT – V

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

Lab Experiments:

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

Learning Resources :

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

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

1. No. of Internal Tests	:	<table border="1"><tr><td>2</td></tr></table>	2	Max. Marks for each Internal Test	:	<table border="1"><tr><td>30</td></tr></table>	30
2							
30							
2. No. of Assignments	:	<table border="1"><tr><td>3</td></tr></table>	3	Max. Marks for each Assignment	:	<table border="1"><tr><td>5</td></tr></table>	5
3							
5							
3. No. of Quizzes	:	<table border="1"><tr><td>3</td></tr></table>	3	Max. Marks for each Quiz Test	:	<table border="1"><tr><td>5</td></tr></table>	5
3							
5							

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
 ACCREDITED BY NAAC WITH 'A++' GRADE
 IBRAHIMBAGH, HYDERABAD – 500 031
 DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

**Introduction to Principles of Communication Engineering
 (Communication Engineering Stream: Open Elective - II)**

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

L:T:P (Hrs./week): 3:0:0	SEE Marks: 60	Course Code: U23OE440EC
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

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

UNIT - I

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

Lab Activity: Generation of AM using MATLAB and Simulink.

UNIT - II

With effect from the Academic Year 2024-25

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

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

UNIT - III

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

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

Lab Activity: Demonstration of Sampling using MATLAB.

UNIT - IV

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

Lab activity: Demonstration of ASK and BPSK using SIMULINK.

UNIT - V

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

Source Coding Techniques: Shannon-Fano coding, Huffman Coding

Lab activity: Entropy calculations using MATLAB

Learning Resources:

1. Louis E. Frenzel, Principles of Electronic Communication Systems, 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 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

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

(GENERAL TRACK: OPEN ELECTIVE-II)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. IV SEMESTER

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : U230E410IT
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
Apply the concepts of database management systems and design relational databases.	<ol style="list-style-type: none">1. Understand functional components of the DBMS and develop ER model for a given problem and map ER it to Relational model2. Understand Relational model and basic relational algebra operations.3. Devise queries using SQL.4. Design a normalized database schema using different normal forms.5. Understand transaction processing and concurrency control techniques.

UNIT – I

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

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

UNIT – II

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

UNIT – III

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

UNIT – IV

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

UNIT – V

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

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

Learning Resources :

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

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

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

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (Autonomous)
 IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF INFORMATION TECHNOLOGY

Essentials of Mathematics for Machine Learning using Python
 (AI&ML TRACK : OPEN ELECTIVE-II)
 (Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. IV SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks :60	Course Code: U230E420IT
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Introduce essential math principles and Python programming techniques for understanding and applying machine learning to real-world problems.	<ol style="list-style-type: none"> 1. Understand and apply linear algebra principles to solving system of linear equations using Python libraries. 2. Understand and apply statistical methods to various estimation problems. 3. Understand and apply probability theory to various problems like density estimation, sampling, and classification. 4. Understand and apply calculus principles to implement various learning problems using Neural networks. 5. Understand and apply optimization principles to solve various ML algorithms.

UNIT – I:

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

UNIT – II:

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

UNIT-III:

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

UNIT-IV:

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

UNIT V:

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

With effect from the Academic Year 2024-25

Learning Resources:

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

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

1	No. of Internal Tests:	<input type="text" value="02"/>	Max.Marks for each Internal Tests:	<input type="text" value="30"/>
2	No. of Assignments:	<input type="text" value="02"/>	Max. Marks for each Assignment:	<input type="text" value="05"/>
3	No. of Quizzes:	<input type="text" value="02"/>	Max. Marks for each Quiz Test:	<input type="text" value="05"/>
Duration of Internal Test: 90 Minutes				

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF MECHANICAL ENGINEERING

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

Instruction : 3Hours /week	SEE Marks : 60	Course Code :U23OE410ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The objective of the course is to	On completion of the course, students will be able to
To develop the fundamental knowledge and skills required to analyze, design and control robotic systems	<ol style="list-style-type: none">1. Analyze the kinematics of robotic systems and apply them to solve real world problems2. Apply differential kinematics and statics concepts to design and control robotic systems3. Analyze the dynamics of serial manipulators using lagrangian method.4. Analyze the dynamics of serial manipulators using lagrangian and Newton-Euler mechanics5. Generate and analyze robot trajectories for various applications

UNIT-I

Robot Kinematics

Forward Kinematics: Forward/direct kinematic analysis of serial manipulators.

Inverse Kinematics: General properties of inverse kinematic solution. Inverse kinematics of serial RR planar manipulators.

UNIT-II

Differential Kinematics

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

UNIT-III

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

Dynamics of serial manipulators

With effect from the Academic Year 2024-25
Lagrangian formulation for equations of motion for RP, RR serial manipulators,

Unit-IV

Dynamics of serial manipulators

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

UNIT-V

Trajectory Generation

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

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

Learning Resources:

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

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
	Duration of Internal Test:	90 Minutes		

With effect from the Academic Year 2024-25
VASAVI COLLEGE OF ENGINEERING (Autonomous)
 IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF MECHANICAL ENGINEERING
 SYLLABUS FOR B.E. IV-SEMESTER

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

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

Course Objectives	Course Outcomes
<p>The objectives of this course are to: understand the application of mathematics for real time problem solving to LPP, sensitivity analysis under set of constraints, applying mathematical techniques to solve transportation problem and assignment problems, applying time value money and ignoring the same to find the optimal replacement of machines, applying Johnsons rules to find the best sequence to minimize elapsed time and minimum no of servers to minimize waiting time of the customers and optimal utilisation of servers.</p>	<p>completion of the course, the student will be able to:</p> <ol style="list-style-type: none"> 1. Apply optimization in multi disciplinary areas through linear programming under different working conditions. 2. Analyze linear programming for a dynamic changes of a customer requirements to suit various Organizations. 3. Reduce total cost to apply for transportation techniques for the transshipment of Goods and products for a product based industry. 4. Estimate the time for replacement of a machine by considering or ignoring time value of money using individual/group replacement policy. 5. Estimate elapsed time for sequencing problem processed through different machines. Minimize waiting time of the customer and optimization of no. of servers.

UNIT – I

Introduction: Definition and scope of operations research.

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

UNIT – II

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

UNIT-III

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

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

UNIT-IV

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

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

UNIT-V

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

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

Learning Resources:

1. Hamady A. Taha, "Operations Research – An introduction", 6th Edition, PHI Pvt. Ltd., 1997.
2. S.D. Sharma, "Operations Research", Kedarnath, Ramnath & Co., Meerut, 2009.
3. Harvey M. Wagner, "Principles of Operations Research", 2nd Edition, PHI

With effect from the Academic Year 2024-25

Pvt. Ltd., 1980.

4. V.K. Kapoor, "Operations Research", S. Chand Publishers, New Delhi, 2004.
5. S.S. Rao, "Engineering Optimization – Theory and Practice", 4th Edition, John Wiley & Sons Inc., 2009.

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
	Duration of Internal Test:	90 Minutes		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

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

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

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: <ol style="list-style-type: none">1. Identify the core skills associated with critical thinking.2. Comprehend the various techniques of critical thinking3. Evaluate data and draw insights from it to make the right decisions4. Understand where to look for bias and assumptions in problem5. Understand structure, standards and ethics of critical writing	At the end of the course the learners will be able to: - <ol style="list-style-type: none">1. Analyse and compare techniques for comparing alternate solutions2. Demonstrate the difference between deductive and inductive reasoning and construct logically sound arguments3. Check for accuracy of data and use it as a tool for problem solving4. Evaluate, identify and distinguish between relevant and irrelevant information to formulate a thesis or hypothesis.5. Employ evidence and information effectively

UNIT 1: COMPONENTS OF CRITICAL THINKING

- 1.1 Applying Reason
- 1.2 Open Mindedness
- 1.3 Analysis
- 1.4 Logic

UNIT 2: NON-LINEAR THINKING

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

UNIT 3: LOGICAL THINKING

- 3.1 Ask the Right Questions

- 3.2 Organize Data
- 3.3 Evaluate Information
- 3.4 Draw Conclusions

UNIT 4: INFER MEANING FROM INFORMATIVE TEXTS

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

UNIT 5: PROBLEM SOLVING

- 5.1 Identifying Inconsistencies
- 5.2 Trust your Instincts
- 5.3 Asking Ask?

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

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

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

1. No. of Internal Tests	:	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)
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS
(Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

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

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: <ol style="list-style-type: none">1. Understand the principles and mechanics of technical writing for students of engineering.2. Identify different kinds of business correspondences and the dos and don'ts for each of them.3. Make effective presentations as part of today's workplace demands.4. Recognize the need for Video and Written CVs with focus on specific elements.5. Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs	At the end of the course the learners will be able to: - <ol style="list-style-type: none">1. Write effective reports.2. Articulate business correspondences based on need.3. Make persuasive presentations.4. Design their videos CVs. Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose

UNIT 1: FORMAL & INFORMAL TECHNICAL REPORTS

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

UNIT 2: BUSINESS CORRESPONDENCE

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

UNIT 3: PROFESSIONAL PRESENTATIONS

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

UNIT 4: RESUME & CVs

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

UNIT 5: WRITING PROPOSALS & SOPs

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

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

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

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

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|--------------------------|---|---|---|-----------------------------------|---|--|----|
| 1. No. of Internal Tests | : | <table border="1"><tr><td>2</td></tr></table> | 2 | Max. Marks for each Internal Test | : | <table border="1"><tr><td>30</td></tr></table> | 30 |
| 2 | | | | | | | |
| 30 | | | | | | | |
| 2. No. of Assignments | : | <table border="1"><tr><td>3</td></tr></table> | 3 | Max. Marks for each Assignment | : | <table border="1"><tr><td>5</td></tr></table> | 5 |
| 3 | | | | | | | |
| 5 | | | | | | | |
| 3. No. of Quizzes | : | <table border="1"><tr><td>3</td></tr></table> | 3 | Max. Marks for each Quiz Test | : | <table border="1"><tr><td>5</td></tr></table> | 5 |
| 3 | | | | | | | |
| 5 | | | | | | | |

Duration of Internal Test: 90 minutes

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9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF PHYSICS
PHYSICS OE TRACKS (B.E-IV Sem)
Semiconductor Physics and Device Applications
Basic Semiconductor Devices

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: U24OE410EH
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

UNIT I: Junction Diode (8 hours)

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

UNIT II: Metal-Semiconductor Junction (10 hours)

Schottky and Ohmic contacts, Schottky barrier diode, Current voltage relationship, comparison of Schottky barrier diode and pn junction diode, Static Barrier Characteristics, Dynamic Characteristics, Ohmic Contact, Metal Oxide Semiconductor Capacitor-Capacitance-Voltage, Ideal MOS system-Threshold voltage.

UNIT III: Special Semiconductor Devices (8 hours)

Small signal equivalent circuits of PN-diode, short and long diode, Breakdown mechanisms in Zener diode, Varactor diode, Tunnel diode, Gunn diode, Shockley diode, IMPATT diode.

UNIT IV: BJT and Thyristor (8 hours)

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

UNIT V: Fabrication Techniques (6 hours)

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

References:

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

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DEPARTMENT OF PHYSICS

**PHYSICS OF TRACKS (B.E-IV Semester)
MATERIALS SCIENCE FOR ENGINEERS**

SYNTHESIS AND PROPERTIES OF MATERIALS

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U24OE420EH
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

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

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

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

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

UNIT III: Electrical Properties of Materials (8 hours)

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

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

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

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

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

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

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

References:

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