VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

Ibrahimbagh, Hyderabad-31

Approved by A.I.C.T.E., New Delhi and

Affiliated to Osmania University, Hyderabad-07

Sponsored

by

VASAVI ACADEMY OF EDUCATION

Hyderabad

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Phones: +91-40-23146020, 23146021

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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

To be a center for academic excellence in the field of Computer Science and Engineering education to enable graduates to be ethical and competent professionals

Department Mission

To enable students to develop logic and problem solving approach that will help build their careers in the innovative field of computing and provide creative solutions for the benefit of society.

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B.E (CSE) Program Educational Objectives (PEO's)	
Graduates should be able to utilize the knowledge gained from their academic program to:	
PEO I	Solve problems in a modern technological society as valuable and productive engineers.
PEO II	Function and communicate effectively, both individually and within multidisciplinary teams.
PEO III	Be sensitive to the consequences of their work, both ethically and professionally, for productive professional careers.
PEO IV	Continue the process of life-long learning.

B.E. (CSE) PROGRAM OUTCOMES (PO's) Engineering Graduates will be able to:	
PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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	**Life long 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.

B.E (CSE) PROGRAM SPECIFIC OUTCOMES (PSO's)	
PSO I	Graduates will have knowledge of programming and designing to develop solutions for engineering problems.
PSO II	Graduates will be able to demonstrate an understanding of system architecture, information management and networking.
PSO III	Graduates will possess knowledge of computer science and engineering in the areas of Cloud Computing & Data Analytics and apply them in appropriate domains.

With effect from the Academic Year 2025-26

SCHEME OF INSTRUCTION AND EXAMINATION(R-24)
FOR B.E 2024-25 ADMITTED BATCH III SEMESTER (A.Y 2025-26)

B.E (CSE) III Semester								
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								
UI24PC310CS	Data Structures	3	1	-	3	60	40	4
UI24PC320CS	Object Oriented Programming through Java	3	-	-	3	60	40	3
UI24PC330CS	Computer Architecture	3	-	-	3	60	40	3
U24BS340MA	Transform Techniques, Probability & Statistics	3	1	-	3	60	40	4
U24OE3XXXX	Open Elective-I	2	-	-	3	60	40	2
U24HS310EH	Critical Thinking	1	-	-	2	40	30	1
U24HS320EH	Skill Development Course-I (Communication Skills-I)	1	-	-	2	40	30	1
UI24PE310CS	Skill Development Course- II (Technical Skills-I)	1	-	-	2	40	30	1
U24HS030EH	Human Values and Professional Ethics-II	1	-	-	2	40	30	1
PRACTICALS								
UI24PC311CS	Data Structures Lab	-	-	2	3	50	30	1
UI24PC321CS	Object Oriented Programming through Java Lab	-	-	2	3	50	30	1
Library / Sports / Mentor Interaction		-	-	-	-	-	-	-
Extra-Curricular Activities –I		-	-	-	-	-	-	-
TOTAL		**18**	**2**	**4**	-	**560**	**380**	**22**
GRAND TOTAL		**24**				**940**		
Student should acquire one NPTEL course certification of 8 weeks duration (2 credits) during I Sem to VI Sem								

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATA STRUCTURES

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week):3:1:0	SEE Marks: 60	Course Code:**UI24PC310CS**
Credits : 4	CIE Marks :40	Duration of SEE : 3 Hours

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

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

UNIT-I:

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

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

UNIT-II:

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

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

UNIT-III:

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

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

UNIT-IV:

Sorting: Insertion Sort, Quick sort, Merge sort, Heap sort, Radix Sort, Sorting on Several Keys.

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

UNIT-V:

Multiway Search Trees: m-way search trees-Definition and properties, Searching an m-way search tree, B-Trees-Definition and properties, Number of Elements in a B-Tree, Insertion into a B-Tree and Deletion from a B-Tree.

Trie Data Structure: Introduction, Basic Operations.

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

Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press.
2. 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), CengageLeaming
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press

7. YedidyahLangsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-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 Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

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Department of Computer Science & Engineering

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks:60	Course Code:**UI24PC320CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply object oriented principles to develop applications using Java constructs.	1 Apply object oriented programming concepts to solve a problem 2 Employ exception handling, concurrent programming practices to develop a parallel processing application 3 Perform I/O operations to develop an interactive Java application. 4 Design a Java utility using the collection framework 5 Apply functional programming constructs and understand a large scale project development architecture style.

CO-PO and CO-PSO mapping

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

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, JVM Architecture, Data types, Variables and Arrays, Operators, Control

Statements, Classes and Methods, Garbage Collection, this keyword, final, Inheritance, Method Overriding.

UNIT-II:

Classes and Interfaces: Singleton class, Abstract class, Nested class, Interface, Package.

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

Multithreaded Programming: Introduction to threads, creating threads, extending the Thread class, implementing the Runnable interface, life cycle of a thread, priority of a thread, synchronization, and Inter-thread Communication, Deadlock.

UNIT-III:

StringHandling: String, StringBuffer and StringBuilder

Java.lang: Type Wrapper, Process, Runtime, Object class, Generics

IO: Java I/O Classes and Interfaces, Files and Directories, Byte and Character Streams, Serialization.

UNIT-IV: **Collections:**

Introduction to Collection: Interfaces, Collection Classes, Iterators, List, Set, Maps, Comparator, Arrays.

Legacy Classes and Interfaces, StringTokenizer, BitSet, Date, Calendar, Random, Flow, Timer.

UNIT-V:

Lambda expressions: Expressions, Functions, lambda as argument

Stream API: Basics, Filter, Sort, Map, Collect

Regular Expressions: Pattern, Matcher, Regular expression Syntax

JAVA Beans: Architecture

Learning Resources:

1. Herbert Schildt, Java: The Complete Reference, 12th Edition, Tata McGraw Hill 2021.
2. Joshua Bloch, Effective Java, 3rd Edition, Pearson, 2017
3. Timothy Budd, An introduction to Object-Oriented Programming, 3rd Edition, Pearson Education, 2008
4. Eric Freeman, Bert Bates, Kathy Sierra , Head First Design Patterns: A Brain-Friendly Guide, 1st Edition, O'Reilly, 2016
5. P.RadhaKrishna, Object Oriented Programming through Java, UniversitiesPress,2007.
6. Sachin Malhotra, Saurabh Choudhary, Programming in Java, 2nd Edition, Oxford Press, 2014.
7. 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 Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

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Department of Computer Science & Engineering

COMPUTER ARCHITECTURE

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**UI24PC330CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, students will be able to
1. Learn the structure and behavior of various functional modules of a computer and identify how they interact to provide the processing needs of the user. 2. Understand memory hierarchy and analyze different ways of communicating with I/O of digital computer.	1. Analyze the major components of a computer and design basic hardware for functional modules of digital computer. 2. Analyze micro programmed control unit for designing a digital computer. 3. Apply pipeline concepts to increase computational speed of CPU and analyze the flow of data and instructions in the CPU operations. 4. Analyze techniques used by a computer to communicate with I/O devices. 5. Evaluate the memory organization techniques and assess the performance of a CPU.

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

UNIT-I

Overview of Computer Function and Interconnection: Computer Components, Interconnection Structures, Bus Interconnection, Bus Structure, Data Transfer.

Register Transfer Micro operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic, Logic, Shift Micro operations, Arithmetic Logic Shift Unit.

UNIT-II

Basic Computer organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instruction, Input-Output and Interrupt.

Micro programmed Control: Control memory, Address Sequencing, Micro program Example, Design of Control Unit.

UNIT-III

Central Processing Unit: General Register organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, RISC.

Pipeline: Parallel processing, Pipelining, Arithmetic pipeline, Instruction Pipeline.

Computer Arithmetic: Addition and Subtraction, Multiplication, Division, Floating Point Arithmetic Operations.

UNIT-IV

Input-Output organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor (IOP).

UNIT-V

Memory Organization: Memory Hierarchy, Main Memory, RAM and ROM, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Assessing and Understanding Performance: CPU Performance and its Factors, Evaluating Performance.

Suggested Books:

1. M.Morris Mano, Computer System Architecture, 3rd Edition (2007), Pearson Education Asia.

Reference Books:

1. William Stallings, Computer Organization & Architecture, 8th Edition (2011), Pearson Education Asia.
2. David A Patterson, John L Hennessy, Computer Organization and Design, 4th Edition (2014), Morgan Kaufmann.
3. Carl.V Hamacher, Vranesic Z.G, Zaky S.G, Computer Organization, 5th Edition (2011), McGraw Hill.

4. Pal Chaudhuri.P, Computer Organization and Design, 3rd Edition(2009), Prentice Hall of India.

Online Resources:

1. http://nptel.ac.in/courses/106102157/
2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-823-computer-system-architecture-fall-2005/

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

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DEPARTMENT OF MATHEMATICS

TRANSFORM TECHNIQUES, PROBABILITY & STATISTICS

SYLLABUS FOR B.E.III-SEMESTER

L :T:P(Hrs/week): 3:1:0	SEE Marks :60	Course Code:**U24BS340MA**
Credits :4	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to :	***At the end of the course students should be able to:***
1. **Study** the conditions for expansion of function as a Fourier series and expansion of a function as a Fourier series. 2. **Understand** the concept of Fourier and inverse Fourier Transform, Fourier Sine and Cosine transform of a function and various properties. 3. **Learn** the properties of Discrete and Continuous Random variables and Normal Distribution. 4. **Analyze** standard statistical tests employed for small samples 5. **Understand** the Method of least squares for fitting of a straight line and second order curves to a given data and also about Correlation between variables.	1. **Expand** a function as a Fourier series in an interval and also expressing even and odd functions as a Fourier series. 2. **Determine** Fourier transform, Fourier sine and cosine transform and inverse Fourier, Sine and Cosine transform of a function. 3. **Differentiate** between discrete and continuous random variables and solve the problems on Normal Distribution. 4. **Formulate** Null and Alternative Hypotheses and apply the tests of hypothesis for small samples. 5. **Apply** the Method of least squares for fitting of straight line and second order curves to the given data and also to find co-efficient of correlation and their application problems.

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

UNIT –I (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

UNIT-II (8 Hours)

FOURIER TRANSFORMS

Fourier Transform – Inverse Fourier Transform - Properties of Fourier Transform –Fourier Cosine & Sine Transforms.

UNIT-III (8 Hours)

PROBABILITY DISTRIBUTIONS

Random Variables - Discrete and Continuous Random variables - Mass and density functions- Cumulative distribution function – Definitions of Mean, Median, Mode and Variance of Probability distributions - Continuous Distribution – Normal Distribution – Properties.

UNIT-IV (8 Hours)

TESTS OF HYPOTHESIS

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

UNIT-V (8 Hours)

CURVE FITTING

The Method of Least Squares - Fitting of Straight line- Second order curve (Parabola)-Exponential curve- Correlation – Karl Pearson's Co-efficient of Correlation

Text Books:

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

Reference Books:

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

3. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand & sons, New Delhi.

Online resources:

1. https://nptel.ac.in/courses/111106046
2. https://nptel.ac.in/courses/111104519
3. https://ocw.mit.edu/courses/18-440-probability-and-random-variables-spring-2014/

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

OPEN ELECTIVES OFFERED IN B.E. III SEMESTER (2025-26)

Dept	Title (Open Elective-I)	Code	Credits
CIVIL	Green Buildings	U24OE310CE	2
ECE	Mathematical Programming for Engineers (General Pool)	U24OE310EC	2
	Introduction to Signals and Systems (General Pool)	U24OE320EC	2
	Introduction to Signals and Systems (Communication Engineering-Stream)	U24OE340EC	2
EEE	Non Conventional Energy Sources	U24OE310EE	2
Mech.	Introduction to Industrial Robotics (Stream: Robotics)	U24OE310ME	2
	Fundamentals of Unmanned Aerial Vehicles (General Pool)	U24OE320ME	2
Chem.	Corrosion Science and Technology	U24OE310CH	2
H & SS	Human Resources Management For Engineers (Management courses – Stream)	U24OE310EH	2
	Introduction to financial services (BFSI - Stream)	U24OE350EH	2
	Learning to Learn (General Pool)	U24OE320EH	2
	Constitution of India – Basic Features & Fundamental Principles (General Pool)	U24OE360EH	2
	Introduction to Journalism(General Pool)	U24OE370EH	2
Physics	Fundamentals of Smart Materials and Applications (FSMA)	U24OE310PH	2
Maths	Number Theory & Boolean Algebra	U24OE320MA	2

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DEPARTMENT OF CIVIL ENGINEERING

GREEN BUILDINGS (Open Elective-I)

SYLLABUS FOR B.E. III-SEMESTER

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

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

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

UNIT-II: Building-Energy-Implications: Environmental implications of buildings energy, carbon emissions, water use, waste disposal; Building

materials: sources, methods of production and environmental Implications. Green building materials and recycling, Green cover and built environment

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers

(General Pool: Open Elective - I)

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

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

COURSE OBJECTIVES	COURSE OUTCOMES
1. To introduce the basic environment and interface of MATLAB, including its windows, file types, and built-in help system. 2. To develop proficiency in MATLAB basics such as variables, arrays, vectors, matrices, and script/function file creation and execution. 3. To build programming skills using MATLAB, including understanding data types, control structures, loops, and debugging techniques. 4. To enable students to generate 2D and 3D plots and visualizations, using MATLAB's wide range of graphic functions. 5. To apply MATLAB for solving mathematical and engineering problems such as numerical integration, linear algebra, interpolation, and root finding.	On completion of the course, students will be able to 1. Demonstrate familiarity with the MATLAB environment, file handling, and basic operations including help utilities. 2. Create and manipulate matrices, vectors, and arrays using built-in functions and scripts in MATLAB. 3. Write and debug MATLAB programs using control structures, loops, and logical operations. 4. Generate and customize 2D and 3D plots for data visualization and analysis. 5. Solve mathematical problems using MATLAB, including linear and nonlinear equations, interpolation, differentiation, and numerical integration.

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

UNIT - I : Introduction:

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

MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots,

Creating, Saving and Executing a Script File, Creating and Executing a function file.

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

UNIT - II : Scripts and Functions

Script Files, Function Files, Debugging methods in MATLAB.

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

UNIT - III : Numerical Methods Using MATLAB

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

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

UNIT - IV : Nonlinear Equations

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

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Signals and Systems

(General Pool: Open Elective - I)

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

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U24OE320EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO and CO-PSO mapping

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

UNIT - I

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

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

UNIT - II

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

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

UNIT – III

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

UNIT - IV

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

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Signals and Systems

(Communication Engineering Stream: Open Elective - I)

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

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U24OE340EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO and CO-PSO mapping

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

UNIT - I

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

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

Lab Activity: Generation of elementary signals in MATLAB.

UNIT - II

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

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

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

UNIT – III

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

Lab activity: Obtaining system response using Laplace transforms in MATLAB

UNIT - IV

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

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

Lab activity: Generation of elementary signals in MATLAB.

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NON CONVENTIONAL ENERGY SOURCES

(Open Elective-I)

SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:**U24OE310EE**
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To provide a survey of the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state- of -the-art energy systems.	1. Demonstrate the generation of electricity from various Non-Conventional sources of energy and solar power generation 2. Illustrate the generation of energy from wind and generation of energy from waste 3. Demonstrate the generation of energy by biomass and fuel cells 4. Illustrate the ocean and geo thermal energy generation

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

UNIT-I: Introduction and Solar Energy:

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

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

UNIT-II: Wind Energy and Waste to Energy:

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

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

UNIT-III: Biomass Energy and Fuel Cells:

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

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

UNIT-IV: Ocean Energy and Geothermal Energy:

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

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

Learning Resources:

1. B H KHAN, Non-Conventional Energy Resources, McGraw Hill, 2nd Edition, 2009.
2. G. S. Sawhney, Non-Conventional Energy Resources, PHI Learning Pvt Ltd, 2012
3. ShobhNath Singh, Non-Conventional Energy Resources, Pearson, 2016
4. G.D. Rai, Non-Conventional Energy Sources ,Khanna Publishers, New Delhi, 2011.
5. Ashok Desai V, Non-Conventional Energy, Wiley Eastern Ltd, 1990.

6. Mittal K.M, Non-Conventional Energy Systems, Wheeler Publishing Co. Ltd, 1997.
7. Ramesh R, Kurnar K.U, Renewable Energy Technologies, Narosa Publishing House, New Delhi

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

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

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

INTRODUCTION TO INDUSTRIAL ROBOTICS
(Stream: Robotics)

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

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

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

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

UNIT-I

ROBOT BASICS

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

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

ROBOT APPLICATIONS

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

UNIT-II

ROBOT ELEMENTS

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

UNIT-III

ROBOT COORDINATE SYSTEMS

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

UNIT-IV

ROBOT SENSORS

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

Robot programming

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

FUNDAMENTALS OF UNMANNED AERIAL VEHICLES

(**General Pool**)

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

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

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

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

Unit-I:

Introduction to UAV

UAV: Definition, History; Difference between aircraft and UAV; DGCA Classification of UAVs; Types and Characteristics of Drones: Fixed, Multi-

rotor, and Flapping Wing; Applications: Defense, Civil, Environmental monitoring.

Unit-II:

Basics of Flight

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

Unit-III:

Manufacturing and Analysis of UAV

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

Unit-IV:

Artificial Intelligence in UAV Systems

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Chemistry

CORROSION SCIENCE AND TECHNOLOGY
(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

Instruction :2Hrs / Week	SEE Marks : 60	Course Code : **U24OE310CH**
Credits: 2	CIE Marks : 40	Duration of SEE : 3Hours

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

CO-PO MAPPING												
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**44**	**12**
CO1	2	1	-	-	-	-	1	-	-	-	-	1
CO2	2	1	-	-	-	-	1	-	-	-	-	1
CO3	2	1	-	-	-	-	1	-	-	-	-	1
CO4	2	1	-	-	-	-	1	-	-	-	-	2

UNIT-I: CHEMICAL AND ELECTROCHEMICAL CORROSION

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

UNIT-II: CORROSION CONTROL METHODS INHIBITORS AND ORGANIC COATINGS

A. Factors influencing corrosion

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

Nature of environment: temperature, pH and humidity.

B. Corrosion Control by Inhibitors and Organic Coatings

Corrosion Inhibitors: Anodic, Cathodic and vapor phase inhibitors.

Organic Coatings: Paints – constituents and their functions, vitreous enamel coatings, varnishes and lacquers.

UNIT-III: METALLIC COATINGS

Passivation of metals, polarization curve of passivating metals, effect of pH and potential-pH diagram for iron (Pourbaix Diagram) and polarization curve of iron, application of Pourbaix diagram for corrosion mitigation.

Metallic coatings: Types - anodic & cathodic. Surface pre-treatment of base metal.

Methods of application of metallic coatings: Hot dipping- galvanization - applications of galvanized RCC steel bars. Cladding, electro plating & electroless plating- principle and their differences.

Electroplating of Cu coating on Fe, Electroless plating of Ni coating on Insulators, Preparation of PCB using Electroless plating.

UNIT-IV: CATHODIC PROTECTION AND SURFACE CONVERSION

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

Surface conversion coatings: Carburizing, Nitriding, Cyaniding.

Text Books:

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

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

HUMAN RESOURCES MANAGEMENT FOR ENGINEERS

(Stream: Management courses for Engineers)

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEE Marks: 60	Course Code: **U24OE310EH**
Credits: 2	CIE Marks: 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 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.	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.

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

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 marks for CIE :

Internal Tests + Quiz Tests + Assignments

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

INTRODUCTION TO FINANCIAL SERVICES

(Stream: BFSI)

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEE Marks: 60	Course Code: **U24OE350EH**
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

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

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

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 marks for CIE :
Internal Tests + Quiz Tests + Assignments

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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Department of Humanities and Social Sciences

LEARNING TO LEARN
(Common to all branches)
(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEE Marks: 60	Course Code: **U24OE320EH**
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

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

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

OVERVIEW:

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

UNIT 1: STUDY SKILLS

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

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

UNIT 2: Chunking

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

2.1 Knowledge Chunking
2.2 Skill and Will
2.3 Sleep and Learning

UNIT 3: Procrastination and Memory

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

3.1 Controlling Procrastination
3.2 Ranking the importance of tasks with a to- do list

3.3 Finding their most productive time
3.4 Keeping track of time spent on different tasks
3.5 Introduction to Deep learning

UNIT 4: Renaissance Learning and Unlocking Your Potential

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

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

LEARNING RESOURCES

learn.talentsprint.com

The break-up of marks for CIE :
Internal Tests + Quiz Tests + Assignments

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

CONSTITUTION OF INDIA – BASIC FEATURES & FUNDAMENTAL PRINCIPLES (Open Elective-I) (Common to all branches) SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEE Marks: 60	Course Code: **U24OE360EH**
Credits: 2	CIE Marks: 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.

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

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

Duration of Internal Tests :90 Minutes

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

Department of Humanities and Social Sciences

INTRODUCTION TO JOURNALISM
(Open Elective-I) (Common to all branches)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEE Marks: 60	Course Code: **U24OE370EH**
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

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

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

UNIT-1: MASSCOMMUNICATION: NATURE AND CONCEPT OF MASSCOMMUNICATION

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

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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

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF PHYSICS

FUNDAMENTALS OF SMART MATERIALS AND APPLICATIONS
(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

Instruction :2Hrs/Week	SEE Marks : 60	Course Code : **U24OE310PH**
Credits: 2	CIE Marks : 40	Duration of Semester End Exam:3 hrs

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

CO-PO and CO-PSO mapping

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

UNIT I: INTRODUCTION TO SMART MATERIALS (6 hours)

Characteristics of metals, polymers and ceramics. Introduction to smart materials, need for smart materials, Classification of smart materials,

Components of a smart System, Applications of smart material, role of smart materials in developing intelligent systems and adaptive structures.

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

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

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

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

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

UNIT IV: SHAPE MEMORY MATERIALS (8 hours)

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

Learning Resources:

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

The break-up of marks for CIE :
Internal Tests + Quiz Tests + Assignments

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

NUMBER THEORY & BOOLEAN ALGEBRA (Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U24OE320MA**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to :	**At the end of the course students should be able to:**
1. Study Fundamental Theorem of Arithmetic and GCD using Euclidean Algorithm and also Linear Diophantine Equations and their solutions. **2. Understand** the concepts of number theory such Congruences and proof of Chinese Remainder theorem. **3. Identify** Primitive roots for primes and their existence and also to outline the Euler's theorem and Lagrange's theorem. **4. Familiarize** with properties of Boolean algebra and to understand Normal Forms.	**1. Calculate** GCD using Euclidean algorithm and also solve Linear Diophantine Equations in order to implement in RSA encryption. **2. Apply** Chinese Remainder theorem for optimizing cryptographic processes, such as accelerating RSA decryption and the Pollard Rho method to assess and demonstrate the factorization of composite numbers used in cryptographic keys. **3. Use** Fermat's Theorem & Wilson's theorem to prove that RSA works accurately and also in discrete log cipher of Cryptography. Also primitive roots in the Diffie-Hellman key exchange protocol of Cryptography **4. Design** secure hash functions, encryption schemes, and authentication protocols using Boolean functions which are the building blocks of symmetric cryptographic systems.

CO-PO and CO-PSO mapping

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

UNIT – I (6 Hours)

THEORY OF NUMBERS: The Integers and Division- Prime and Composite Numbers -Division Algorithm- Fundamental Theorem of Arithmetic(without proof) –GCD and their properties- Euclidean Algorithm- Linear Diophantine Equations and their solutions.

UNIT – II (8 Hours)

CONGRUENCES: Modular Arithmetic- Introduction to Congruences, Linear Congruence. Chinese Remainder Theorem - System of Linear Congruences in two variables- The Pollard Rho Factoring Method.

UNIT – III (5 Hours)

SOME SPECIAL CONGRUENCES: Fermat's Little Theorem- Wilsons Theorem and its converse Euler's phi-function - Euler's theorem -The order of an integer modulo n, Primitive roots for primes.

UNIT – IV (6 Hours)

BOOLEAN ALGEBRA: Axiomatic definition of Boolean Algebra, Basic theorems and Properties of Boolean Algebra, Boolean Functions, Minterms and Maxterms, Disjunctive normal form and conjunctive normal form.

Text Books:

1. K.H. Rosen: Elementary Number Theory & its Applications, Pearson Addition Wesley
2. Elementary Number Theory | 7th Edition by David Burton, Mc Graw Hill Education
3. Discrete mathematics for computer scientists and mathematicians / by Joe L. Mott, Abraham Kandel and Theodore P. Baker, Prentice Hall Of India Pvt.Ltd., 1986.Edition: 2nd edition, New Delhi.
4. Discrete Mathematics, R.K.Bisht and H.S.Dhami, Oxford Higher Education.

Reference Books:

1. N. Koblitz; A course in Number theory and Cryptography; Springer.
2. Neville Robinns, Beginning Number Theory (2nd Edition), Narosa Publishing House Pvt. Limited, Delhi, 2007.
3. Elementary Number Theory with Applications, Thomas Koshy, 2nd edition, Academic Press, An Imprint of Elsevier, USA, 2007.
4. Basic Number Theory by S.B. Malik,S. Chand publishers

5. Arnold B. H.: Logic and Boolean Algebra, Prentice Hall, 1962.

Online Resources:

1. https://www.classcentral.com/course/openlearn-science-maths-technology-introduction-number-theory-95553
2. https://www.open.edu/openlearn/science-maths-technology/introduction-number-theory/content-section-0?intro=1
3. https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-fall-2010/resources/lecture-4-number-theory-i/

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

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

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

CRITICAL THINKING

SYLLABUS FOR B.E. - III Semester

Instruction : 2.0.0	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.	1. Students will identify assumptions, biases, and logical fallacies in real-world scenarios.
2. Learn to evaluate evidence and differentiate between facts and opinions.	2. Learn to evaluate evidence and differentiate between facts and opinions.
3. Introduce frameworks like SWOT and root cause analysis for problem-solving.	3. Students will apply structured methods to analyze problems and propose actionable solutions.
4. Develop critical thinking skills through case studies and ethical debates.	4. Students will demonstrate critical thinking through group discussions and case study analyses

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

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

LEARNING RESOURCES

learn.talentsprint.com

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

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

Duration of Internal Test: 90 Minutes

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VASAVI COLLEGE OF ENGINEERING(Autonomous)

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Department of Humanities and Social Sciences

Skill Development Course - I (Communication Skills -I)

SYLLABUS FOR BE -III SEMESTER

(COMMON FOR ALL BRANCHES)

L:T:P(Hrs/Week):2:0:0	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

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

Unit 1: Delightful Descriptions

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

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

Unit 2: Formal Conversation Skills

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

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

Unit 3: Technical Expositions and Discussions

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

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

Unit 4: Rational Recap

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

Unit 4: Rational Recap

4.1 Paraphrasing - Written
1.2 Summarizing - Written
1.3 Paraphrasing – Spoken
1.4 Summarizing – Spoken

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

Learning Resources:

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

The break-up of marks for CIE :

Internal Tests + Quiz Tests + Assignments

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

Skill Development Course-II (Technical Skills-I)
Problem Solving through Data Structures

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week):1:0:0	SEE Marks : 40	Course Code:**UI24PE310CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Understand the significance of Competitive Coding 2. Prepare the students for the contests relative to the concepts learnt 3. Build confidence in coding using Linear Data structures 4. Learn essential algorithms for Competitive Coding	1. Solve scenario based problems on linked lists, Recursive Algorithms, Search & Sort Algorithms, Divide & Conquer Strategies and use memory manipulation functions. 2. Learn linear data structures usage in various applications with scenario based problem solving through coding.

CO-PO mapping												
CO/PO	**PO**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	3	2	1	-	-	-	-	-	-	-	2
CO2	3	3	2	1	-	-	-	-	-	-	-	2

Code Complexity Analysis & Linear List data

Problem solving through Coding, Compare and contrast coding and competitive coding, Various approaches for problem solving, techniques for competitive coding, Orientation on Competitive coding on coding platforms like Codechef/ Codeforces/ Leetcode/ Hackerrank etc.

Precise coding techniques implementing the evaluation of the language supported expressions, code complexity analysis, Linear / Logarithmic/ Super linear/ Polynomial/ Exponential/ Recursion Algorithm analysis, Problem Solving using Linear list data, Subscripts, 2D Array Subscript, RMO

& CMO Representation, Matrix Problems. Company Specific Examples & Competitive Programming Practice Problems.

Contextual implementation using Competitive Coding using global coding platforms: Code chef/ Leet code / Codeforces / Hackerrank etc.

Memory Manipulation Methods and Problem Solving on ring

Pointer Variable, Pointer Arithmetic, Memory Layout, Runtime memory allocation, Problem Solving on String Data, String handling methods, Examples, Practice Problems.

Problem Solving using Linked List data

Implementing a Structure member pointer reference, Coding solutions for Linked list manipulation, Solutions for order statistic problems on linked lists: Comparison/ Cycle Detection/ Merge Point Detection/ Merging the lists, Coding solution for the circular linked data and Double linked data, coding problems, Examples, Practice problems.

Problem Solving using Abstract data structures: Stacks

Problem solving using Stacks, Coding solutions for the implementation of stack using an array, Coding solutions for the implementation of stack using a linked list. Problem solving on expression conversion and evaluation, Examples, Practice problems.

Problem Solving through Queues & Search-Sort Algorithms

Problem solving using Queues, Coding solutions for the implementation of queue using an array/ linked list, Divide & Conquer Strategies: Linear Vs Binary Search Analysis, Bubble sort and Selection Sort Analysis, Examples, Practice problems.

Problem Solving through Divide & Conquer Strategies

Divide & Conquer Strategies: Quick sort Analysis, Merge Sort Analysis, Min/Power functions, Examples, Practice problems.

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

1	No. of Internal Tests	:	1	Max. Marks for each Internal Test	:	20
1	No. of Quizzes	:	1	Max. Marks for each Quiz	:	10

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities & Social Sciences

Human Values and Professional Ethics-II

SYLLABUS FOR B.E- III SEMESTER

(COMMON FOR ALL BRANCHES)

L:T:P(Hrs/Week):1:0:0	SEE Marks: 40	Course Code: **U24HS030EH**
Credits: 1	CIE Marks: 30	Duration of SEE: 02 Hours

COURSE OBJECTIVES **The course will enable the learners to:**	**COURSE OUTCOMES** **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

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

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 • Project

Relevant Websites, CD's and Documentaries

- https://plato.stanford.edu/

Learning Resources:

- learn.talentsprint.com

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

Additional Reading

1. Akash Singh Rathore - On Constitution

The break-up of marks for CIE :
Internal Tests +Quiz Tests+ Assignments

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATA STRUCTURES LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks : 50	Course Code:**UI24PC311CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

CO-PO and CO-PSO mapping

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

Programming Exercise:

1. Implementation of Formula based representation.
2. Implementation of Singly Linked List, Doubly Linked List and Circular Linked List.
3. Implementation of Polynomial Arithmetic using Linked List.

4. Implementation of String Matching algorithms.
5. Implementation of Stacks, Queues.(Using both Arrays and Linked Lists)
6. Implementation of Infix to Postfix Conversion, Postfix Expression Evaluation.
7. Implementation of Recursive and Iterative Traversals on Binary Tree.
8. Implementation of Binary Search Tree.
9. Implementation of Operations on Binary Tree (Delete Entire Tree, Copy Entire Tree, Mirror Image, Level Order, Search for a Node etc.)
10. Implementation of Traversal on Graphs.
11. Implementation of Selection, Merge, Quick, Heap, and Insertion Sort.
12. Implementation of Binary Search and Hashing
13. Implementation of operations on AVL Trees.
14. Implementation of B-Trees.
15. Develop application using appropriate data structures.

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. 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), CengageLeaming
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press
7. YedidyahLangsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-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 day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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Department of Computer Science & Engineering

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks: 50	Course Code:**UI24PC321CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Implement object oriented concepts using Java constructs 2 Develop Java application using collection frame work and streams .	1 Implement a use-case using object oriented programming concepts 2 Develop applications using multi threaded programming 3 Implement I/O operations using console and file streams 4 Apply collection framework to store and manipulate data 5 Apply functional programming constructs

CO-PO and CO-PSO mapping

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

Programming Exercise:

1. A program to demonstrate the concept of class with constructors, methods and overloading.
2. A program to demonstrate the concept of inheritance and dynamic Polymorphism Abstract class & Interface
3. A program to create Packages.

4. A program to demonstrate Exception Handling.
5. A program to demonstrate Thread Synchronization.
6. A program to work on strings using String classes.
7. A program to demonstrate the usage of Filter and Buffered I/O streams
8. A program to demonstrate Serialization and Deserialization
9. A program using List & Set interfaces, Iterator & List Iterator
10. A program using Mapinterface, Date, Calendar &Timer.
11. A program to implement object comparison using comparator
12. A program to implement Lambda Functions
13. A program to implement Stream API
14. A program to demonstrate usage of Regular Expressions

Learning Resources:

1. Herbert Schildt, Java: The Complete Reference, 12th Edition, Tata McGraw Hill 2021.
2. Joshua Bloch, Effective Java, 3rd Edition, Pearson, 2017
3. Timothy Budd, An introduction to Object-Oriented Programming, 3rd Edition, Pearson Education, 2008
4. Eric Freeman, Bert Bates, Kathy Sierra , Head First Design Patterns: A Brain-Friendly Guide, 1st Edition, O'Reilly, 2016
5. P. Radha Krishna, Object Oriented Programming through Java, Universities Press,2007.
6. Sachin Malhotra, Saurabh Choudhary, Programming in Java, 2nd Edition, Oxford Press,2014.
7. https://docs.oracle.com/javase/tutorial/java

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

SCHEME OF INSTRUCTION AND EXAMINATION(R-24)
FOR B.E BRIDGE COURSE III SEMESTER (A.Y 2025-26)

B.E. III Semester								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P		SEE	CIE	
THEORY								
UB24BS300MA	Foundation to Engineering Mathematics	2	-	-	3	50	-	-
UB24ES310CS	Computer Programming	2	-	-	3	50	-	-
	TOTAL	**4**	**-**	**-**	-	**100**	**-**	**-**
	GRAND TOTAL	**4**				**100**		

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH,HYDERABAD– 500031

DEPARTMENT OF MATHEMATICS

FOUNDATION TO ENGINEERING MATHEMATICS

BRIDGE COURSE FOR B.E. III-SEMESTER

(Common to all branches)

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

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

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

UNIT – I: (8 Hours)

CALCULUS

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

UNIT – II: (6 Hours)

DESCRIPTIVE STATISTICS

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

UNIT –III: (6 Hours)

BASICS OF PROBABILITY

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

UNIT – IV: (8 Hours)

MATRICES

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

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 Fundamentals of Mathematical Statistics, S. C. Gupta, V.K. Kapoor, S Chand & Sons

VASAVICOLLEGEOFENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD– 500031

Department of Computer Science & Engineering

COMPUTER PROGRAMMING

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code :**UB24ES310CS**
Credits :--	CIE Marks : --	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. Develop flow charts 3. Understand structured programming concepts 4. Write programs in C Language	1. Design flowcharts and algorithms for solving a problem and choose appropriate data type for writing programs in C language 2. Design modular programs involving input output operations, decision making and looping constructs 3. Apply the concept of arrays for storing, sorting and searching data 4. Apply the concept of pointers for dynamic memory management and string handling 5. Design programs to store data in structures and files

CO-PO and CO-PSO mapping

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

UNIT-I

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

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

UNIT-II

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

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

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

UNIT-III

Recursion-Recursive Functions, Preprocessor Commands.

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

UNIT-IV

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

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

UNIT-V

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

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

Learning Resources:

1. B. A. Forouzan& Richard F. Gilberg, "A Structured Programming Approach using C", 3rd Edition, Cengage Learning, 2013.
2. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Prentice-Hall, 2006.
3. Rajaraman V, "The Fundamentals of Computer", 4th Edition, Prentice-Hall of India, 2006.
4. Steve Oualline, "Practical C Programming", 3rd Edition, O'Reilly Press.
5. Jeri R. Hanly, Elliot B. Koffman, "Problem Solving and Program Design in C", 5th Edition, Pearson Education, 2007.

6. E. Balagurusamy, “Programming in ANSI C”, 4th Edition, TMG, 2008.
7. Gottfried, “Programming with C”, 3rd Edition, TMH, 2010.
8. R G Dromey, “How to Solve it by Computer”, 1st Edition, Pearson Education, 2006.

With effect from the Academic Year 2025-26

SCHEME OF INSTRUCTION AND EXAMINATION(R-24)
FOR B.E 2024-25 ADMITTED BATCH IV SEMESTER (A.Y 2025-26)

B.E (CSE) IV Semester								
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								
UI24BS410MA	Discrete Structures	3	-	-	3	60	40	3
UI24PC420CS	Database Management Systems	3	-	-	3	60	40	3
UI24PC430CS	Operating Systems	3	-	-	3	60	40	3
UI24PC440CS	Design and Analysis of Algorithms	3	1	-	3	60	40	4
UI24PC450CS	Machine Learning	3	-	-	3	60	40	3
U24OE4XXXX	Open Elective-II	3	-	-	3	60	40	3
U24BS430MA	Skill Development Course -III (Aptitude)	1	-	-	2	40	30	1
UI24PE410CS	Skill Development Course -IV (Technical Skills-II)	1	-	-	2	40	30	1
PRACTICALS								
UI24PC421CS	Database Management Systems Lab	-	-	2	3	50	30	1
UI24PC431CS	Operating Systems Lab	-	-	2	3	50	30	1
UI24PC441CS	Design and Analysis of Algorithms Lab	-	-	2	3	50	30	1
Library / Sports / Mentor Interaction		-	-	-	2	-	-	-
Co-Curricular Activities –I		-	-	-	2	-	-	-
TOTAL		**20**	**1**	**6**		**590**	**390**	**24**
GRAND TOTAL		**26**				**980**		
Student should acquire one NPTEL course certification of 8 weeks duration (2 credits) during I Sem to VI Sem								

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DISCRETE STRUCTURES

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**UI24PC410MA**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	*At the end of the course students will be able to:*
1. Study the foundational concepts of propositional and predicate logic **2. Understand** the concepts of relations, partial orders, equivalence relations, and various types of functions. **3. Understand** the principle of inclusion and exclusion in counting problems. **4. Study** the concept of generating functions and their basic applications. **5. Learn** techniques for solving non-homogeneous recurrence relations.	**1. Apply** logical connectives, truth tables, and rules of inference to analyze and validate logical arguments. **2. Analyze** relations and functions, including partial orders and equivalence relations, and perform function operations. **3. Solve** counting problems using the principle of inclusion and exclusion. **4. Construct** generating functions to solve combinatorial problems and recurrence relations**.** **5. Solve** linear recurrence relations using standard techniques and generating functions.

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

UNIT –I (08 Hours)

Fundamentals of Logic:

Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication: Rules of inference, The Use of Quantifiers.

UNIT –II (08 Hours)
Relations and Functions:
Cartesian product and relations, Partial Orders: Hasse Diagrams, Equivalence Relations and Partitions. Functions, One-to-one, Onto Functions, Special Functions, Function Composition and Inverse Functions. Introduction to Graph theory: Directed and undirected graphs.

UNIT-III (08 Hours)
The Principle of Inclusion and Exclusion:
The Principle of Inclusion and Exclusion, Generalizations of Principle, Derangements: Nothing is in its right place, Rook Polynomials, Arrangements with Forbidden Positions.

UNIT-IV (08 Hours)
Generating Functions:
Introductory Examples, Definition and Examples: Calculational Techniques, Partitions of Integers, Exponential Generating Function, Summation Operator.

UNITV (08 Hours)
Recurrence Relations:
First – Order Linear Recurrence Relation, Second – Order Linear Homogenous Recurrence Relation with Constant Coefficients, Non Homogenous Recurrence Relation, The method of Generating functions.

Learning Resources:
1. Ralph P. Grimaldi, Discrete and Combinatorial Mathematics, 4th Edition(2003), Pearson Education.
2. Kenneth H Rosen, Discrete mathematics and its applications, 5th Edition(2006), Tata McGraw-Hill Edition, New Delhi.
3. J.P. Tremblay, R. Manohar, Discrete Mathematical Structure with Applications to Computer Science, 4th Edition (1987),McGraw Hill , New Delhi.
4. Joe L. Mott, A. Kandel, T.P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd Edition (1986), Prentice Hall.
5. Thomas Koshy, Discrete Mathematics with Applications, 1st Edition (2004), Elsevier Inc.
6. http://nptel.ac.in/courses/106106094/
7. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-fall-2010

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATABASE MANAGEMENT SYSTEMS

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:**UI24PC420CS**
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 Identify issues involved in the design and implementation of a database system. 2 Understand transaction processing, concurrency control and recovery techniques.	1 Identify the functional components of database management system. Design conceptual data model using Entity Relationship Diagram. 2 Transform a conceptual data model into a relational model. 3 Apply normalization techniques in database design. 4 Apply indexing and hashing techniques for effective data retrieval. 5 Analyze strategies for managing security, backup and recovery of data.

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

UNIT-I:

Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Design, Data Storage and Querying, Data Mining and Information retrieval, Database Architecture , Database Users and Administrators.

Database Design and E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E-R Design Issues, Extended E-R features, Reduction to Relational Schemas.

UNIT-II:

Relational Model: Structure of Relation Database, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations, Modification of the Database, Relational Calculus.

Structured Query Language: Introduction, Basic Structure of SQL Queries, Set Operations, Additional Basic Operations, Aggregate Functions, Null Values, Nested Sub queries, Views, Join Expression.

UNIT-III:

Advanced SQL: SQL Data Types, Integrity constraints Authorization, Functions and Procedural Constructs, Recursive Queries, Triggers, JDBC, ODBC and Embedded SQL.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and first Normal form, Decomposition Using Functional Dependencies, functional Dependency Theory and Decomposition using Multivalue Dependencies

UNIT-IV:

Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, B-Tree Files, Multiple – Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing.

Transaction Management: Transaction concept, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation and Atomicity, Serializability, Recoverability.

UNIT-V:

Concurrency Control: Lock Based Protocols, Timestamp – Based Protocols Validation Based Protocols, Deadlock Handling.

Recovery System: Failure Classification, Storage Structure Recovery and Atomicity, Log Based Recovery

NoSQL: Introduction to NOSQL, NoSQL Vs RDBMS, Categories of NoSQL Databases, Case studies: HBase, Firebase, MongoDB, Cloud DB.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
2. Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Wiley Publications,1st Edition ,2019.

3. Raghu Ramakrishna, and Johannes Gehrke, Database Management Systems, 3rd Edition(2003), McGraw Hill.
4. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
5. Peter Rob, Carlos coronel, Database Systems, (2007), Thomoson.
6. http://nptel.ac.in/courses/106106093/

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OPERATING SYSTEMS

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks: 60	Course Code:**UI24PC430CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Understand Operating system Structures, Services and threading models 2 Learn operating system services by considering case studies such as Linux, Windows and Android	1 Explain Operating system structures and internal structure of a process and Compare CPU scheduling algorithms 2 Apply contiguous & non-contiguous techniques for main memory management. 3 Design solutions for classical synchronization problems and describe deadlock handling methods 4 Explain file system Implementation and device management. 5 Explain I/O operation implementation techniques and apply Access matrix for system protection. Describe the features of Linux, Windows and Android Operating systems

CO-PO and CO-PSO mapping

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

UNIT-I:

Introduction to operating systems: Operating system services, User and Operating- system interface, System calls, Operating system structure.

Process: Process concept, Process Scheduling, Operations on process, Threads, Multithreading Models, Multicore programming.

CPU Scheduling: Scheduling Criteria, Scheduling Algorithms, Multiprocessor scheduling.

UNIT-II:

Memory Management: Swapping, Contiguous memory allocation, Paging, Segmentation, Structure of the page table.

Virtual memory: Demand paging, Page replacement Algorithms, Thrashing, Allocating Kernel memory.

UNIT –III:

Process synchronization: The critical Section problem, Peterson's solution, Synchronization Hardware, Semaphores, Classic problems of Synchronization, Monitors.

Deadlocks: System model, deadlock characterization, Methods for handling deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from deadlock.

UNIT –IV:

File System Interface: File Concept, Access Methods, Directory and Disk Structure

File System Implementation: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free Space management.

Device Management: Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap Space Management, RAID structure.

UNIT-V:

I/O System: I/O hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O request to hardware operation.

Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of Access matrix

Case Studies: Linux System: Design Principles, Process Management, Scheduling

Windows 10 - Design Principles, System components, Terminal Services & Fast user switching, File system

Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 10th Edition (2018), Wiley India.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition (2001), Pearson Education, Asia.
3. Dhananjay, Dhamdhere.M, *Operating System-concept based approach*, 3rd edition (2009), Tata McGraw Hill, Asia
4. Robet Love: *Linux Kernel Development*, (2004)Pearson Education
5. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
6. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DESIGN AND ANALYSIS OF ALGORITHMS

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):3:1:0	SEE Marks:60	Course Code:**UI24PC440CS**
Credits : 4	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Analyze the asymptotic performance of algorithms	1 Compare asymptotic behavior of functions derived from algorithms
2 Apply algorithm design strategies to solve science and engineering problems.	2 Apply divide & conquer and greedy algorithmic design paradigms to solve problems
	3 Design algorithms using Dynamic Programming strategy
	4 Design algorithms for problems using backtracking and branch & bound algorithm design techniques
	5 Identify the complexity class of a given problem

CO-PO and CO-PSO mapping

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

UNIT – I:

Introduction: Introduction to Algorithm, algorithm specification.

Performance analysis: Space complexity, time complexity. Asymptotic notations, amortized analysis, Masters theorem.

UNIT – II:

Divide and Conquer: General method, Binary search, finding maximum and minimum, Merge sort, Quick sort, Expected Running Time of

Randomized Quick Sort, Strassen's Matrix Multiplication Algorithm, Karatsuba's large Integer Multiplication.

The Greedy Method: General method, Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Path, Ford–Fulkerson algorithm for Maximum flow problem.

UNIT – III: Dynamic Programming: General method, Matrix-chain multiplication problem, Multistage graph, All Pairs Shortest Paths, Optimal Binary Search Trees (OBST), 0/1 Knapsack, Reliability Design, Traveling Salesman Problem, Bi-connected Components and DFS, Longest Common Subsequence (LCS) problem.

UNIT – IV:

Backtracking: General method, the 8-Queens Problem, Graph Coloring, Hamiltonian Cycles, Knapsack Problem.

Branch and Bound: The method, 0/1 Knapsack problem, Traveling Salesperson problem.

UNIT – V: NP-Hard and NP-Complete problems: Tractable and intractable problems, Non-Deterministic search and sorting, classes P, NP, NP-Complete, NP-Hard, Satisifiability (SAT), Cook's theorem, reductions, Procedure for NP-Complete, Clique Decision Problem, Traveling Salesperson problem, Approximation algorithm for Vertex Cover Problem, Set Cover Problem.

Learning Resources:

1. Ellis Horowitz, Sartaj Sahani, Sanguthevar Rajasekaran," Fundamentals of computer Algorithms", Second edition (2008),Universities Press.
2. Thomas H. Cormen, Leiserson C.E, Rivest.R.L , Stein.C, Introduction to Algorithm, 2nd edition (2001), MIT press, USA.
3. Michael T. Goodrich, Roberto Tamassia, Algorithm Design, foundations, analysis, and internet examples, WIELEY student edition (2006).
4. Aho, Hopcroft, Ulman, The Design and Analysis of Computer Algorithms, (2000), Pearson Education.
5. Algorithm Design, 1st Edition, Jon Kleinberg and ÉvaTardos, Pearson.

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MACHINE LEARNING

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:**UI24PC450CS**
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** On completion of the course, students will be able to
To formulate machine learning problems corresponding to an application.	1 Explain the basics of concept learning and inductive learning. 2 Design decision tree neural network solve classification problems. 3 Comprehend probabilistic methods for learning. 4 Explain the instance based learning and reinforcement learning. 5 Build optimal classifiers using Genetic Algorithm and deep learning.

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

UNIT-I:

Introduction: Well-Posed Learning Problems, Designing a Learning System, Perspectives and Issues in Machine Learning, Types of Machine Learning.

The Concept Learning: A concept Learning Task, Concept learning as Search: General –to- Specific Ordering of Hypothesis, Find-S: Finding

Maximally Specific Hypothesis, Version spaces and the CANDIDATE-ELIMINATION ALGORITHM: Representation, The List-Then-Eliminate Algorithm, Candidate Elimination Learning Algorithm, Inductive bias.

UNIT-II:

Supervised Learning- Introduction, Classification, Algorithms - **Decision Tree Learning:** Introduction, Decision Tree Representation, Approximate Problems for Decision Tree Learning, The Basic Decision Tree Algorithm, Hypothesis space search in Decision Tree Learning, Issues in Decision Tree Learning.

Artificial Neural Networks: Introduction, Neural Network Representation, Perceptrons, Gradient descent and the Delta rule, Multilayer Networks and the Backpropagation Algorithm, Derivatives of back propogation rule. Back propagation algorithm- Convergence, Generalization.

Evaluating Hypotheses: Estimating hypotheses Accuracy, Basics of sampling theory.

UNIT-III:

Bayesian Learning: Introduction, Bayes Theorem, Concept Learning, Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Belief networks.

Un Supervised Learning – Introduction, Clustering Algorithms- K means and EM algorithm.

Computational Learning Theory: Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Spaces: E-Exhausting the version space, Sample Complexity for Infinite Hypothesis Spaces: Shattering a set of Instances, The Vapnik-Chervomenkis Dimension

UNIT-IV:

Instance-based Learning: Introduction, k-Nearest Neighbor Learning, Locally Weighted Regressions, Radial Basis Functions, Case –based learning.

Reinforcement Learning: Introduction, Learning Task, Q Learning.

UNIT-V:

Genetic Algorithms: Motivation, Genetic Algorithm-Representing Hypotheses, Genetic Operators, Fitness Function and Selection, An Illustrative Example, Hypothesis Space Search, Genetic programming.

Deep Learning: Convolutional neural networks, Recurrent neural networks.

Learning Resources:

1. Tom Mitchell, —Machine Learning||, McGraw-Hill Science, First edition.
2. Christopher Bishop, —Pattern Recognition and Machine learning||,

Springer (2006).
3. Stephen Marsland,‖Machine Learning –an algorithmic perspective‖, CRC Press.
4. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville, "Deep learning ", An MIT Press book in preparation (2015).
5. Daniela witten, Trevor Hastie Robert Tibshirani and Gareth James, —An introduction to statistical Learning with applications in R, Springer 2013
6. https://onlinecourses.nptel.ac.in/noc18_cs26/preview
7. https://www.coursera.org/learn/machine-learning

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

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

Dept	Title Open Elective-II	Code	Credits
CIVIL	Solid Waste Management	U24OE410CE	3
ECE	Sensors for Engineering Applications (General Pool)	U24OE410EC	3
	Introduction to Principles of Communication Engineering (General Pool)	U24OE420EC	3
	Introduction to Principles of Communication Engineering (Communication Engineering - Stream)	U24OE440EC	3
EEE	Mathematical Programming for Numerical Computation	U24OE410EE	3
MECH	Kinematics and Dynamics of Robotics (Stream: Robotics)	U24OE410ME	3
	Operations Research (General Pool)	U24OE420ME	3
H&SS	Introduction to Finance Management for Engineers (Management Courses for Engineers-Stream)	U24OE410EH	3
	Introduction to FINTECH (BFSI- Stream)	U24OE450EH	3
	Introduction to Sociology (General Pool)	U24OE480EH	3
Maths	Numerical Methods	U24OE410MA	3
	Algebraic Structures	U24OE420MA	3

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

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):3:0:1	SEE Marks:60	Course Code: **U24OE410CE**
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

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 of hazardous waste and its management. 5. Understand the solid waste management practices adopted actual practical scenarios.	1. Understand types, characteristics, composition of solid waste and rules laid for its management as per legislation. 2. Apply gained knowledge of waste reduction methods, collection techniques, resource recovery/ recycling, energy recovery, transport & transfer options for solid waste management. 3. Identify appropriate technologies for transformation and disposal of solid waste. 4. Categorize solid waste as hazardous or non- hazardous based on solid waste toxicology principles. 5. Analyze and apply solid waste management techniques in actual practice.

CO-PO and CO-PSO mapping

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

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/

With effect from the Academic Year 2025-26

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

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

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Sensors for Engineering Applications
(General Pool: Open Elective - II)

SYLLABUS FOR B.E. IV - SEMESTER

(Civil, CSE, CSE (AI&ML) EEE, IT & Mech.)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U24OE410EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO and CO-PSO mapping

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

UNIT - I

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

UNIT – II

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

UNIT – III

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

UNIT – IV

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

UNIT – V

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

Lab Experiments:

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

8. Estimate the range for a given IR and ultrasonic sensor using QRB1134 IR sensors and MAXSONAR ultrasonic sensor.

Learning Resources :

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Principles of Communication Engineering (General Pool: Open Elective - II)

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

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

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

CO-PO and CO-PSO mapping

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

UNIT - I

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

Lab Activity: Generation of AM using MATLAB and Simulink.

UNIT - II

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

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

UNIT - III

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

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

Lab Activity: Demonstration of Sampling using MATLAB.

UNIT - IV

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

Lab activity: Demonstration of ASK and BPSK using SIMULINK.

UNIT - V

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

Source Coding Techniques: Shannon-Fano coding, Huffman Coding

Lab activity: Entropy calculations using MATLAB

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Principles of Communication Engineering

(Communication Engineering Stream: Open Elective - II)

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

L:T:P (Hrs./week): 3:0:0	SEE Marks: 60	Course Code: **U24OE440EC**
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

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

CO-PO and CO-PSO mapping

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

UNIT - I

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

Lab Activity: Generation of AM using MATLAB and Simulink.

UNIT - II

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

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

UNIT - III

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

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

Lab Activity: Demonstration of Sampling using MATLAB.

UNIT - IV

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

Lab activity: Demonstration of ASK and BPSK using SIMULINK.

UNIT - V

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

Source Coding Techniques: Shannon-Fano coding, Huffman Coding

Lab activity: Entropy calculations using MATLAB

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

MATHEMATICAL PROGRAMMING FOR NUMERICAL COMPUTATION

Open Elective-II

SYLLABUS FOR B.E. IV SEMESTER

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

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

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

UNIT - I : Introduction:

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

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

a function file.

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

UNIT - II : Scripts and Functions

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

UNIT - III : Numerical Methods Using MATLAB

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

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

UNIT - IV : Nonlinear Equations

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

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

UNIT - V :

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

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

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by RudraPratap, Oxfordpublications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt.Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition- Cengage Learning- 2015. Getting started with MATLAB

(Version 9) The Mathworks.

4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siauw Alexandre Bayen, Elsevier - 18th April2014.
5. https://nptel.ac.in/courses/103106118/2

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OFMECHANICAL ENGINEERING

Kinematics and Dynamics of Robotics
(Stream: Robotics)

(Open Elective-II)

SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U24OE410ME**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO and CO-PSO mapping

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

UNIT-I
Robot Kinematics

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

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

UNIT-II
Differential Kinematics

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

UNIT-III

Static Analysis: Force and moment balance.

Dynamics of serial manipulators

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

Unit-IV

Dynamics of serial manipulators

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

UNIT-V

Trajectory Generation

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

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

OPERATIONS RESEARCH

(General Pool : Open Elective-II)

SYLLABUS FOR B.E. IV-SEMESTER

Instruction:3Hrs/week	SEE Marks : 60	Course Code: **U24OE420ME**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

UNIT – I

Introduction: Definition and scope of operations research.

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

UNIT – II

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

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

UNIT-III

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

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

UNIT-IV

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

UNIT-V

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

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

Learning Resources:

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

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

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

Duration of Internal Test: **90 Minutes**

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO FINANCE MANAGEMENT FOR ENGINEERS
(Stream: Management Course for Engineers)
(Open Elective-II)
SYLLABUS FOR B.E. - IV Semester

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:	**At the end of the course the learners will be able 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.	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.

CO-PO mapping

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

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:-

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

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

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

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO FINTECH

(Stream: BFSI)

(Open Elective-II)

SYLLABUS FOR B.E. - IV Semester

Instruction : 3.0.0	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.

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

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

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

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO SOCIOLOGY

(Open Elective-II)

SYLLABUS FOR B.E. - IV Semester

Instruction : 3 Hours	SEE : 60	Course code **: U24OE480EH**
Credits : 3	CIE : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To introduce the basic concepts, theories, and perspectives in sociology. 2. To develop critical thinking about social structures and processes. 3. To examine social institutions such as family, education, religion, and economy. 4. To foster an understanding of social diversity, inequality, and global interdependence. 5. To equip students with research skills for analyzing social issues.	1. Identify and explain key sociological concepts and theoretical approaches. 2. Analyze how social structures influence individual and group behaviour. 3. Evaluate the functions and impact of major social institutions. 4. Demonstrate awareness of social issues like class, gender, race, and globalization. 5. Apply sociological research methods to real-world social questions.

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

CONTENTS

UNIT-II: Basic Concepts

4: Social Groups, Community, Society, Associations, and Institutions, Status and Role
5: Family, Marriage, Culture, Religion and Kinship
6: Caste, Polity, State, Education and Economy

UNIT-III: Socialization

7: Meaning and Significance of Socialization
8: Agencies of Socialization
9: Social Control

UNIT-IV: Social Structure, Social Stratification and Social Interaction

10: Meaning and Characteristics of Social Structure
11: Meaning and Characteristics of Social Stratification
12: Meaning and Characteristics of Social Interaction

UNIT-V: Social Change

13: Meaning and Characteristics of Social Change
14: Factors of Social Change
15: Types of Social Change

LEARNING RESOURCES:-

Textbooks:-

1. Principles of Sociology with an Introduction to Social Thought - Book by C N Shankar Rao
2. Sociology: Themes and Perspectives -Textbook by Martin Holborn and Michael Haralambos

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

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

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

NUMERICAL METHODS

(Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code:**U24OE410MA**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	**At the end of the course students will 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.

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

UNIT – I: (8 Hours)

SOLUTION OF ALGEGBRAIC AND TRANSCENDENTAL EQUATIONS:

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

UNIT – II: (8 Hours)

SOLUTION OF SYSTEM OF LINEAR EQUATIONS:

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

UNIT – III: (8 Hours)

NUMERICAL DIFFERENCES - I

Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae - Interpolation with unequal intervals - Lagrange's Interpolation Formula - Divided differences - Newton's divided difference formula.

UNIT – IV: (8 Hours)

NUMERICAL DIFFERENCES - II

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

UNIT – V: (8 Hours)

NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS

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

Text Books:

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

Reference Books:

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

Online Resources:

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

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

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

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

ALGEBRAIC STRUCTURES

(Open Elective-II)

SYLLABUS FOR B. E. IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code:**U24OE420MA**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	*At the end of the course students will be able to:*
1. Study the concept of Groups, Finite Groups, Subgroups, Cyclic Groups and their properties. **2. Understand** Isomorphism – Automorphism of groups and their Properties. **3. Learn** group Homomorphism and related concepts. **4. Acquire** knowledge of Rings, Integral domains and Fields, External and Internal direct products. **5. Identify** Ring Homomorphism, properties and polynomial rings	**1. Solve** the problems on Groups and will be equipped to apply them in applications like robotics, computer vision, computer graphics and medical image analysis **2. Implement** the concepts of automorphism in developing encoding and decoding tools of Cryptography **3. Apply** homomorphism in the study of formal languages, automata theory, and compiler design. **4. Use** the knowledge of Ring, Integral domain and Field in coding theory. **5. Compute** the programming of modern computer algebra algorithms using ring homomorphism.

CO-PO and CO-PSO mapping

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

UNIT – I: (8 Hours)

GROUPS

Binary operations - Groups – Definition, Elementary properties of Groups, Finite Groups, Subgroups, Cyclic Groups – Properties of Cyclic Groups, Fundamental theorem of Cyclic Groups-Classification of Subgroups of Cyclic Group.

UNIT – II: (8 Hours)

GROUP ISOMORPHISM

Isomorphism – Definition, Properties (without proof)- Automorphism - Cosets -Properties of Cosets (without proof), Lagrange's theorem.

UNIT – III: (8 Hours)

GROUP HOMOMORPHISM

External Direct Product - Definition, Properties(without proof), Normal Subgroups and Factor Groups, Internal Direct Product, Group Homomorphism – Definition, Properties (without proof).

UNIT – IV: (8 Hours)

RINGS

Rings, Properties of Rings (without proof) – Subrings - Integral Domains and Fields - Ideals- Prime and Maximal Ideals.

UNIT – V: (8 Hours)

RING HOMOMORPHISM

Ring Homomorphism - Properties of Ring Homomorphism (without proof) - Polynomial Rings - The Division Algorithm.

Text Books:

Contemporary Abstract Algebra, Joseph A. Gallian, CRC Press

Reference Books:

1. Topics in Algebra, I. N. Herstein, John Wiley & Sons
2. Basic Abstract Algebra, P. B. Bhattacharya, S. K. Jain, S. R. Nagpaul, Cambridge University Press
3. Abstract Algebra, D. S. Dummit, R. M. Foote, John Wiley & Sons, Inc.
4. A First Course in Abstract Algebra, John B. Fraleigh, Pearson Education Limited

Online Resources :

1. https://ocw.mit.edu/courses/18-703-modern-algebra-spring-2013/
2. https://onlinecourses.nptel.ac.in/noc19_cs78/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

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Skill Development Course- III (Aptitude)
SYLLABUS FOR B. E -IV SEMESTER

L : T : P (Hrs/Week) : 2:0:0	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:	**At the end of the course the learners will be able 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	1. Solve questions in the mentioned areas using shortcuts and smart methods. 2. Understand the fundamentals concept of Aptitude skills. 3. Perform calculations with speed and accuracy. 4. Solve complex problems using basic concepts. 5. Use shortcuts with ease for effective problem solving.

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

UNIT 1

QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -1

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

UNIT 2

REASONING ABILITY- LOGICAL REASONING

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

UNIT 3

REASONING ABILITY- NON VERBAL REASONING

3.1 Figure Series
3.2 Directions
3.3 Clocks
3.4 Calendars

UNIT 4

QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -2

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

UNIT 5

QUANTITATIVE APTITUDE- ENGINEERING MATHEMATICS

5.1 Permutations and combinations
5.2 Probability

Learning Resources :

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

With effect from the Academic Year 2025-26

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

1	No. of Internal tests	:	2	Max. Marks	:	20
2	No. of assignments	:	2	Max. Marks	:	5
3	No. of Quizzes	:	2	Max. Marks	:	5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

Skill Development Course-IV (Technical Skills-II)
Problem Solving through Data Structures

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):1:0:0	SEE Marks : 40	Course Code: **UI24PE410CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Understand the Nonlinear data structures and their applications. 2. Prepare the students for the contests relative to the concepts learnt. 3. Build confidence in coding using Non Linear Data structures 4. Leverage the Industry Standards of the DBMS concepts	1. Lean non-linear data structures with various applications that are essential for solving problems which involve complex relationships, efficient searching, and hierarchical organization. 2. Solve scenario based problems using Tree Data structures 3. Learn and apply greedy algorithms for efficient solutions to complex problems. 4. Learn and apply database concepts for designing efficient, reliable, and well-structured databases that meet the needs of modern applications.

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

Problem Solving through Non-Linear Data structures – Trees I
Problem solving approaches using Non-linear data structures, Coding problems on the height of a binary tree, Size of a binary tree, Tree order traversals, Problem Solving on Binary Trees, Examples, Practice problems.

Problem Solving through Non-Linear Data structures – Trees II
Time comparison and analysis on Binary Search Trees & Coding problems, Search/probe sequence validation, Significance of height balancing the tree, Examples, Practice problems.

Problem Solving implementing Algorithms - Greedy Methods II
Algorithmic Thinking, Selection as Greedy Strategy, Heaps Min and Max, Priority Queues, Greedy Coin change solution, Examples, Practice problems.

Problem Solving implementing Algorithms - Greedy Methods II

Fractional Knapsack, Sequencing jobs with deadlines, Activity selection, Examples, Practice problems.

Problem Solving using DBMS I
Industry Standards of leveraging DBMS concepts: SQL Queries, Entity Relationship Models, Question, and answers.

Problem Solving using DBMS II
Industry Standards of leveraging DBMS concepts: Query Optimization, Transactions & Concurrency, Normalization, case studies, Question and answers

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

1	No. of Internal Tests	:	1	Max. Marks for each Internal Test	:	20
2	No. Quizzes	:	1	Max. Marks for each Quiz	:	10

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATABASE MANAGEMENT SYSTEMS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:**UI24PC421CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply SQL commands on a database. 2 Develop an application using forms, reports and PL/SQL.	1 Design and implement a database schema. 2 Apply DDL, DML, DCL and TCL commands on a database. 3 Apply No-SQL concepts for given database. 4 Implement PL/SQL programs for creating stored procedures, cursors & triggers. 5 Design and implement an application using forms and reports.

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

Programming Exercise:

I. SQL

1. Creation of database tables without constraints.
2. Creating tables using combination of constraints.
3. Usage of Stored Functions.
4. Exercising all types of Joins.

5. Exercising complex Queries.
6. Experiments on No-SQL.

II. PL/SQL

1. Demonstration of Blocks, Cursors, functions and Packages.
2. Demonstrate Exception Handling.
3. Usage of Triggers to perform operation on Single and Multiple Tables.
4. PL/SQL Procedures for data validation.

Learning Resources:

1. Ivan Bayross, SQL, PL/SQL, The Programming Language of Oracle,4th Edition, PBP Publications.
2. Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Wiley Publications,1st Edition ,2019.
3. Rick F Van der Lans, Introduction to SQL, 4th Edition (2007), Pearson Education.
4. Benjamin Rosenzweig Elena Silvestrova, Oracle PL/SQL by Example, 3rd Edition(2004), Person Education.
5. Albert Lulushi, Oracle Forms Developer's Handbook, 1st Edition (2006), Pearson Education.
6. https://www.lynda.com/Access-tutorials/Welcome/195854/373426-4.html

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OPERATING SYSTEMS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:**UI24PC431CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply system calls for process management and file management 2 Implement techniques related to CPU Scheduling, Main memory management, Process synchronization and deadlock avoidance & detection	1 Implement operations on Files and Process by using system calls 2 Implement CPU Scheduling algorithms 3 Implement Page Replacement techniques 4 Design and implement solutions for Inter-Process Communication 5 Implement Kernel module programs

CO-PO and CO-PSO mapping

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

Programming Exercise:

1. Building & Booting of Operating system, Disk partitioning and Dual boot of OS
2. Write shell programs to implement a given task.
3. Implement system calls for File system management.

4. Implement system calls for Process management.
5. Write C programs to implement CPU scheduling algorithms (FCSF, SJF, Priority, RR, Multi level)
6. Write C programs to implement Page Replacement algorithms.
7. Implement Inter-process communication using
   i. Pipes (by using pipe system call)
   ii. Message Queues (by using msgget, msgsnd, msgrcv system calls)
   iii. Shared Memory (by using shmget, shmat, shmdt system calls)
8. Implement Process Synchronization for Bounded buffer, Readers-Writers and Dining philosophers' problems using Semaphores. (by using semget, semop system calls)
9. Study pthreads and implement a program which shows the performance improvement in using threads as compared with process.(Examples like Matrix Multiplication, Hyper quicksort, Merge sort, Traveling Sales Person problem)
10. Write a Linux Kernel Module for Task Information extraction.
11. Write a Linux Kernel Module for Listing Tasks.

Learning Resources:

1. Kernighan and Pike, UNIX Programming Environment,PHI/Pearson Education
2. U. Vahalia, UNIX Internals: The New Frontiers, Pearson Education Inc.2003.
3. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 10th Edition (2018), Wiley India.
4. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition (2001), Pearson Education, Asia.
5. Dhananjay, Dhamdhere.M, *Operating System-concept based approach*, 3rd edition (2009), Tata McGraw Hill, Asia
6. Robet Love: *Linux Kernel Development*, (2004)Pearson Education
7. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
8. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php
9. https://nptel.ac.in/courses/106106144/

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DESIGN & ANALYSIS OF ALGORITHMS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks : 50	Course Code:**UI24PC441CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Implement solutions for the given problems using divide and conquer 2 Implement solutions for the given problems using greedy and dynamic programming 3 Implement solutions for the given problems using backtracking and branch and bound.	1 Implement searching, sorting and hashing using basic data structures. 2 Apply divide and conquer strategy to implement algorithm for a given problem. 3 Implement an algorithm for a given problem using Greedy design strategy 4 Apply dynamic programming to implement algorithms for a set of problems. 5 Implement algorithms for set of problems using backtracking and branch and bound.

CO-PO and CO-PSO mapping

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

Programming Exercise:

1. Implementation of Merge Sort, Quick Sort, Heap Sort, Binary Search and Hashing.
2. Implementation of Traversal on Graphs.
3. Implementation of Traversal on Trees and DAG.
4. Implement Single source shortest path algorithm.
5. Implement Minimum cost spanning tree algorithm.
6. Implement fractional Knapsack algorithm.
7. Implement Optimal merge patterns -Huffman encoding algorithm.
8. Implement Matrix–chain multiplication algorithm with dynamic programming.
9. Implement LCS algorithm and print Longest common subsequence.
10. Implement All-pairs shortest path algorithm.
11. Implement 0/1 Knapsack algorithm.
12. Implement multi-stage graph.
13. Implementation of N-queens problem with back tracking.
14. Implement Graph coloring problem with back tracking.
15. Implement TSP by branch and bound.
16. Implement 0/1 knapsack by branch and bound.

Learning Resources:

1. Ellis Horowitz, Sartaj Sahani, Sanguthevar Rajasekaran," Fundamentals of computer Algorithms", Second edition (2008),Universities Press.
2. Thomas H. Cormen, Leiserson C.E, Rivest.R.L , Stein.C, Introduction to Algorithm, 2nd edition (2001), MIT press, USA.
3. Michael T. Goodrich, Roberto Tamassia, Algorithm Design, foundations, analysis, and internet examples, WIELEY student edition (2006).
4. Aho, Hopcroft, Ulman, The Design and Analysis of Computer Algorithms, (2000), Pearson Education.
5. Algorithm Design, 1st Edition, Jon Kleinberg and ÉvaTardos, Pearson.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2025-26

SCHEME OF INSTRUCTION AND EXAMINATION(R-24)
FOR B.E BRIDGE COURSE IV SEMESTER (A.Y 2025-26)

B.E IV Semester								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P		SEE	CIE	
THEORY								
UB24HS410EH	English Language & Communication	2	-	-	3	50	-	-
PRACTICAL								
UB24HS411EH	English Language & Communication Skills Lab	-	-	2	3	50	-	-
	TOTAL	**2**	**-**	**2**	-	**100**	**-**	**-**
	GRAND TOTAL	**4**				**100**		-

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION

SYLLABUS FOR B.E. IV SEMESTER (Bridge Course)

L :T:P(Hrs/week): 2	SEE Marks :50	Course Code: **UB24HS410EH**
Credits :0	CIE Marks :-	Duration of SEE : 3 Hours

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

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

Unit-1 1.0: Communication& Functional English

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

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

Unit 2 2.0: Listening

2.1 Importance of Active listening and Features , types of listening

Unit 3. 3.0: Writing

1.1 Paragraph writing, coherence and cohesion, Transition words and Phrases.

Unit 4 4.0: Grammar and Vocabulary

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

Unit- 5 5.0: Reading

5.1 Prose text 'Yesterday was beautiful' by Roald Dahl

Prescribed text book for theory:

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

Suggested Reading

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

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

SYLLABUS FOR B.E. IV SEMESTER (Bridge Course)

(Common to all branches)

L :T:P(Hrs/week): 2	SEE Marks :50	Course Code: **UB24HS411EH**
Credits :-	CIE Marks :-	Duration of SEE : 3 Hours

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

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

INTERACTIVE COMMUNICATION SKILLS LAB

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

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

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

Prescribed text book for laboratory:

Speak Well: Jayshree Mohanraj, Kandula Nirupa Rani and Indira Babbellapati- Orient Black Sw[1]an.

Learning Resources:

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