VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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

**Sponsoredby
VASAVI ACADEMY OF EDUCATION
Hyderabad**

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR
**B.E. (EEE) III and IV Semesters
With effect from 2025-26
(For the batch admitted in 2024-25)
(R-24)**

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.
P1O	**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.

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATION (R-24)::B.E. - EEE : THIRD SEMESTER (2025-26)

Course Code	Name of the Course	Scheme of Instruction				Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks			Credits
		L	T	P/D		SEE	CIE		
	THEORY								
U24BS310MA	Transform Techniques and Partial Differential Equations	3	-	-	3	60	40		3
U24PC310EE	Electromagnetic Field Theory	3	1	-	3	60	40		4
U24PC320EE	DC Machines & Transformers	3	1	-	3	60	40		4
U24ES310EC	Electronic Devices and Circuits	3	-	-	3	60	40		3
U24OE3X0XX	Open Elective-I	2	-	-	3	60	40		2
U24HS320EH	Skill Development Course-I (Communications Skills-I)	1	-	-	2	40	30		1
U24BS330MA	Skill Development Course-II (Aptitude-I)	1	-	-	2	40	30		1
U24HS310EH	Critical Thinking	1	-	-	2	40	30		1
	PRACTICALS								
U24ES311EC	Electronic Devices and Circuits Lab	-	-	2	3	50	30		1
U24PC321EE	DC Machines & Transformers Lab	-	-	2	3	50	30		1
ECA-I		-	-	-	-	-	-		-
	Library/Sports/Mentor- Mentee Interaction	-	-	-	-				
	Total	17	02	4		520	350		21
	Grand Total	23				870			21

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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

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: **U24BS310MA**
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
1. **Understand** the definition and properties of the Laplace transforms. 2. **Understand** the definition and properties of the inverse Laplace transforms and its applications to Initial Value Problems. 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.	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.

UNIT-I (8 Hours)
LAPLACE TRANSFORMS:

Introduction to Laplace transforms - 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.

UNIT-II (9 Hours)
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 - Division by s –Convolution Theorem (without proof)- Applications- Solving Linear Ordinary Differential Equations with constant coefficients upto 2nd order.

UNIT –III (8 Hours)
FOURIER SERIES:

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

UNIT –IV (8 Hours)
PARTIAL DIFFERENTIAL EQUATIONS:

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

UNIT-V (7 Hours)
APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:

Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation (Homogeneous 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.

<u>Online Resources:</u>
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
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9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

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: **U24PC310EE**
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	1. Evaluate electric filed 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 filed 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 Compatibility 5. 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 filed 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 of current

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.

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
1. No. of Internal Tests : 2 | Max. Marks for each Internal Test : 30
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Duration of Internal Test: 90 minutes

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DC Machines & Transformers

SYLLABUS FOR B.E. III SEMESTER

L:T: P (Hrs/Week):3:1:0	SEE Marks: 60	Course Code: **U24PC320EE**
Credits: 4	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
Study the working of DC machines and transformers, performances and applications of D.C machines and Transformers which are used in many real time applications.	1. Identify and analyze the performance of DC machine parts 2. Analyze the operation and characteristics of DC generators. 3. Analyze the operation and characteristics of DC motors and find the suitable applications. 4. Analyze the single phase transformer operation, characteristics and find the suitable applications. 5. Analyze three phase transformer operation and different configurations.

UNIT –I
DC Machines: Essential parts of DC machine, Details of Lap winding& Wave winding, Simple loop generator, EMF equation, Armature reaction— effects, Brush position, Remedies: Ampere turns, inter poles, advanced brush shift, Commutation: Effects, Methods of improving commutation — High resistance brushes, shifting of brushes, inter poles, Compensating winding, Demagnetizing and cross magnetizing ampere turns

UNIT –II
DC Generators: Types of field excitations – separately excited, shunt, series and compound generators, voltage build-up in a shunt generator, critical field resistance and critical speed, Internal and External characteristics, Applications, Parallel operation of Generators.

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, Direct loading, Swinburne's test.

AI Applications to Machines: Predictive Maintenance using AI, AI-based Speed Control of DC motor.

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 3single phase transformers, Three phase transformers connections Y-Y, Δ- Δ, Δ-Y,Y-Δ, Scoot connections, Parallel Operation.

Suggested Books:
1. Dr. P.S. Bhimbra, Electrical machinery, 7th edition (2011), Khanna Publications, Delhi
2. Fitzgerald, Kingsley, Umans, Electric Machinery, 6th edition (2002), Tata McGraw Hill Publications New Delhi3. 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%2 0Machinery&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

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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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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: **U24ES310EC**
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. Introduce the fundamental principles of semiconductor devices including diodes, BJTs, FETs, MOSFETs, IGBTs, and their characteristics. 2. Provide a strong understanding of rectifier circuits, filters, and voltage regulation techniques for DC power supplies. 3. Develop the ability to analyze small-signal low-frequency models of Bipolar Junction Transistors in amplifier configurations. 4. Enable students to analyze and design small-signal low-frequency FET amplifier circuits using equivalent circuit models in various configurations. 5. Familiarize students with practical applications of diodes and special-purpose diodes in real-world electronic circuits.	1. Define and describe the principle of operation of electronic devices like PN junction diode, Zener diode, power diode, BJT, FET, MOSFET and IGBT etc. 2. Analyze and design various rectifier circuits with and without filters for a regulated DC power supply. 3. Analyze the small signal low frequency Bipolar junction Transistor model in exact and approximate model. 4. Analyze the small signal low frequency Field effect transistor amplifiers in different configurations with the help of their equivalent circuits. 5. Illustrate the use of diode in practical applications and gain knowledge on special diodes

UNIT-I: Semiconductor Diodes and Rectifiers

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

UNIT-II: BJT circuits

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

UNIT-III: Small Signal analysis of Transistor Circuits

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

UNIT-IV: Metal Oxide Semiconductor Field Effect Transistors

Enhancement and Depletion mode MOSFETs, V-I characteristics. MOSFET biasing, MOSFET as a switch. MOSFET as an amplifier: common-source amplifier and common-gate amplifier. Small signal equivalent circuits-gain, input and output impedances, transconductance. IGBT, working and characteristics.

UNIT-V: Special devices:

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

Learning Resources:

1. Jacob Millman and Christos C. Halkias, Satyabratajit "Electronics Devices and Circuits", Mc Graw hill, 3rd edition, 2010.
2. Jacob Millman and Christos C. Halkias, Chetan D Parikh, "Integrated Electronics" Mc Graw Hill,2009.
3. Adel S. Sedra and Kenneth C. Smith "Micro Electronic Circuits theory and applications" 7th edition Oxford publications, 2017.
4. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", PHI, 11th edition 2015.
5. A.S. Sedraand K.C. Smith, "Microelectronic Circuits", Seventh Edition

New York, Oxford University Press,2014.
6. https://nptel.ac.in/courses/108102095/
7. https://nptel.ac.in/courses/117101106/

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

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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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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: **U24HS320EH**
Credits: 1	CIE Marks: 30	Duration of SEE :2 Hours

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

Unit 1:   Delightful Descriptions
1.1 Introductions on an Online Forum
1.2 Making Observations and Giving Opinion
1.3 Recalling and Describing

Unit 2: Formal Conversation Skills

2.1 Ask for Information
2.2 Give Information
2.3 Give Feedback
2.4 Seek Permission

Unit 3: Technical Expositions and Discussions

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

Unit 4: Rational Recap

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

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

Learning Resources:

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

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

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3. No. of Quizzes : 2   Max. Marks for each Quiz Test : 5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING
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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: **U24BS330MA**
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

2.2 Partnership
2.3 Ages
2.4 Allegations and mixtures
2.5 Averages

UNIT 3: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 1

3.1 Percentages
3.2 Profit and loss

UNIT 4: REASONING ABILITY- GENERAL REASONING PART 1

4.1 Blood Relations
4.2 Number Series
4.3 Coding and decoding

UNIT 5: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 2

5.1 Time and Work
5.2 Chain Rule
5.3 Pipes and Cisterns

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

Suggested Reading

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

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Duration of Internal Test: 90 minutes

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Department of Humanities and Social Sciences

Critical Thinking
SYLLABUS FOR B.E. III – SEMESTER

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

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

OVERVIEW:

In a world where automation and AI are rapidly transforming the workforce, critical thinking has become a vital human skill that sets professionals apart. This course empowers engineering students to think independently, evaluate information logically, and make well-reasoned decisions. Through engaging with

real-world problems, ethical dilemmas, and structured problem-solving tools, students will develop the ability to question intelligently, respond thoughtfully, and contribute meaningfully in AI-assisted environments.

UNIT 1: Fundamentals of Critical Thinking
Introduces the foundations of logical thinking and the importance of recognizing faulty reasoning.

1.1 Logic and Reasoning
1.2 Identifying Assumptions
1.3 Bias and Fallacies

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

UNIT 2: Analytical Thinking
Equips students to analyze information critically and draw conclusions based on solid evidence.

2.1 Evaluating Evidence
2.2 Drawing Logical Conclusions
2.3 Differentiating Facts from Opinions

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

UNIT 3: Problem-Solving Frameworks
Builds practical decision-making skills using structured, human-driven analytical tools.

3.1 Root Cause Analysis (5 Whys)
3.2 Decision Trees
3.3 SWOT Analysis

Learning Outcomes:

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

UNIT 4: Applications of Critical Thinking

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

4.1 Case Studies
4.2 Group Discussions on Ethical Dilemmas
4.3 Critical Thinking in Action: Debating Complex Engineering Issues

Learning Outcomes:

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

ADDITONAL READING:

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

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

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

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
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: **U24ES311EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

CYCLE - I Experiments
1. Zener diode as a Voltage Regulator
2. Design of Full wave Center tapped Rectifier with and without Filters.
3. Common Emitter characteristics of BJT and measurement of h-parameters

4. Applications of Cathode ray oscilloscope.
5. MOSFET Characteristics and measurement of its small signal parameters.
6. BJT biasing.

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

New / Additional experiments planned

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

Mini Project(s)

Designing of various basic applications using devices.

Learning Resources:

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**			

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DC Machines & Transformers Lab
SYLLABUS FOR B.E. III SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: **U24PC321EE**
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	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.
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**			

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

Dept	CODE	Title
Civil	U24OE310CE	Green Buildings
CSE	U24OE310CS	Introduction to Python Programming
CSE	U24OE320CS	Programming Essentials in Python (Stream: Artificial Intelligence & Machine Learning)
MECH	U24OE320ME	Fundamentals of Unmanned Aerial Vehicles
MECH	U24OE310ME	Introduction to Industrial Robotics (Stream: Robotics)
IT	U24OE310IT	Fundamentals of Python Programming
IT	U24OE320IT	Computing using Python (Stream: AI&ML)
Chemistry	U24OE310CH	Corrosion Science and Technology
Physics	U24OE310PH	Fundamentals of Smart Materials and Applications
H&SS	U24OE320EH	Learning to Learn
H&SS	U24OE360EH	Constitution of India
H&SS	U24OE370EH	Introduction Journalism
H&SS	U24OE350EH	Introduction to Financial Services (Stream: Banking, Finance, Securities and Investments)
H&SS	U24OE310EH	Human resource Management for Engineers (Stream: Management Courses for Engineers)

VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-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: U24OE310CE
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests   : 90 Minutes

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

Department of Computer Science & Engineering
INTRODUCTION TO PYTHON PROGRAMMING
(OPEN ELECTIVE-I)

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

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code : U24OE310CS
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

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

Iteration: while statement

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

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

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

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

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

Learning Resources:

1. Downey A, How to think like a Computer Scientist :Learning with Python, 1st Edition(2015), John Wiley
2. Lambert K.A, Fundamentals of Python –First Programs, 1st Edition(2015), Cengage Learning India
3. Perkovic L, Introduction to Computing using Python,2/e, (2015), John Wiley
4. Stewart Venit and Elizabeth Drake, Prelude to Programming: Concepts and Design, 6th Edition(2015),Pearson India
5. Mark J Guzdial, Introduction to Computing and programming in Python, 3rdEdition(2013), Pearson India
6. Allen Downey, Think Python, 2nd Edition(2015),Shroff Publisher Orielly

7. http://nptel.ac.in/courses/117106113/34
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-01sc-introduction-to-electrical-engineering-and-computer-science-i-spring-2011/python-tutorial/
9. www.scipy-lectures.org/intro/language/python_language.html

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

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

Duration of Internal Tests   : 90 Minutes

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

Department of Computer Science & Engineering

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

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code :**U24OE320CS**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests   : 90 Minutes

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

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U24OE320ME
Credits :02	CIE Marks:40	Duration of SEE:03Hours

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

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

Unit-II:
Basics of Flight
Different types of flight vehicles; Components and functions of an airplane; Forces acting on Airplane; Physical properties and structure of the

atmosphere; Aerodynamics – aerofoil nomenclature, aerofoil characteristics, Angle of attack, Mach number, Lift and Drag, Propulsion and airplane structures.

Unit-III:
Manufacturing and Analysis of UAV

Drone Manufacturing, Additive Manufacturing, Health Evaluation and Failsafe, Introduction to CAD; Design of UAV components; Structural Analysis using CAE; Aerodynamic Analysis using CFD; Manufacturing of the components of UAVs: 3D printing; Case studies;

Unit-IV:
Artificial Intelligence in UAV Systems

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

Learning Resources:

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

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

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

Duration of Internal Tests   : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering
INTRODUCTION TO INDUSTRIAL ROBOTICS
(Stream: Robotics)
(Open Elective-I)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U24OE310ME
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

COURSE OBJECTIVE	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.	1 explain configuration of industrial robots and summarize various applications. 2 interpret various elements of the industrial robots 3 Develop methodology to represent position and orientation of industrial robot links in spatial coordinate system. 4 classify various sensors used in industrial robots and interface between the human user and an industrial robot using various programming languages.

UNIT-I
ROBOT BASICS
Robot-Basic concepts, Need, Law, History, Anatomy, specifications.
Robot configurations-cartesian, cylindrical, polar, articulated and SCARA.
Parallel robots
ROBOT APPLICATIONS
Application in industry – material handling, loading & unloading, processing, welding & painting, assembly and inspection

UNIT-II
ROBOT ELEMENTS

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

UNIT-III
ROBOT COORDINATE SYSTEMS

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

UNIT-IV
ROBOT SENSORS

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

Robot programming

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

Learning Resources:

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

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

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

Duration of Internal Tests   : 90 Minutes

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

FUNDAMENTLAS OF PYTHON PROGRAMMING
(GENERAL POOL STREAM: OPEN ELECTIVE-I)
(Common for CIVIL, ECE, EEE & MECH) SYLLABUS FOR B.E. III SEMESTER

L:T:P(Hrs./week):2:0:0	SEE Marks :60	Course Code:**U24OE310IT**
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The Objectives of the course:	*On completion of the course, students will be able to*
Acquire problem solving skills for writing python scripts	1. Understand the fundamentals of python and implement control structures. 2. Understand basic knowledge on strings,lists and tuples. 3. Implement programs using dictionaries, and sets. 4. Implement OOP concepts in python.

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

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

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

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

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

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

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

Duration of Internal Test: 90 Minutes

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

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

L:T:P(Hrs./week):2:0:0	SEE Marks :60	Course Code:**U24OE320IT**
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

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

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

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

tuples, tuple methods and functions.

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

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

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

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

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

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF CHEMISTRY
CORROSION SCIENCE AND TECHNOLOGY

B E III SEMESTER

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

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

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

UNIT-II: CORROSION CONTROL METHODS
INHIBITORS AND ORGANIC COATINGS
A. Factors influencing corrosion
Nature of metal: Relative position of metal in galvanic series, over voltage, relative areas of anode & cathode and nature of corrosion product.
Nature of environment: temperature, pH and humidity.
B. Corrosion Control by Inhibitors and Organic Coatings
Corrosion Inhibitors: Anodic, Cathodic and vapor phase inhibitors.
Organic Coatings: Paints – constituents and their functions, vitreous enamel coatings, varnishes and lacquers.

UNIT-III: METALLIC COATINGS
Passivation of metals, polarization curve of passivating metals, effect of pH and potential-pH diagram for iron (Pourbaix Diagram) and polarization curve of iron, application of Pourbaix diagram for corrosion mitigation.
Metallic coatings: Types - anodic & cathodic. Surface pre-treatment of base metal.
Methods of application of metallic coatings: Hot dipping- galvanization - applications of galvanized RCC steel bars. Cladding, electro plating & electroless plating- principle and their differences.
Electroplating of Cu coating on Fe, Electroless plating of Ni coating on Insulators, Preparation of PCB using Electroless plating.
UNIT-IV: CATHODIC PROTECTION AND SURFACE CONVERSION
Cathodic protection: Principle, sacrificial anodic protection (SAP), impressed current cathodic protection (ICCP). Application of cathodic protection for bridges, ship hulls and underground pipelines.
Surface conversion coatings: Carburizing, Nitriding, Cyaniding.

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

4. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).

Suggested Reading:

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

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

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

Duration of Internal Tests   :90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF PHYSICS
FUNDAMENTALS OF SMART MATERIALS AND APPLICATIONS
OPEN ELECTIVE COURSE

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

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

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

UNIT II: PIEZO AND FERRO ELECTRIC MATERIALS (8 hours)
Piezo electric effect and inverse piezoelectric effect, Piezo electric materials, Structure of Quartz crystal, piezoelectric oscillator, Magnetostriction,

Magnetostriction oscillator, piezo-electric sensors, applications of Piezo-electric materials. Characteristics and properties of ferroelectric materials, Curie-Weiss law, applications of Ferro electric materials.

UNIT III: PYRO AND THERMO-ELECTRIC MATERIALS (6 hours)
Pyro electricity: pyro electric effect, pyro electric materials, pyro-electric detector.
Thermoelectricity: thermoelectric effect, Seebeck effect, Peltier effect, thermocouple, Principle and working of thermoelectric generator and Thermoelectric cooler, applications of thermoelectric materials

UNIT IV: SHAPE MEMORY MATERIALS (8 hours)
Introduction to shape memory alloys (SMA)- Shape Memory Effect (SME), Austenite, Martensite phases, Properties and characteristics SMAs, one-way and two-way shape memory effects, Properties of Ni-Ti shape memory alloy, Cu-based shape memory alloys, and their applications, Applications of SMAs.

Learning Resources:
1. Mukesh V. Gandhi, Brian S Smart Materials and Structures, Thompson, Springer, May- 1992
2. D. Patranabis, Sensors and Transducers, PHI Learning Pvt. Ltd., 2022
3. Nachiketa Tiwari, B. 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	:	30
2	No. of assignments	:	2	Max. Marks	:	5
3	No. of Quizzes	:	2	Max. Marks	:	5

Duration of Internal Tests   :90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
LEARNING TO LEARN
(Open Elective) SYLLABUS FOR B.E. III SEMESTER

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

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

Course Objectives:

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

UNIT 1: Foundations of Computational Thinking and Coding

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

UNIT 2: Problem-Solving with Abstraction

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

UNIT 3: Algorithmic Thinking for Coding Efficiency

3.1 Writing Algorithms: Step-by-Step Logical Instructions
3.2 Data Structures as Abstractions: Arrays, Lists, and Dictionaries
3.3 Debugging and Optimization: Finding and Fixing Errors in Code

UNIT 4: Applying Computational Thinking to Real-World Problems

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

Methodology

1. **Hands-On Coding Labs:**
   - Write simple Python programs to implement CT concepts.
   - Examples: Fibonacci sequence generator, basic search algorithms.
2. **Case Studies and Examples:**
   - Explore how CT principles (e.g., divide-and-conquer) solve problems like sorting or pathfinding.
   - Case studies: Binary Search, Google Maps routing.
3. **Group Projects:**
   - Teams design, code, and debug small projects, applying decomposition, abstraction, and algorithmic thinking.
4. **Assessments:**

- Online coding challenges (using HackerRank or similar platforms).
- Mid-term project: Write and optimize a simple algorithm (e.g., finding the largest number in an array).

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

LEARNING RESOURCES
learn.talentsprint.com

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

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

Duration of Internal Tests   :90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
CONSTITUTION OF INDIA
BASIC FEATURES & FUNDAMENTAL PRINCIPLES
(Common to all branches) SYLLABUS FOR B.E. 2/4- III semester

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

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

CONSTITUTION OF INDIA – BASIC FEATURES & FUNDAMENTAL PRINCIPLES

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

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

Unit –III: Government: Union & State – Executive & Legislature, composition, powers and functions, Local Self Governments – Panchayat Raj Institutions & Urban Local Bodies (Municipalities). Statutory Institutions: Elections-Election Commission of India, National Human Rights Commission, National Commission for Women.
]Unit –IV : Federal structure & distribution of legislative and financial powers between the Union and the States.

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

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

1	No. of Internal tests	:	2	Max. Marks	:	40
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

Duration of Internal Tests   :90 Minutes

VASAVI COLLEGE OF ENGINEERING (a)
Department of humanities and social sciences
Introduction to journalism
(Common to all branches) B.E. III   SEMESTER

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

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

UNIT-1:   MASS communication: Nature and Concept of Mass communication
Defining Mass Communication - Nature - Functions and Scope of Mass Communication - Mass Communication as Distinct from Other Forms of Communication - Mass Communication and Mass Media: Advantages and Limitations - Process of Mass Communication - Interactive Communication-Mass Communication in a Democratic (and Developing) Nation

UNIT - 2: Mass Media and Society

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

UNIT –3:   Introduction to journalism AND principles of journalism

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

UNIT – 4:   Types of journalism (Media and SUBJECT Specific)

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

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO FINANCIAL SERVICES
SYLLABUS FOR B.E-III SEMESTER (Stream based Open Elective)

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

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

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

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

Unit III: Finance (8 hours)

Nature and concept of Equities – Common Shares – Preference equity - Primary Market and Secondary Market – Nature and Functions- Bonds – characteristics – Valuation – Hybrid Financial instruments.

Unit IV: Securities (5 hours)
Derivatives – Meaning - Uses – Types of Derivatives – Forwards – Futures- Options – Recent Trends in Derivative Trading, Financial Market Infrastructure Institutions – Nature and Functions of Stock Exchanges , Depositories and Clearing Houses

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

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

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

Duration of Internal Tests   :   90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031,
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

HUMAN RESOURCES MANAGEMENT
(STREAM BASED ELECTIVE) SYLLABUS FOR B.E

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

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

Unit 1 - Introduction
Introduction – Nature and Objectives of HRM – Scope of HRM – Evolution of HRM- Importance of HRM - Environment of HRM -External and Internal forces acting – Strategic HRM

Unit 2 – Human Resources Planning
Human Resources Planning – Nature and Importance of Human Resources Planning- Factors affecting H R Planning – Requisites for successful HR Planning – Nature of Job Analysis – Process of Job analysis – Methods of collecting data for Job Analysis

Unit 3 - Training and Development
Nature of Training and Development – Inputs in Training and Development – Gaps in Training – The Training Process – Impediments to effective training –Career Development – uniqueness in international training-

Unit 4 – Performance Management
Performance Appraisal process- challenges in performance appraisal – methods of performance appraisal – designing an effective performance appraisal system – Improving performance - Performance based incentives

Unit 5 – Contemporary Issues in HRM
Ethical Issues in HRM - Employee privacy issues and surveillance – workplace harassment - Employer branding–Green HRM – Managing global workforce- Motivation across Cultures.

Learning resources:-
Prescribed Textbook
Human Resources Management, V Edition, K Ashwatappa, McGraw Hill Publication,
Personnel Management, 31st Edition, V S P Rao, Himalaya Publications.

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031.
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION (R-24) :: B.E. - EEE : FOURTH SEMESTER(2025-26)

Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U24BS410MA	Numerical Methods, Probability and Statistics	3	-	-	3	60	40	3
U24ES410EE	Data Structures using C	3	-	-	3	60	40	3
U24PC410EE	AC Machines	3	1	-	3	60	40	4
U24ES410EC	Analog Electronic Circuits	2	1	-	3	60	40	3
U24OE4X0XX	Open Elective-II	3	-	-	3	60	40	3
U24HS030EH	Human Values and Professional Ethics -II	1	-	-	2	40	30	1
U24BS430MA	Skill Development Course-III (Aptitude-II)	1	-	-	2	40	30	1
U24PE430EE	Skill Development Course-IV (Technical Skills-I)	1	-	-	2	40	30	1
PRACTICALS								
U24ES411EE	Data Structures using C Lab	-	-	2	3	50	30	1
U24ES411EC	Analog Electronic Circuits Lab	-	-	2	3	50	30	1
U24PC421EE	AC Machines Lab	-	-	2	3	50	30	1
CCA-I		-	-	-	-	-	-	-
Library/Sports/Mentor- Mentee Interaction		-	-	-	-	-	-	-
	Total	17	02	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

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

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: **U24BS410MA**
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
1. **Understand** the concepts of interpolation and to learn various methods for interpolating data points and approximating functions.	1. **Apply** numerical methods to interpolate data points with equal and unequal intervals.
2. **Learn** Numerical techniques for solving first-order ordinary differential equations.	2. **Use** Numerical techniques to solve first-order ordinary differential equations.
3. **Understand** random variables and its probability distributions	3. **Differentiate** between discrete and continuous random variables and apply various probability distributions to solve practical problems
4. **Study** the concept of hypothesis testing employed for small samples.	4. **Formulate** Null and Alternative Hypotheses and apply the tests of hypothesis for small samples.
5. **Understand** the principles of curve fitting using the method of least squares and the concept of correlation.	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 Solutions of Ordinary Differential Equations of first order - Taylor's Series Method - Euler's Method – Modified Euler's Method - Runge-Kutta of 4th order (without proofs)

UNIT-III (08 Hours)
PROBABILITY DISTRIBUTIONS
Random Variables - Discrete and Continuous Random Variables – Mass and density functions – Cumulative distribution functions - Definitions of Mean, Median, Mode and Variance of Probability distributions – Continuous Distributions - Normal Distribution – Properties.

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.

UNIT-V (08 Hours)
CURVE FITTING
Curve fitting by the Method of Least Squares - Fitting of Straight line-Second order curve (parabola)--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
    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 : $\boxed{3}$ Max. Marks for each Quiz Test : $\boxed{5}$

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-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: **U24ES410EE**
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, studentswill be able to
Implement linear data structures Stacks, Queues and Linked Lists and the non-linear data structures Trees, Binary Search Trees and Graphs.	1. Explain importance of Recursion, ADTs, Performance Analysis and dynamic allocation of arrays 2. 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 0, 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 Leaming
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Carmen, 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-videos
9. 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 : 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, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

AC MACHINES
SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):4:0:0	SEE Marks: 60	Course Code: **U24PC420EE**
Credits: 4	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
To study the performances and applications of AC machines like Induction machines and Synchronous machines.	1. Analyze speed torque characteristics and performance of the 3-phase induction motor, identify the applications. 2. Start and Control the speed of 3-phase induction motors based on applications. 3. analyze the operation of Single –phase induction motors and Identify the applications. 4. Analyze the operation and characteristics of synchronous generator. 5. Analyze the operation and characteristics of synchronous motor.

UNIT-I:
Three Phase Induction Motors:
Construction, Types (squirrel cage and slip-ring), generation   of   RMF, principle of operation of IM, Torque Slip Characteristics, Starting and Maximum Torque, Equivalent circuit. Phasor Diagram, Power Flow diagram, Losses and Efficiency. No load and Blocked rotor test, Circle diagram.

UNIT-II:
Starting & Speed Control Methods: Starting methods of 3-phase induction motor –DOL, Autotransformer, Star delta Starter, rotor resistance. Double cage machine, Speed control methods – Pole changing, Voltage Control, frequency control, Resistance control. Induction Generator - concept, Applications of 3-phase IM.

UNIT-III:
Single-phase induction motors:
Constructional features of single phase induction motor, working principle, double revolving field theory, No load and Blocked rotor test on single phase induction motor, determination of equivalent circuit parameters. speed torque characteristics of Split-phase and capacitor start motors, stepper, BLDC motors and applications.

UNIT-IV:
Synchronous machines:
Constructional features, Salient and non-salient pole synchronous machines
Types of AC windings, short pitch and full pitch coil, pitch factor, concentrated winding, distributed winding, winding distribution factor,
Synchronous Generator (Alternator): generated EMF, equivalent circuit and phasor diagram, armature reaction, synchronous impedance, voltage regulation- Synchronous impedance method, Ampere-turns and Z.P.F Method. Power angle characteristics, Slip test, V-curves power angle characteristics. Parallel operation of alternators - synchronization.

UNIT-V:
Synchronous Motors:
Operating Principle, Two reaction theory, Power flow equations of cylindrical and salient pole machines, Operating characteristics. Synchronous Motor-Starting methods, Effect of varying field current at different loads, V- curves, Hunting& damping, Synchronous condenser.
   AI Applications to Machines: Fault Detection and Diagnosis using AI.

Suggested Books:
1. Nagarath I.J., Kothari D.P., Electrical Machines. 4th Edition 2010, Tata McGraw Hill.
2. Gupta J.B., Theory and Performance of Electrical Machines, 2003, S.K. Kataria.& Sons.

3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013.
4. A. S. Langsdorf, "Alternating current machines", McGraw Hill Education, 1984.
5. P. C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons, 2007
6. Bhimbra P.S., Generalized Theory of Electrical Machines, Khanna Publications
7. Dr.P.SBimbhra, Electrical Machinery,7th Edition, Khanna Publishers
8. M.G. Say, The Performance and Design of A.C. Machines – Pitman Publications.
9. Online   resources:
       http://nptel.ac.in/courses/;
       http://ocw.tufts.edu; http://ocw.upm.es;
10.   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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-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: **U24ES410EC**
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. Design and analyze various non-linear wave shaping Circuits. 2. Analyze and design various multistage amplifiers. 3. Analyze different types of feedback amplifiers. 4. Design sinusoidal oscillators for the required frequency. 5. Analyze different types of power amplifiers.

UNIT-I: Wave-Shaping Circuits
RC low pass and high pass circuit, response to Step, Pulse and Square wave inputs, clipping circuits for single level and two levels, clamping circuits.

UNIT-II: Multi stage amplifiers using Mosfet
Cascading amplifier stages, classification of amplifiers, frequency responses of RC coupled amplifiers, Transformer coupled amplifiers, effect of cascading on bandwidth. Direct Coupled (DC) Amplifiers, drawbacks of DC amplifiers, Drift compensation techniques.

UNIT-III: Feedback amplifiers
Concept of Feedback, General characteristics of negative feed back amplifier, Feedback topologies,Effect of negative feedback on input and output impedances, Voltage-series and Voltage-shunt feedbacks using mosfets.

UNIT-IV: Oscillators

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

UNIT-V: Power amplifiers

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

Learning Resources:

1. Jacob Millman and Christos C. Halkias, Satyabratajit "Electronics Devices and Circuits", Mc Graw hill, 3rd edition, 2010.
2. Jacob Millman and Christos C. Halkias, Chetan D Parikh, "Integrated Electronics" McGraw Hill,2009.
3. Adel S. Sedra and Kenneth C. Smith "Micro Electronic Circuits theory and applications" 7th edition Oxford publications, 2017.
4. Robert L. Boylestad and Louis Nashel sky, "Electronic Devices and Circuit Theory", PHI,11th edition2015.
5. Jacob mill man and Taub: "Pulse, Digital and switching wave forms", McGraw hill,2003.
6. https://nptel.ac.in/courses/108102095/
7. https://nptel.ac.in/courses/117101106/

The break-up of CIE: Internal Tests+ Assignments + Quizzes
1. No. of Internal Tests : 2 Max. Marks for each Internal Test : 30
2. No. of Assignments : 3 Max. Marks for each Assignment : 5
3. No. of Quizzes : 3 Max. Marks for each Quiz Test : 5
Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-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: **U24HS030EH**
Credits: 1	CIE Marks: 30	Duration of SEE : 2 Hours

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

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, 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

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

Relevant Websites, CD's and Documentaries

● 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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-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:**U24BS430MA**
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

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

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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: **U24PE430EE**
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

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

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: **U24ES411EE**
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

Each Department will conduct under Technical Skills

COURSE OBJECTIVES The course will enable the students to:	COURSE OUTCOMES On completion of the course, students will be able to
Design and implement various linear and non-linear data structures with their practical applications.	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.

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 Leaming
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Carmen, 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**			

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

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: **U24ES411EC**
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. Introduce the principles of RC low-pass and high-pass circuits and enable students to design such circuits for different time constants, along with various types of clipper and clamper circuits. 2. Develop practical skills in designing and constructing multistage amplifier circuits and analyzing their frequency response characteristics. 3. Provide an understanding of small-signal amplifier behavior and the role of feedback in modifying amplifier performance. 4. Enable students to design and experimentally verify the operation of various sinusoidal oscillator circuits.	1. Design & Analyze RC Low pass and High pass Circuits for different time constants and to design different types of clippers and clampers. 2. Build a multi stage amplifier and find the frequency response of amplifier. 3. Analyze the small signal amplifiers behavior with and without feedback. 4. Design and verify the functioning of various sinusoidal oscillators.

CYCLE - I Experiments

1. Linear wave shaping circuits-Integrator & Differentiator
2. Clipping circuits
3. Clamping Circuits

4. Frequency response of Two stage amplifier using MOSFET
5. Frequency response of Voltage series feedback amplifier using MOSFET
6. Frequency response of Voltage Shunt feedback amplifier using MOSFET
7. Frequency response of Current series feedback amplifier using MOSFET
8. Frequency response of Current Shunt feedback amplifier using MOSFET

CYCLE - II Experiments

9. Design of Hartley Oscillator
10. Design of Colpitt's Oscillator
11. Design of RC Phase Shift oscillator.
12. Transformer coupled Class A power amplifier
13. Class AB Power amplifier

New Experiments

1. OP-Amp Applications (Adder, Subtractor, Comparator)

2. OP-Amp Applications (Integrator & Differentiator)

Learning Resources:

1   Paul B. Zbar, Albert P. Malvino, Michael A. Miller, "Basic Electronics, A Text– Lab Manual", 7th Edition, TMH2001.
2   Paul B. Zbar, Industrial Electronics, A Text-Lab Manual, 3rd Edition, TMH 1990.
3   Paul R.Gray & Robert G.Meyer, Analysis and Design of Analog Integrated Circuits, John Wiley,3rd Edition.

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

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

AC Machines Lab

SYLLABUS FOR B.E. IV SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: **U24PC411EE**
Credits: 1	CIE Marks: 30	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
To expose the students to practical experiments of AC machines.	1. Test the performance of 3-phase induction motor 2. Predetermine the voltage regulation of Non- salient and Salient Alternators by conducting suitable tests. 3. Test the performance of performance of 3-phase synchronous motor 4. Test the performance of Induction generator 5. Test the performance of 1-phase induction motor

List of Experiments:
1. No-load test, blocked rotor test and load test on 3-phase Induction motor
2. Voltage regulation of Alternator by Synchronous impedance method
3. Voltage regulation of Alternator by Ampere – turn method
4. Voltage regulation of Alternator by Z.P.F. method.
5. Regulation of Alternator by slip test.
6. Determination of V curves and inverted V curves of Synchronous motor.
7. Power angle characteristics of a Synchronous motor.
8. Load characteristics of Induction Generator.
9. P.F. improvement of Induction motor using capacitors.

10. Synchronization of Alternator using three dark lamp method.
11. Torque –speed characteristics of single phase Induction Motor.
12. Parallel operation of Alternators

Virtual lab Experiments:

Speed control of slipring Induction Motor
 Motor forward and reverse direction control using PLC

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**			

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. IV SEMESTER (2025-26)

Dept	Code	Title
Civil	U24OE410CE	Solid Waste Management
CSE	U24OE410CS	Basics Of Java Programming
CSE	U24OE420CS	Mathematical Computing for AI&ML with Python (Stream: Artificial Intelligence & Machine Learning)
MECH	U24OE420ME	Operations Research
MECH	U24OE410ME	Kinematics and Dynamics of Robotics (Stream: Robotics)
IT	U24OE410IT	Object Oriented Programming using Java
IT	U24OE420IT	Essentials of Mathematics for Machine Learning using Python (Stream: AI&ML)
MATHS	U24OE410MA	Numerical Methods
H&SS	U24OE450EH	Fintech (Stream: Banking, Finance, Securities and Investments)
H&SS	U24OE410EH	Finance Management for Engineers (Stream: Management Courses for Engineers)

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF CIVIL ENGINEERING
SOLID WASTE MANAGEMENT
(Open Elective-II) SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:U24OE410CE
Credits: 3	CIE Marks:40	Duration of SEE : 3Hrs

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

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

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

UNIT-III: Solid waste transformation: aerobic and anaerobic composting, combustion, Thermal conversion- Incineration and pyrolysis system, Gasification, RDF- recovery of energy from conversion products. Energy recovery systems, Solid waste disposal- Land farming, deep well injections, Landfills: Site selection, method, drainage and leachate collection systems, requirements and technical solutions.

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

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

Learning Resources:
1. P. A. Vesilind, Worrell W and Reinhart, "Solid Waste Engineering", Cengage Learning India Pvt. Ltd. 2nd Edition, 2016.
2. Tchobanoglous," Integrated Solid Waste Management", Mc-Graw Hill International, 1st Edition, New York, 2014.
3. Charles A. Wentz; "Hazardous Waste Management", McGraw Hill Publication, 1995.

4. CPHEEO, "Manual on Municipal Solid waste management", Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000.
5. A. D. Bhide and B. B. Sundaresan, "Solid Waste Management, Collection, Processing and Disposal",Nagpur. 2001.
6. https://archive.nptel.ac.in/courses/105/103/105103205/

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

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

Duration of Internal Test: 90 minutes

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)

Instruction: 3 Hours	SEE: 60	Course code: U24OE410CS
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

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

UNIT-I: Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Concepts, Benefits of Object Oriented Development.
Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables and Arrays, Operators, Control Statements.
UNIT-II: Building blocks of OOP: Classes and Methods, Constructor, Parameterized constructor, Garbage Collection, this, static, final keywords, Inheritance, types of inheritance, Method Overriding, Abstract class, Nested

class, Interface, Package.

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

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

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

Util: Date, Calendar, Random, Timer, Observable

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

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

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

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

Duration of Internal Test: 90 minutes

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

Instruction: 3 Hours	SEE: 60	Course code: U24OE420CS
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

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

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

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

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

UNIT-IV
Regression: Introduction to Regression, Linear Regression, Multiple Linear Regression, Polynomial Regression, Logistic Regression

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

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

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Duration of Internal Test: 90 minutes

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

OPERATIONS RESEARCH

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

| Instruction: 3 Hours | SEE: 60 | Course code: U24OE420ME |
| Credits: 3 | CIE: 40 | Duration of SEE: 3 Hours |

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

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

UNIT – II
Duality: Definition, Relationship between optimal primal and dual solutions. Economic interpretation, Post optimal analysis (restricted to variation of resources i.e., RHS), Dual simplex method.
Transportation model: Finding an initial feasible solution– north west corner method, least cost method, Vogel's approximation method, finding the optimal solution, optimal solution by stepping stone and MODI method, special cases in transportation problems – Unbalanced transportation problem.

UNIT-III
Assignment Problem: Hungarian method of assignment problem, maximization in assignment problem, unbalanced problem, problems with restrictions, travelling salesman problem.
Replacement models: Introduction, Replacement of items that deteriorate ignoring change in money value, replacement of items that deteriorate considering change in money value with time, replacement of items that fail suddenly – individual replacement policy, group replacement policy.

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

UNIT-V
Sequencing models: Introduction, General assumptions, processing n jobs through 2 machines, processing n jobs through m machines processing 2 jobs through n machines.
Queuing theory: Introduction, Single channel – Poisson arrivals – exponential service times with infinite population and finite population.

Learning Resources:
1. Hamady A. Taha, "Operations Research – An introduction", 6th Edition, PHI

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

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

1.	No. of Internal Tests	: 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)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OFMECHANICAL ENGINEERING
Kinematics and Dynamics of Robotics
(Open Elective-II) (Stream: Robotics) SYLLABUS FOR B.E. IV – SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U24OE410ME
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

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

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

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

UNIT-III
Static Analysis: Force and moment balance.
Dynamics of serial manipulators
Lagrangian formulation for equations of motion for RP, RR serial manipulators,

Unit-IV
Dynamics of serial manipulators
Recursive dynamics using Newton-Euler formulation of RP and RR serial manipulator.

UNIT-V
Trajectory Generation
Joint-Space Techniques: Cubic Polynomial Trajectories, Linear Segments with Parabolic Blends-without and with via points
Cartesian-Space Techniques: Straight line path, Circular Path, Position Planning, Orientation Planning.

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

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3.   No. of Quizzes   :   3   Max. Marks for each Quiz Test   :   5
Duration of Internal Test: 90 minutes

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

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

Instruction: 3 Hours	SEE: 60	Course code: U24OE410IT
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to*
Explain the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, building simple GUI applications.	1. Understand fundamental concepts in Object oriented approach. 2. Develop object-oriented programs using the concepts of exception handling. 3. Demonstrate the usage of Java I/O streams to handle user input and output. 4. Design and develop GUI programs. 5. Develop applets for web applications.

UNIT- I
Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables-scope and lifetime, Operators, Control statements, Structure of a Java class, Classes, Methods, Inheritance, and Command Line Arguments.
Arrays: One-dimensional arrays, creating an array, declaration of arrays, initialization of arrays, two-dimensional arrays.
Packages: Creation, importing a package and user defined package.
Interfaces: Defining interfaces, extending interfaces, implementing interfaces.

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

exceptions.

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

UNIT- IV
Introducing Awt,Awt Controls:
Event Handling: The Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces.
 Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckboxGroup, Choice Controls, Using Lists, Managing Scroll Bars, Using TextField, Using TextArea, Understanding Layout Managers, Menu bars and Menus, Dialog Boxes, FileDialog, Exploring the controls, Menus ,and Layout Managers.

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

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

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Duration of Internal Test: 90 minutes

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

Essentials of Mathematics for Machine learning using Python
(AI&ML Stream : Open Elective-II)
(Common for ECE, EEE, MECH & CIVIL) SYLLABUS FOR B.E IV-SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U24OE420IT
Credits: 3	CIE: 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 the essential maths principles of linear algebra, vector calculus, probability theory and statistical methods along with exposure to Python libraries for understanding and applying machine learning to real-world problems.	1. Understand the fundamentals of linear algebra – vectors and matrices. 2. Understand and apply various matrix norms, Eigenvectors and PCA techniques. 3. Understand basics of derivatives, integrals and optimization. 4. Understand various data distributions and apply probabilistic techniques to handle uncertainty. 5. Define basic descriptive and inferential statistical measures.

Unit-1 Basics of Linear Algebra
- Scalars, Vectors, Matrices, Tensors for Data Representation and Analysis
- Matrix Analysis (Rank, Determinant, Trace, Orthogonal basis & Inverse)
- Operations: Addition, Subtraction, Scalar Multiplication, Matrix Multiplication, Dot Product, Cross Product Feature Interactions for Data Manipulation
- Python experiments

Unit-2 Matrix
- Matrix Norms: L0 Norm, L1 Norm, L2 Norm; Linear Regression &

Regularization
- Eigenvalues and Eigenvectors, Principal Component Analysis
- Python experiments

Unit-3 Vector Calculus
- Derivatives and Gradients
- Differential Operators - Laplacian operator, Gradient operator: for Gradient Descent in Optimization
- Integrals for cumulative distribution function
- Python Experimentation

Unit 4 Probability Theory
- Define Random Variables, Probability Distributions – Gaussian, Bernoulli, Binomial, and Poisson distributions model specific types of events
- Bayes' theorem, uncertainty modelling - updating beliefs based on observed evidence
- Python Experiments

Unit -5 Statistical Methods
- Descriptive Statistics - Expectation, Variance and Covariance
- Central Limit Theorem – Sampling distribution
- Inferential Statistics - Hypothesis Testing – Chi square test, T-Test
- Python Experiments

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

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Duration of Internal Test: 90 minutes

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

DEPARTMENT OF MATHEMATICS

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

Instruction: 3 Hours	SEE: 60	Course code: U24OE410MA
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to :	At the end of the course students should be able to:
1. Study various numerical methods to solve Algebraic and Transcendental equations. 2. Learn the methods to solve linear system of equations. 3. Understand the numerical methods in interpolation and extrapolation. 4. Understand the numerical methods in interpolation using central differences. 5. Understand numerical methods in solving ordinary differential equations.	1. Apply numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods 2. Solve linear system of equations using direct and iteration methods. 3. Use various numerical methods in interpolation and extrapolation. 4. Implement various numerical methods in interpolation using central differences. 5. Find numerical solutions of ordinary differential equations.

<u>UNIT – I: (8 Hours)</u>
SOLUTION OF ALGEGBRAIC AND TRANSCENDENTAL EQUATIONS:
Algebraic and Transcendental equations: Bisection method - Newton-Raphson method - Regula-Falsi method.

<u>UNIT – II: (8 Hours)</u>
SOLUTION OF SYSTEM OF LINEAR EQUATION<u>S:</u>

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

UNIT – III: (8 Hours)
NUMERICAL DIFFERENCES - I
Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae - Interpolation with unequal intervals - Lagrange's Interpolation Formula - Divided differences - Newton's divided difference formula.

UNIT – IV: (8 Hours)
NUMERICAL DIFFERENCES - II
Central differences interpolation - Gauss's forwards and backward difference formulae - Stirling's formula - Bessel's formula.

UNIT – V: (8 Hours)
NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS
Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta of 4th order (without proofs).

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

Reference Books:
1. Numerical Analysis by S.S.Sastry, PHI Ltd.

Online Resources:
https://onlinecourses.swayam2.ac.in/cec24_ma19/preview

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Duration of Internal Test: 90 minutes

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

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

Instruction: 3 Hours	SEE: 60	Course code: U24OE450EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

Course Objectives: This is a theory based paper :	Course Outcomes: At the end of the course the students will be able to:
1 Provides exposure to students regarding financial markets integrating Technology and financial services. 2 Creates awareness about Fintech (focus areas of leading technology companies)	1 Apply the traditional methods and adopt to the digital methods now used in banks. 2 Use digital wallets and digital currency more dexterously. 3 Access bank accounts through chatbots in banking sector.

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

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

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

Unit IV:

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

Unit V :

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

Prescribed Textbook :
Introduction to Fintech, Ist Edition, Pearson publications

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

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

Duration of Internal Test: 90 minutes

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

INTRODUCTION TO FINANCE MANAGEMENT FOR ENGINEERS
SYLLABUS FOR B.E -   IV SEMESTER
(STREAM BASED ELECTIVE) W.E.F ACADEMIC YEAR 2025-26

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

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

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

Unit -1: Introduction

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

Unit -2: Sources of Finance

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

Unit-3: Financial performance assessment

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

Unit -4: Project Finance

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

Unit-5: International Finance (Only Theory)

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

LEARNING RESOURCES:-

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

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

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