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

ACCREDITED BY NAAC WITH A++ GRADE

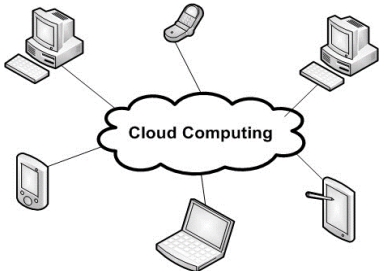
Approved by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

Sponsored by

VASAVI ACADEMY OF EDUCATION

Hyderabad

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR B.E. (IT) III and IV Semesters with effect from 2024-2025
(For the batch admitted in 2023-24)
(R-23)



DEPARTMENT OF INFORMATION TECHNOLOGY

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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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IBRAHIMBAGH, HYDERABAD-500 031

Vision

Striving for a symbiosis of technological excellence and human values.

Mission

To arm young brains with competitive technology and nurture holistic development of the individuals for a better tomorrow.

Quality Policy

Education without quality is like a flower without fragrance. It is our earnest resolve to strive towards imparting high standards of teaching, training and developing human resources.

DEPARTMENT OF INFORMATION TECHNOLOGY

Vision

To be a center of excellence in the emerging areas of Information Technology.

Mission

- Provide a comprehensive learning experience on the latest technologies and applications.
- Equip the stakeholders with latest technical knowledge and leadership skills with collaboration to become competent professionals.
- Motivate innovation and contribute to the societal issues with human values and professional ethics.

Programme Educational Objectives (PEOs) for IT Program
A Graduate of Information Technology will be able to:

PEO1: Pursue higher studies in multidisciplinary areas with research orientation.
PEO2: Develop core IT competencies aligned with emerging industry trends to become global leaders with ethical values.
PEO3: Engage in continuous learning and address the societal problems with sustainable solutions.

Program Specific Outcomes (PSOs) for IT Program
Our students, upon graduation from the program, will be able to:

PSO1: Identify and develop software solutions using programming languages, tools and AI/ML concepts.
PSO2: Design, develop and maintain secure stand-alone, embedded and networked systems.
PSO3: Analyze the architectures of autonomous or semi-autonomous intelligent systems and apply to real-time scenarios.

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Program Outcomes (POs) for IT Program
At the end of the program, the graduates will demonstrate

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **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.
4. **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.
5. **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.
6. **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.
7. **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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROMOTION RULES

1. Attendance and Sessional marks requirements:

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

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

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

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

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)
B.E. – INFORMATION TECHNOLOGY : THIRD SEMESTER (2024 - 2025)

B.E (IT) III-Semester								
Course Code	**Course Name**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
U23BS340MA	Discrete Mathematics	3	-	-	3	60	40	3
U23ES310IT	Digital Electronics & Logic Design	3	-	-	3	60	40	3
U23PC310IT	Data Structures	3	-	-	3	60	40	3
U23PC320IT	Object Oriented Programming	3	-	-	3	60	40	3
U23OE3XXXX	Open Elective – I	2	-	-	3	60	40	2
U23HS320EH	Skill Development Course- I: Communication Skills in English–I	1	-	-	2	40	30	1
U23PE310IT	Skill Development Course– II : Technical Skills- I	1	-	-	2	40	30	1
PRACTICALS								
U23PC311IT	Data Structures Lab	-	-	3	3	50	30	1.5
U23PC321IT	Object Oriented Programming Lab	-	-	3	3	50	30	1.5
U23PC331IT	Network Engineering Lab	-	-	2	3	50	30	1
U23PW319IT	Mini Project	-	-	2	3	50	30	1
	Co-Curricular Activities-I	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Extra-Curricular Activities-I	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Library / Sports / Mentor Interaction	**-**	**-**	**-**	**-**	**-**	**-**	**-**
• Student should acquire one NPTEL Certification Course equivalent to 2 credits (8 weeks) by the end of VI Semester. • Students opting for Honours should complete one NPTEL Course of 2 credits (8 Weeks) by the end of IV Semester.								
	Total	**16**	**-**	**10**	**-**	**580**	**380**	**21**
	Grand Total	**26**			**--**	**960**		

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

DISCRETE MATHEMATICS
for B.E., III- Sem., (CBCS)
(For IT only)

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code **:: U23BS330MA**
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. **Understand** the Propositions and their equivalences, predicates and quantifiers and learn various proof strategies.	**1. Use** the logical notation **t**o define and reason about fundamental mathematical concepts and synthesize induction hypothesis and simple Induction proofs**.**
2. **Learn** the basics of counting, combinatory, and various methods of solving Recurrence relations.	**2. Apply** the basic principles of counting to solve combinatorial problems and solve recurrence relations, both linear homogeneous and non-homogeneous, using various techniques.
3. **Study** the concept of relations, including their properties and representations, equivalence relations, Posets, Hasse diagrams, maximal and minimal elements	**3. Identify** various types of relations, represent relations using matrices and graphs, construct Hasse diagrams for Posets, determine maximal and minimal elements in a Poset.
4. **Understand** the fundamentals of graph theory, graph isomorphism, and connectivity.	**4. Apply** graph terminology to describe the structure of graphs and determine graph isomorphism.
5. **Understand** the advanced topics in graph theory, graph colouring, and applications of graph colouring.	**5. Determine** the existence of Eulerian and Hamiltonian paths, and the chromatic number of a graph using various techniques of graph colouring.

UNIT – I

Logic: Logic- Logical connectives- Propositional equivalences– Predicates and quantifiers.

Mathematical Reasoning, Induction: Proof Strategy- Methods of Proofs- Mathematical Induction- Second Principle of Mathematical Induction.

UNIT – II

Counting: Basics of counting- Pigeonhole principle –Permutations & Combinations- Pascal's Identity- Vandermonde's Identity.

Advanced Counting Techniques: Recurrence relations: Solving Recurrence Relations- Linear Homogeneous and Non-Homogeneous Recurrence relations.

UNIT – III

Relations: Relations – Properties -Representing relations - Equivalence Relations - Partial Orderings- Poset- Hasse diagrams – Maximal & Minimal Elements.

UNIT –IV

Graph Theory-I: Introduction - Graph Terminology - Types of graphs - Basic theorems - Representing Graphs and Graph Isomorphism – Connectivity.

UNIT –V

Graph Theory-II: Euler and Hamiltonian paths – Shortest path problems - Dijkstra's algorithm - Planar graphs- Euler's Formula – Graph Colouring – Chromatic number – Applications of graph colouring.

Learning Resources:

1. Kenneth H. Rosen – Discrete Mathematics and its application – 5th edition, Mc Graw – Hill, 2003.
2. Joel. Mott. Abraham Kandel, T.P. Baker, Discrete Mathematics for Computer Scientist &Mathematicians, Prentiee Hail N.J., 2nd edn, 1986.
3. Discrete and Combinatorial Mathematics by Ralph P. Grimaldi, Pearson International
4. J.P.Trembly, R.Manohar, Discrete Mathematical Structure with Application to Computer Science, Mc Graw- Hill – 1997.
5. R.K. Bisht, H.S.Dhami - Discrete Mathematics, Oxford University Press, 2015.

Online Resources:

1. https://onlinecourses.nptel.ac.in/noc24_cs58/preview
2. https://onlinecourses.swayam2.ac.in/cec24_ma18/preview

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

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

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DEPARTMENT OF INFORMATION TECHNOLOGY

DIGITAL ELECTRONICS AND LOGIC DESIGN

SYLLABUS FOR III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **U23ES310IT**
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Introduce the concepts of combinational and sequential circuit design. 2. Introduce VHDL Programming Language to implement digital circuits.	1. Simplify Boolean Functions using algebraic and K-map techniques to specific number of literals. 2. Design combinational circuits using fundamental logic gates and programmable logic devices for a given problem. 3. Draw the circuits of different types of flipflops and explain their operation using Truth tables and excitation tables. 4. Analyze any given synchronous or asynchronous sequential circuit and design synchronous or asynchronous sequential circuits for a given specification of the problem. 5. Implement combinational and sequential circuits using VHDL programming language.

UNIT – I:
Introduction to Boolean algebra and number system, Logic Gates, Optimized implementation of logic functions – Karnaugh Map, Strategies for minimization of product-of-sum and sum-of-product functions. Multiple output circuits. NAND and NOR logic networks, Cost functions, Introduction to CAD tools and VHDL

UNIT – II:
Combinational circuit building blocks – Multiplexers. Decoders. Encoders. Code converters, Arithmetic comparison circuits. General structures of a PLA, gate level diagram, schematic diagram, PAL. Structure of CPLDs and FPGAs, 2-input and 3-input lookup tables(LUT). Design of Arithmetic-circuits using CAD tools. VHDL for Combinational circuits

UNIT – III:
Basic Latch, Gated SR Latch, gated D Latch, T Flip-flop, JK Flip-flop, excitation tables. Master-Slave edge triggered flip-flops. Set up and hold time of a flip-flop. Registers, Counter. Using registers and counters with CAD tools. Design examples using VHDL.

UNIT – IV:

Synchronous Sequential Circuits – Analysis of Synchronous sequential Circuits Basic design steps. State-Assignment problem Moore and Mealy state models. State minimization, Design of FSM with CAD Tools. Implementation using VHDL.

UNIT – V:

Introduction to Asynchronous sequential circuits, Analysis of Asynchronous sequential circuits. Hazards: static and dynamic hazards. Significance of Hazards. Clock skew, ASM Charts, Digital Hardware Design Flow.

Learning Resources :

1. M. Moris Mano, Charles R. Kime, Logic and Computer Design Fundamentals, 2nd edition, Pearson Education Asia, 2001.
2. Stephen Brown , Zvonko Vranesic – Fundamentals of Digital Logic with VHDL design, McGraw Hill – 2000.
3. Virendrakumar Digital ElectronicsTheory& Experiments, New Age International Publishers, 2002
4. John F. Walkerly, Digital Design : Principles and Practices, Pearson India, 4th Edition.
5. Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss, Digital Systems: Principles and Applications, Pearson India, 10th Edition.
6. https://nptel.ac.in/courses/117106086/

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

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

Duration of Internal Tests **: 90 Minutes**

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DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES

SYLLABUS FOR III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **U23PC310IT**
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Demonstrate linear and non-linear data structures and their applications. 2. Illustrate searching and sorting techniques.	1. Understand asymptotic notations, operations on arrays and stacks, and evaluate arithmetic expressions. 2. Analyze search, insert and delete operations on queues and linked list. 3. Compare complexities of insertion, deletion and search operations on trees, binary search trees and balanced binary search trees. 4. Understand the operations on multiway search trees and apply graph search algorithms to find minimal cost Spanning trees. 5. Evaluate the complexities of sorting, searching and hashing techniques.

UNIT-I:

Basic Concepts: Elementary Data Organizations, Data Abstraction. Data Structures Introduction and Operations: insertion, deletion, traversal. Performance analysis - time complexity and space complexity, Asymptotic Notations- Big O, Omega and Theta notations.

Arrays: Arrays – ADT, Polymonials, Sparse matrices, Strings-ADT, Pattern Matching

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

UNIT-II:

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

Linked List: Introduction – Singly Linked list -Operations on a singly linked list -Dynamically Linked Stacks and Queues Doubly linked list-Operations on a doubly linked list, Circular Linked list, Polynomial manipulation - Operations, Sparse Matrices.

UNIT-III:

Trees: Introduction, Binary Trees, Binary Tree Traversals, Priority Queues, 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:

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 - Depth First Search (DFS), Breadth First Search (BFS), Minimal Cost Spanning Trees- Kruskal's Algorithm, Prim's Algorithm.

UNIT-V:

Sorting and complexity analysis: Insertion Sort, Heap Sort, Topological Sort
Searching: Linear Search, Binary Search Techniques and their complexity analysis.
Hashing : Introduction, Static Hashing – Hash tables, Hash functions, Overflow handling.

Learning Resources:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2/e, Universities Press, 2008
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition (2002), Pearson
3. Richard F, Gilberg, B.A. Forouzan, "Data Structures, A Pseudocode Approach with C", Cengage, 2nd Edition
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stem 'Introduction to Algorithms' 2002.
5. Tanenbaum A. M , Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson
6. Data Structures through C in depth,S K Srivastava,Deepali Srivastava,BPB publications,2nd Edition
7. http://nptel.ac.in/courses/106106127/
8. http://nptel.ac.in/courses/106103069/
9. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos/

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

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

Duration of Internal Tests : 90 Minutes

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DEPARTMENT OF INFORMATION TECHNOLOGY

OBJECT ORIENTED PROGRAMMING

SYLLABUS FOR B.E. III-SEMESTER

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

COURSE OBJECTIVE	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Provide an overview of object-oriented programming concepts. 2. Explore java libraries to build applications.	1. Illustrate object-oriented programming features using Java. 2. Perform exception handling and multithreading. 3. Perform I/O operations, String manipulation using java libraries. 4. Implement data structures using collections framework. 5. Design and develop GUI using java libraries.

UNIT-I

Object Oriented Programming Fundamentals :
Object, Class, Abstraction, Encapsulation, Inheritance, Polymorphism.

Java Programming Fundamentals: Overview of Java , Java-keywords, Data types, Variables, Arrays, Command Line Arguments, Operators, Control statements, Structure of a Java class, Classes, Methods, Abstract Classes, Nested Classes. **Interfaces :** Defining interfaces, extending interfaces, implementing interfaces. Lambda expression fundamentals, Functional Interfaces, Examples of Lambda expressions. **Packages**: Creation, importing a package and user defined package.

UNIT-II

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.

UNIT-III

Exploring java.io : Java I/O classes and interfaces, Files, Character, and Byte Streams Serialization.

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

Exploring java.util: Scanner, StringTokenizer; regular expression processing using java.util.regex; **Exploring java.time**: date and time API

UNIT-IV

Introduction to Generics: Defining Generics, Generics and Subtyping, Wildcards, Generic Methods.

Introduction to Collections: Collection Framework, Benefits of Collections Framework, Collection Framework Interfaces : Collection , Set, List, Queue, Deque, Sorted Set, Map, Sorted Map. Collection Framework Implementations : HashSet, TreeSet, ArrayList, LinkedList, PriorityQueue, ArrayDeque, HashMap, TreeMap. Traversing Collections. Collection Framework Algorithms : Sorting, Searching.

UNIT-V

GUI Programming : Introduction to Abstract Window Toolkit(AWT), Swing Class Hierarchy, Swing Components, Containers, Layout Managers, Event Handling : The Delegation Event Model, Model View Controller Architecture, Modifying Look and Feel.

Introducing JavaFX for GUI programming, exploring JavaFX Controls, introducing JavaFX Menus.

Learning Resources:

1. Herbert Schildt, The Complete Reference Java, 9th Edition, Tata McGraw Hill Education,2014.
2. Nell Dale, Chip Weems, Programming and Problem solving with JAVA, Jones and Bartlett Publisher, 2004.
3. C Thomas Wu, An Introduction to Object Oriented Programming with Java, 5th edition, McGraw Hill Publishing, 2010.
4. Y. Daniel Liang , An Introduction to JAVA Programming, Tata McGraw Hill, 2009.
5. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.
6. https://nptel.ac.in/courses/106105191/
7. https://docs.oracle.com/javase/tutorial/

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

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

Duration of Internal Tests : 90 Minutes

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

SKILL DEVELOPMENT COURSE-I -COMMUNICATION SKILLS IN ENGLISH-I

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

L:T:P (Hrs./week): 1:0:0	SEE: 40	Course code: **U23HS320EH**
Credits : 1	CIE: 30	Duration of SEE: 2 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. 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 Develop and improve reading skills needed for college work and reproduce the content based on the situational need.	1. Introduce themselves effectively and converse in a formal environment especially in the online space 2. Write emails with appropriate structure and content 3. Use appropriate structure based on the content employing appropriate transitions in written and spoken communication 4. Paraphrase and Summarise in Spoken and written formats

Unit 1: Delightful Descriptions

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

Unit 2: Formal Conversation Skills

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

Unit 3: Technical Expositions and Discussions

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

Unit 4: Rational Recap

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

METHODOLOGY
ASSESSMENTS

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

Learning Resources:
learn.talentsprint.com

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

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DEPARTMENT OF INFORMATION TECHNOLOGY

SKILL DEVELOPMENT COURSE-I -TECHNICAL SKILLS-I

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code : **U23PE310IT**
Credits : 2	CIE Marks : 30	Duration of SEE : 2 Hours

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

Phase I

#1: Code Complexity Analysis & Linear List data

Problem solving through Coding, Compare and contrast coding and competitivecoding, 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 Solvingusing 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

#2: Memory Manipulation Methods and Problem Solving on String data

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

#3: 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

#4: 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

#5: 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

#6: Problem Solving through Divide & Conquer Strategies

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

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

DATA STRUCTURES LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:3	SEE Marks : 50	Course Code : **U23PC311IT**
Credits : 1.5	CIE Marks : 30	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Demonstrate stacks, queues, linked lists and its applications. 2. Provide hands-on experience to perform searching, sorting problems insertion and deletion operations on non-linear data structures.	1. Implement operations on stacks, queues and linked lists and evaluate expressions. 2. Execute insert, search and delete operations on trees. 3. Implement priority queues, heaps and sorting. 4. Implement graph traversal algorithms. 5. Implement multi way search trees.

1. Menu driven program that implements Stacks using arrays for the following operations
   a)create b)push c)pop d) peek
2. Implementation of Infix to Postfix Conversion and evaluation of postfix expression.
3. Menu driven program that implements Queues using arrays for the following operations
   a)create b)insert c)delete d) display
4. Menu driven program that implements Circular Queues for the following operations
   a)create b)Insert c)delete d) display
5. Implementation of Singly Linked List, Stack using Singly Linked List, Queue using Singly Linked List.
6. Implementation of polynomial operations using Linked List.
7. Implementation of Doubly Linked List, Circular linked list.
8. Implementation of Operations on Binary Tree (Insert, Delete, Level Order, Search)
9. Implementation of Recursive and Iterative Traversals on Binary Trees.
10. Implementation of Operations on Priority Queues and Heaps.
11. Implementation of Operations on Binary Search Tree.
12. Implementation of operations on AVL Tree.
13. Implementation of Breadth First search Traversal on Graphs.
14. Implementation of Depth First search Traversal on Graphs.

15. Implementation of prim's and Kruskals Algorithm for Minimum Spanning Tree
16. Implementation of Insertion Sort, Heap Sort.

Virtual Lab :

17. Stacks and Queues: https://ds1-iiith.vlabs.ac.in/exp/stacks-queues/index.html
18. Polynomial Arithmetic: https://ds1-iiith.vlabs.ac.in/exp/poly-arithmetic/index.html

Learning Resources

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2/e, Universities Press, 2008
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition (2002), Pearson
3. Richard F, Gilberg, B.A. Forouzan, "Data Structures, A Pseudocode Approach with C", Cengage, 2nd Edition
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stem 'Introduction to Algorithms' 3rd Edition.
5. Tanenbaum A. M , Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson
6. Data Structures through C in depth,S K Srivastava,Deepali Srivastava,BPB publications,2nd Edition

Online Resources:

1. http://nptel.ac.in/courses/106106127/
2. http://nptel.ac.in/courses/106103069/
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos/

No. of Internal Tests:	02
Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work	18

Duration of Internal Test: **3 Hours**

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

OBJECT ORIENTED PROGRAMMING LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:3	SEE Marks : 50	Course Code : **U23PC321IT**
Credits : 1.5	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Illustrate the key features of Object-Oriented Programming, threads and files. 2. Demonstrate command line as well as graphical user interface applications.	1. Implement object-oriented programming features using Java. 2. Implement exception handing and multithreading. 3. Execute I/O and string manipulation operations using java libraries. 4. Implement data structures using collection framework. 5. Develop GUI using java libraries, following MVC architecture.

JAVA API(java.lang package)

1. A program to illustrate the concept of arrays in Java.
2. A program to demonstrate the use of command line arguments.
3. A program to illustrate the concept of inheritance.
4. A program to illustrate the concept of dynamic polymorphism.
5. A program to illustrate the concept of abstract class.
6. A program to demonstrate various access specifiers and their scope using packages.
7. A program to demonstrate how multiple inheritance is achieved using interfaces.
8. A program to demonstrate the use of Lambda functions.
9. A program to demonstrate exception handling by using throw, finally & multiple catch statements.
10. A program to illustrate the concept of user-defined exception.
11. A program to create multiple threads using Thread class and Runnable interface.
12. A program to illustrate the concept of thread synchronization.
13. IITD virtual Lab core java programming simulations.

JAVA API(java.io package)

14.a) A program to illustrate the use of FileInputStream and FileOutputStream

b) A program to illustrate the use of BufferedInputStream and BufferedOutputStream.
c) A program to illustrate serialization and deserialization using ObjectInputStream and ObjectOutputStream.

JAVA API(java.util package)

15.a) A program to demonstrate the use of Scanner class to read user input.
b) A program to demonstrate the use of StringTokenizer.
c) A program to demonstrate the use of regular expressions.
16. A program to demonstrate the use of java.time.
17. An application to demonstrate the use of Collection framework classes and algorithms for implementing data structures.

JAVA API(Swing and JavaFX Packages)

18. a) An application involving GUI with different controls using Swing.
b) An application involving GUI with different controls using JavaFX.

Virtual Lab:

19. Understanding Life cycle of a Thread:
https://java-iitd.vlabs.ac.in/exp/life-cycle-thread/

Learning Resources:

1. Herbert Schildt, The Complete Reference Java, 9th Edition, Tata McGraw Hill Education,2014.
2. Nell Dale, Chip Weems, Programming and Problem solving with JAVA, Jones, and Bartlett Publisher, 2004.
3. C Thomas Wu, An Introduction to Object Oriented Programming with Java, 5th edition, McGraw Hill Publishing, 2010.
4. Y. Daniel Liang , An Introduction to JAVA Programming, Tata McGraw Hill, 2009.
5. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.
6. https://nptel.ac.in/courses/106105191/
7. https://docs.oracle.com/javase/tutorial/
8. https://java-iitd.vlabs.ac.in/List%20of%20experiments.html

No. of Internal Tests:	02
Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work	18

Duration of Internal Test: **3 Hours**

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

NETWORK ENGINEERING LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks : 50	Course Code : **U23PC331IT**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Introduce the fundamental concepts in Networking, OSI and TCP/IP protocol suite. 2. Demonstrate Switching, Routing and Wireless networking concepts using Packet Tracer tool.	1. Identify and Configure LAN switching technologies 2. Implement IP addressing and subnetting. 3. Design and configure routers, switches and wireless devices. 4. Build configuration for DHCP server and client. 5. Identify and provide security to LAN Ports.

List of Experiments:

1. **Basic Networking Commands-**The networking commands like ipconfig, netstat, ping, system info, lookup, traceroute, hostname, Arp are discussed.
2. **Configure Initial Switch Settings**- Connect a switch to a PC via a console cable, specify the switch's name using IOS commands, then set up passwords to safeguard the switch using Packet Tracer Simulator. Save the switch's configuration to its NVRAM (Using IOS commands).
3. **Connect a Wired and Wireless LAN**- Connect all devices in the supplied activity using guided media in accordance with the directions on the instructions page by using the packet tracer simulator and verify end-to-end connectivity
4. **Subnet an IPv4 Network-** Create an IPv4 Network Subnetting Scheme, configure the devices, test the network and troubleshoot it.
5. **Sub-netting Scenario-** Design an IP addressing scheme using FLSM (Fixed Length Subnet Mask) and assign IP addresses to network devices as per instructions given in instructions page in packet tracer activity and check connectivity.
6. **Design and Implement a VLSM addressing Scheme-** Given a network address and host requirements, create a VLSM (Variable Length Subnet Mask) addressing scheme by setting up addressing on network hosts, switches, and routers. Verify IP connectivity and troubleshoot connectivity issues as required.

7. **Configure IPv6 Addressing Scheme-** To Set Up Topology by configuring basic Router and Switch Settings and IPv6 Addresses manually and to verify end-to-end Connectivity
8. **Build a small network. -** Create a new IPv4 addressing scheme that will accommodate 4 subnets using the 192.168.0.0/24 network. 25 hosts are required by the IT department.(The Web server, ISP cluster, and Central router have been completely configured). 50 hosts are required for the sales division. 100 hosts are needed in the subnet for the remaining employees. To support 25 hosts, a Guest subnet will be implemented in the future. On R1, you must also complete the fundamental interface and security setups. On switches S1, S2, and S3, you will configure the Switch Virtual interface and the fundamental security settings.
9. **Configure SSH-** Replace Telnet protocol with SSH using CISCO IOS Commands on networking devices to encrypt communication between client and server and to verify connectivity.
10. **Implement VLANs and Trunking-** To configure and implement Virtual LANs by assigning ports and create static and dynamic trunks.
11. **Configure Router-on-a-Stick Inter-VLAN Routing: -** To add VLANs to a switch and configure sub interfaces on the router in order to test the connectivity with Inter VLAN Routing.
12. **Configure DHCPv4-** To configure a router as a DHCP server, PCs as DHCP clients and other routers as DHCP relay agents as per the instructions given in packet tracer activity, verify DHCP and test the connectivity.
13. **Implement Port Security-**In the given Topology Implement Port Security on Switches and verify.
14. **Configure a Wireless Network-** To connect wired and wireless devices to a wireless router, configure and add access point to extend wireless coverage.

Virtual Lab:

15. Cisco Packet Tracer to visualize and simulate a network: https://skillsforall.com/course/getting-started-cisco-packet-tracer?utm_source=netacad.com&utm_medium=referral&utm_campaign=packet-tracer&courseLang=en-US&userlogin=0

Learning Resources:

https://www.netacad.com/courses/networking/ccna-introduction-networks
https://www.netacad.com/courses/networking/ccna-switching-routing-wireless-essentials

No. of Internal Tests:	02
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)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

MINI PROJECT

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks : 50	Course Code : **U23PW319IT**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	*On completion of the course, students will be able to:*
Develop and implement a project using any of the programming languages/simulation tools/electronic components.	1. Apply theoretical knowledge to design solutions for real life problems. 2. Demonstrate the ability to locate and use technical information from multiple sources. 3. Develop team spirit and demonstrate an understanding of professional ethics. 4. Demonstrate the ability to communicate effectively in speech and in writing. 5. Develop the capability for lifelong learning through advanced technology.

1. During the implementation of the projects, Personnel Software Process (PSP) has to be followed.
2. Two reviews will be conducted.
3. Report of the project work has to be submitted for evaluation.

Continuous Internal Evaluation (CIE) – 30 marks : To be evaluated by the Internal Examiner

Assesment-1 : **[5 Marks]**
To be conducted on week-2 : Review of problem selection and Abstract.

Assesment-2: [10 Marks]
To be conducted on week-7: Review of project design and initial phase of implementation.

Assesment-3: [15 Marks]
To be conducted on week-15 : Review of final implementation, presentation and report.

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

Evaluation is done based on the following deliverables:

PowerPoint Presentation	[10 Marks]
Demonstration of the application	[20 Marks]
Project report	[10 Marks]
Viva Voce	[10 Marks]

External Examiner should be appointed from other premier Institutes OR from the industry.

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OPEN ELECTIVES - I			
Department	**Code**	**Title**	
Civil	U23OE310CE	Green Buildings	General
CSE	U23OE310CS	Introduction to Python Programming	General
	U230E320CS	Programming Essentials in Python	Stream
ECE	U23OE310EC	Mathematical Programming for Engineers	General
ECE	U23OE320EC	Introduction to Signals and Systems	General
EEE	U23OE310EE	Non Conventional Energy Sources	General
IT			
Mechanical	U23OE310ME	Introduction to Industrial Robotics (Stream: Robotics)	Stream
	U23OE320ME	Fundamentals of Unmanned Aerial Vehicles	General
Chemistry	U23OE310CH	Polymeric Materials	General
English	U23OE310EH	Learning To Learn	General
	U23OEH340EH	Mastering Leadership	General
Maths	U23OE320MA	Number Theory & Boolean Algebra	General
	U23OE310MA	Complex Variables	General
Physics	U24OE310PH	Fundamentals of Smart Materials and Applications	General
	U24OE330PH	Materials Science for Engineers Fundamentals of materials science	
	U24OE320PH	Semiconductor Physics and Device Applications Essentials of Semiconductor Physics	

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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DEPARTMENT OF CIVIL ENGINEERING

GREEN BUILDINGS (Open Elective-I)

SYLLABUS FOR B.E. III-SEMESTER

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

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

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

Department of Computer Science & Engineering

INTRODUCTION TO PYTHON PROGRAMMING (OPEN ELECTIVE-I)

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

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

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

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

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

Iteration: while statement

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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Department of Computer Science & Engineering

PROGRAMMING ESSENTIALS IN PYTHON

Stream - Artificial Intelligence & Machine Learning

(OPEN ELECTIVE-I)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III-SEMESTER

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

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers

(General Pool: Open Elective - I)

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

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

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

CO-PO Mapping

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

UNIT - I : Introduction:

Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on-line help, file types.
MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file.
Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions

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

UNIT - III : Numerical Methods Using MATLAB

Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, MATLAB functions for integration.
Linear Equations- Linear algebra in MATLAB, Solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations.

UNIT - IV : Nonlinear Equations

System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation.
Solution of Ordinary differential Equations (ODEs)-ODE Solvers in MATLAB, Solving First-order equations using ODE23 and ODE45.

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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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, EEE & IT branches)

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

COURSE OBJECTIVES	COURSE OUTCOMES
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-PSO Mapping

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

UNIT - I

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

Continuous time systems: classification of systems - static 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 and Systems, 2nd ed., PHI, 2009.
3. Nagoor kani , Signals and Systems McGraw Hill, 2013
4. https://onlinecourses.nptel.ac.in/noc19_ee07/preview (Principle of Signals and Systems by Prof. Aditya K Jagannatham
5. https://www.edx.org/course/signals-and-systems-part-1-1
6. https://www.edx.org/course/signals-systems-part-2-iitbombayx-ee210-2x-3

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF 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:**U23OE310EE**
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

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

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

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

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

UNIT-III: Biomass Energy and Fuel Cells:
BiomassEnergy: Definition, Bio fuels, Biomass resources, Biomass conversion technologies: Incineration- Thermo chemical conversion- Bio-

chemical conversion. Advantages and disadvantages of biomass energy, Case study

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

UNIT-IV: Ocean Energy and Geothermal Energy:

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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: U23OE310ME
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. Position and velocity feedback devices

UNIT-III

ROBOT COORDINATE SYSTEMS

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

UNIT-IV

ROBOT SENSORS

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

Robot programming

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

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: U23OE320ME
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 of UAV, elements, navigation and guidance of UAV and to design and silmulate UAV	1 Explain the types and characteristics of UAVs and their applications. 2 Illustrate the concepts of aerodynamics of flight vehicle. 3 Identify and explain the components, sensors and payload of UAVs, their navigation and guidance. 4 Design and perform structural, aerodynamic analysis of UAV components

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: UAV Elements, Navigation and Guidance

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

Unit-IV: Design & Simulation of UAV

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (A)
DEPARTMENT OF CHEMISTRY
OPEN ELECTIVE (*General Pool*)
B E III SEMETER

POLYMERIC MATERIALS

Instruction : 2Hour / Week	SEE- Marks : 60	Course Code : U23OE310CH
Credit : 2	CIE- Marks : 40	SEE- Duration : 2Hours

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

CO-PO MAPPING:

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

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

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

UNIT-II: POLYMERIZATION: (7h)

Initiators- Types of Initiators, Thermal Decomposition of Initiators, Redox Initiation, Photochemical Initiation, Initiation by Ionizing Radiation, Pure Thermal Initiation, Other Methods of Initiation, Initiator Efficiency, Definition - Mechanism - Cage Effect.Step-Reaction (Condensation) Polymerization, Polymerization Mechanisms- Mechanism of Stepwise Polymerization, Radical Chain (Addition) Polymerization, Chain Polymerization, Ionic and Coordination Chain (Addition) Polymerization, Cationic Polymerization, Anionic Polymerization, Copolymerization - Mechanisms of Copolymerization, Block and Graft Copolymers

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

Living Radical Polymerization - General Considerations, Atom Transfer Radical Polymerization (ATRP) -Polymerization Mechanism, Stable Free-Radical Polymerization (SFRP), Radical Addition–Fragmentation

Transfer (RAFT) -and Other Living Radical Polymerizations.process conditions -bulk (mass) polymerization - solution polymerization- emulsion & suspension polymerization - heterogeneous polymerization - other processes; self-assembly and nanostructures.

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

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

Requirements for High-Temperature Polymers.

Synthesis, properties and applications of

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

Text Books:

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

Learning Resources:

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

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

COURSE NAME-LEARNING TO LEARN

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

W.E.F-2024-2025

Instruction: 2 Hours	SEE: 60	Course code: U23OE310EH
Credits: 2	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to:	**At the end of the course the learners will be able to: -**
1. 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.

OVERVIEW:

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

UNIT 1: STUDY SKILLS

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

1.1 Study Skills Checklist
1.2 Learning Styles
1.3 Habits of Effective Students

1.4 Using the Focused and Diffuse Modes
1.5 Introduction to memory and Memory Technique

UNIT 2: Chunking

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

2.1 Knowledge Chunking
2.2 Skill and Will
2.3 Sleep and Learning

UNIT 3: Procrastination and Memory

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

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

UNIT 4: Renaissance Learning and Unlocking Your Potential

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

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

4.6 Goal Progress Review

LEARNING RESOURCES
learn.talentsprint.com

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

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

Duration of Internal Tests : 90 Minutes

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

COURSE NAME-MASTERING LEADERSHIP

(Open Elective) SYLLABUS FOR B.E. 2/4 – III SEMESTER
W.E.F-2024-2025

Instruction: 2 Hours	SEE: 60	Course code: U23OEH340EH
Credits: 2	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to:	**At the end of the course the learners will be able to: -**
1. Develop self-awareness, assess personal strengths, and set goals for leadership growth.	1. Create a personalised leadership development plan, showcasing self-awareness and goals for growth.
2. Foster inclusive teamwork by leveraging diverse talents and viewpoints.	2. Demonstrate the ability to lead inclusive teams, leveraging diverse talents and viewpoints.
3. Apply rational decision-making models and critical thinking to engineering challenges.	3. Employ innovative problem-solving techniques to tackle complex technical issues.
4. Manage time efficiently, balance priorities, and integrate continuous improvement practices.	4. Demonstrate efficient time management skills, balancing priorities and integrating continuous improvement.
5. Integrate competence-building, self-development, and ethical leadership into engineering leadership roles.	5. Integrate competence-building, self-development, and ethical leadership principles into their engineering leadership roles.

Unit 1: Foundations of Leadership in Engineering (6 hours)
1.1 Introduction to Leadership
1.2 Exploring diverse leadership styles and their applications
1.3 Building Competence and Self-Development
1.4 Assessing personal strengths and areas for improvement
1.5 Setting SMART goals for leadership and professional growth

Unit 2: Communication and Team Collaboration (6 hours)
2.1 Active listening, empathy, and conflict resolution
2.2 Enhancing Personal and Team Performance
2.3 Leveraging strengths within a team for optimal performance
2.4 Constructive feedback and coaching for skill development
2.5 Techniques for fostering a collaborative and high-performing team

Unit 3: Decision Making and Problem Solving (6 hours)
3.1 Rational decision-making models and critical thinking

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

Unit 4: Leading Change and Project Management (6 hours)
4.1 Navigating technological advancements and industry shifts
4.2 Leading teams through organisational change and adaptation
4.3 Time Management and Continuous Improvement
4.4 Techniques for effective time management and priority setting
4.5 Strategies for managing multiple engineering projects and deadlines
4.6 Integrating personal and team growth into ongoing project improvement

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

ASSESSMENTS
- Online assignments
- Individual and Group

LEARNING RESOURCES
learn.talentsprint.com

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

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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

DEPARTMENT OF MATHEMATICS

NUMBER THEORY& BOOLEAN ALGEBRA (OE) for B.E., III - Semester – CBCS

(For CSE, AIML & IT only)

Instruction :2 Hours per week	Semester End Exam Marks: 40	Subject Reference Code: U23OE320MA
Credits: 2	Sessional Marks: 60	Duration of Semester End Exam: 3 Hrs.

Course Description: This course is designed to explain the basics and applications of number theory for the students of Computer Science & Information Technology. The core courses of these branches encounter with concepts like prime factorization, modular arithmetic, Congruences, Primitive roots and Boolean function in number theory. The students will also learn how number theory is used in public key cryptography to securely transmit information over the internet.

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to:	***At the end of the course students will be able to:***
6. ***Study*** Fundamental Theorem of Arithmetic and GCD using Euclidean Algorithm and also Linear Diophantine Equations and their solutions. 7. ***Understand*** **the concepts of number theory such Congruences and proofs of Fermat's and Wilson's theorem.** 8. ***Identify*** Primitive roots for primes and their existence and also to outline the Euler's theorem and Lagrange's theorem. 9. ***Familiarise*** **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.** ***Use*** Fermat's Little Theorem & Wilson's theorem to prove that RSA works correctly and accurately and also in discrete log cipher of Cryptography. **3.** ***Apply*** primitive roots in the Diffie-Hellman key exchange protocol and ElGamal encryption of Cryptography **4.** ***Design*** secure hash functions, encryption schemes, and authentication protocols using Boolean functions which are the building blocks of symmetric cryptographic systems, which are used to design all types of digital security systems.

UNIT – I (6 Hours)

Theory of Numbers: The Integers and Division- Prime and Composite Numbers - Division Algorithm- Fundamental Theorem of Arithmetic –GCD and their properties- Euclidean Algorithm- Modular Arithmetic- Linear Diophantine Equations and their solutions.

UNIT – II (8 Hours)

Congruences: Introduction to Congruences, Linear Congruence. Chinese Remainder Theorem -Polynomial Congruences- System of Linear Congruences in two variables- The Pollard Rho Factoring Method- Fermat's Little Theorem, Wilsons Theorem and its converse

UNIT – III (5 Hours)

Primitive Roots: Euler's phi-function - Euler's theorem -The order of an integer modulo n, Primitive roots for primes - Lagrange's Theorem - Existence of Primitive roots.

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. Basic Number Theory by S.B. Malik,S. Chand publishers

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. An introduction to the theory of number, Ivan Niven, Zuckerman, Montgomery, willy India edition
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/

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

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

DEPARTMENT OF MATHEMATICS

COMPLEX VARIABLES

(Open Elective) For B.E., III - Semester – CBCS

(For CIVIL, EEE, ECE & MECH only)

Instruction: 2 Hours per week	Sem. End Exam Marks: 60	Subject Reference Code: U23OE310MA
Credits: 2	Sessional Marks: 40	Duration of Semester End Exam: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to :	At the end of the course students should be able to:
1. Understand the Analytic functions, conditions and harmonic functions. 2. Evaluate a line integral of a function of a complex variable using Cauchy's integral formula, and how to 3. Evaluate Taylor's and Laurent Series. 4. Understand the Cauchy's residue theorem	1. Apply the condition(s) for a complex variable function to be analytic and/or harmonic and to construct an Analytic function. 2. Evaluate complex integrals by Cauchy's theorem and Cauchy's Integral formula 3. Identify the singularities of a function and to expand a given function as a Taylor's / Laurent's series. 4. Evaluate complex integrals by Cauchy's Residue theorem

UNIT – I (8 classes)

DIFFERENTIATION OF COMPLEX FUNCTION

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

UNIT – II (6 classes)

INTEGRATION OF COMPLEX FUNCTION

Complex Integration- Cauchy's Theorem (with proof) - Cauchy's Integral Formula (with proof) - Evaluation of integrals by Cauchy's Integral formula.

UNIT – III (6 classes)
SERIES OF COMPLEX FUNCTIONS
Power series - Taylor's Series - Laurent's Series (without proofs) –Zero and singularities of complex function.

UNIT – IV (8 classes)
RESIDUES
Introduction to Residues- Residues at singularities-Cauchy's Residue theorem (without proof) – Evaluation of integrals by Cauchy's Residue theorem.

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

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

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

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS
Open elective Course
FUNDAMENTALS OF SMART MATERIALS AND APPLICATIONS
B.E. III Semester

L:T: P	Credits	CIE Marks	SEE Marks	SEE Duration	Course Code
2:0:0	02	40	60	3 hours	24OE310PH

CO-PO Mapping

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

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

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS
PHYSICS OPEN ELECTIVE TRACKS (B.E-III Semester)

MATERIALS SCIENCE FOR ENGINEERS
FUNDAMENTALS OF MATERIALS SCIENCE

L : T : P	Credits	CIE		SEE		Course Code
		Marks	Exam Duration	Marks	Exam Duration	
02 :0 :0	2	30	90 min	60	3hours	**U24OE330PH**
CIE	Assignments (02)		Quizzes (02)	Internal Exams(01)		Total CIE Marks
Ave. Marks	5		5	30		40

UNIT I: Atomic structure and Chemical Bonding (8 hours)
Structure of the atom, The quantum states, Forces between atoms, Ionization potential, Electron affinity and electronegativity. Bond energy, Bond type and Bond length. Types of Bonds-Ionic, Covalent, Metallic bonding, Hydrogen bond, Vander-walls bond, Cohesive energy of ionic crystals, Madelung constant.

UNIT II: Atomic Packing (6 hours)
Simple crystal structures, Classification of close packings 2-D & 3-D, Voids in closed packings, size and coordination of voids, significance of voids, axial ratio and lattice constants, effect of radius ratio, representation of closed packing, Pauling's rule, Applications of Pauling's rule to actual structures, examples of closed packed structures. Line and surface density of atoms.

UNIT III: Diffusion in Solids (8 hours)
Solid state diffusion, Diffusion mechanisms, Self-diffusion, Impurity diffusion coefficient, Fick's laws, Diffusion coefficient, determination of diffusion coefficient, Random walk diffusion, Diffusion in a simple cubic structure, Diffusion under external field, Kirkendall shift, Ionic conductivity, Ionic conductivity of alkali halides.

UNIT-IV: Strengthening Mechanisms (6 hours)
Solidification of metals and alloys, cooling curves, concepts of nucleation and growth, Heat transfer associated in nucleation and growth, Homogeneous and Heterogeneous nucleation, Structure of metal ingots, Construction of binary alloys, Formation of alloy phases, viz. Solid solutions – substitutional and interstitial, intermetallic compounds.

References:

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

PHYSICS OE TRACKS (B.E-III Semester)

Semiconductor Physics and Device Applications
ESSENTIALS OF SEMICONDUCTOR PHYSICS

L : T : P	Credits	CIE		SEE		Course Code
		Marks	Exam Duration	Marks	Exam Duration	
02 :0 :0	2	30	90 min	60	3hours	**U24OE320PH**
CIE	Assignments (02)		Quizzes (02)	Internal Exams(01)		Total CIE Marks
Ave. Marks	5		5	30		40

UNIT I: Basics of Quantum Mechanics (8 Hrs)
Existence of matter waves, Wave function and its significance, Schrodinger time dependent and independent wave equations, Wave equation of a free particle, Origin of band gap, Energy bands in solids, Postulates of quantum mechanics, Quantum mechanical operators and expectation values, Potential well, Quantum tunnelling.

UNIT II: Semiconductors: Energy Band and Charge Carriers (6 Hrs)
Types of semiconductors (doping, bandgap, composition), Fermi-Dirac statistics- Density of states of semiconductor, Fermi level in semiconductors, Law of mass action, Charge compensation and charge neutrality, Hall probes and its applications.

UNIT-III: Growth of Semiconductors (6 Hrs)
Introduction, Bulk crystal growth, Epitaxial crystal growth, Evaporation and sputtering, defects in crystal, Band gap engineering, GaAs crystal growth.

UNIT IV: Carrier Transport in Semiconductors (6 Hrs)
Carrier generation, Carrier life time, Carrier scattering and mobility, Low-field and high-field transport, introduction to diffusion, Drift-diffusion current and total current density, Einstein relation , Direct and indirect recombination and trapping, Current continuity equation, Carrier injection, ambipolar transport, Diffusion length.

References:

1. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)

B.E. – INFORMATION TECHNOLOGY : THIRD SEMESTER (2024 - 2025)

B.E (IT) III-Semester (BRIDGE COURSE)								
Course Code	**Course Name**	**Scheme of Instruction**			**Scheme of Examination**			**Credits**
		Hours per week			**Duration in Hrs**	**Maximum Marks**		
		L	**T**	**P/D**		**SEE**	**CIE**	
THEORY								
UB23BS300MA	Matrix Theory and Vector Calculus	2	-	-	3	50	-	-
UB23ES310IT	Problem Solving through Programming using C	2	-	-	3	50	-	-
PRACTICAL								
UB23ES311IT	Problem Solving through Programming using C Lab	-	-	2	3	50	-	-
	Total	**4**	**-**	**2**	**-**	**150**		
	Grand Total	**6+0=6**						

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

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

DEPARTMENT OF MATHEMATICS

CALCULUS & MATRIX THEORY

BRIDGE COURSE B.E. III-SEMESTER (CBCS)

(Common to all branches)

Instruction:	2 hours/Week	SEE Marks	:50	Subject Reference Code	**UB23BS300MA**
Credits:	-	CIE Marks	:-	Duration of SEE	3 Hrs

UNIT-I:

CALCULUS

Differentiation of standard functions (Formulae) - Taylor's Series – Maclaurin's Series for functions of one variable - Partial Derivatives – Total Derivative - Derivative of Composite functions and Implicit functions - Chain Rule.

UNIT –II

VECTOR DIFFERENTIATION

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

UNIT – III

MULTIPLE INTEGRALS: Double integrals - Change of order of integration (Cartesian Coordinates) – Change of variables (Cartesian to polar coordinates in two dimensions) - Triple integrals (Cartesian).

UNIT- IV

MATRIX THEORY

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

Suggested 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.

VASAVICOLLEGEOFENGINEERING (AUTONOMOUS)
IBRAHIMBAGH,HYDERABAD– 500031
DEPARTMENT OF INFORMATION TECHNOLOGY

PROBLEM SOLVING THROUGH PROGRAMMING USING C

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code:**UB23ES310IT**
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

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.

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

DEPARTMENT OF INFORMATION TECHNOLOGY

PROBLEM SOLVING THROUGH PROGRAMMING USING C LAB

SYLLABUS FOR BRIDGE COURSE B.E III SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code :**UB23ES311IT**
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. Understand the fundamentals of programming in C Language 2. Write, compile and debug programs in C. 3. Formulate solution to problems andimplement in C. 4. Effectively choose programming components to solve computing problems.	1. Choose appropriate data type for implementing programs in C language. 2. Design and implement modular programs involving input output operations, decision making and looping constructs. 3. Implement search and sort operations on arrays. 4. Apply the concept of pointers for implementing prog rams on dynamic memory management and string handling. 5. Design and implement programs to store data in structures and files.

Programming Exercise:

1. Programs to illustrate arithmetic and bitwise operators
2. Programs to illustrate selection control statements
3. Programs to illustrate loop control statements.
4. Programs to illustrate functions and recursion
5. Programs to illustrate one dimensional arrays, searching and sorting.
6. Programs to illustrate two dimensional arrays
7. Programs on pointers
8. Program on usage of built-in Functions for string manipulations.
9. Programs on structures and unions.
10. File handling programs.

Learning Resources:

1. Forouzan B.A & Richard F. Gilberg, A Structured Programming Approach using C, 3rd Edition(2013),Cengage Learning.
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition (2006), Prentice-Hall.
3. Steve Oualline, Practical CProgramming,3rd Edition(2006),O'Reilly Press.
4. Balagurusamy E, Programming in ANSI C, 4th Edition(2008), TMG.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)
B.E. – INFORMATION TECHNOLOGY : FOURTH SEMESTER (2024 - 2025)

B.E (IT) IV Semester								
Course Code	**Course Name**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
U23BS420MA	Probability and Statistics	3	-	-	3	60	40	3
U23PC410IT	Computer Organization	3	-	-	3	60	40	3
U23PC420IT	Database Management Systems	3	-	-	3	60	40	3
U23PC430IT	Design & Analysis of Algorithms	3	-	-	3	60	40	3
U23PC440IT	Full Stack Development	3	-	-	3	60	40	3
U23OE4XXXX	Open Elective – II	3	-	-	3	60	40	3
U23HS020EH	Human Values and Professional Ethics – II	1	-	-	2	40	30	1
U23BS430MA	Skill Development – III (Aptitude)	1	-	-	2	40	30	1
U23PE410IT	Skill Development - IV (Technical Skills- II)	1	-	-	2	40	30	1
PRACTICALS								
U23PC421IT	Database Management Systems Lab	-	-	2	3	50	30	1
U23PC431IT	Design and Analysis of Algorithms Lab	-	-	2	3	50	30	1
U23PC441IT	Full Stack Development Lab	-	-	2	3	50	30	1
	Co-Curricular Activities-II	-	-	-	-	-	-	-
	Library /Sports/ Mentor Interaction	**-**	**-**	**-**	**-**	**-**	**-**	**-**
• Student should acquire one NPTEL Certification Course equivalent to 2 credits (8 weeks) by the end of VI Semester. • Students opting for Honours should complete one NPTEL Course of 2 credits (8 Weeks) by the end of IV Semester.								
	Total	**21**	**-**	**6**	**--**	**630**	**420**	**24**
	Grand Total	**27**			**--**	**1050**		

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

PROBABILITY & STATISTICS

for B.E., IV- Sem., (CBCS)
(For IT only)

L:T:P(Hrs./week): 3:0:0	SEE Marks:60	Course Code:**U23BS420MA**
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	***At the end of the course students will be able to:***
1. **Study** the fundamental concepts of probability theory. 2. **Understand** random variables and its probability distributions. 3. **Learn** various probability distributions, and their related applications. 4. **Study** the concept of hypothesis testing employed for large samples. 5. **Study** the various methods of testing small samples.	1. **Define** probability and compute probabilities of events and apply Bayes' Theorem to update probabilities based on new information. 2. **Differentiate** between discrete and continuous random variables and its distributions. 3. **Apply** various theoretical probability distributions to solve related problems in various applications. 4. **Formulate** Null and Alternative Hypotheses and apply the tests of hypothesis for large samples. 5. **Apply** various methods for Tests of Significance for small samples.

UNIT –I
Probability:
Basic terminology- Definition of Probability – Addition Law of probability- Independent events- Conditional Probability- Multiplication law of probability - Baye's Theorem.
UNIT –II
Random variables and Distributions:
Random Variables - Discrete and Continuous Random Variables – Mass and density functions – Distribution functions - Definitions of Mean, Median, Mode and Variance – Binomial & Poisson distributions.
UNIT-III
Continuous Distributions:

Geometric distribution - Uniform distribution - Exponential distribution & Normal Distribution - Properties

UNIT-IV

Tests of Hypothesis for Large samples:

Introduction -Testing of Hypothesis- Null and Alternative Hypothesis -Errors- - Level of Significance –Confidence Intervals - One and two tailed tests - Tests of Significance for large samples – Tests for single mean- Difference of means.

UNITV

Tests of Hypothesis for Small samples:

Tests of Significance for small samples - t-test for single mean and difference of means – F- test for comparison of variances - Chi-square test for goodness of fit.

Learning Resources : 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.

Reference Books:

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

Online Resources:

1 https://onlinecourses.nptel.ac.in/noc24_ma39/preview

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

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

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

COMPUTER ORGANIZATION

SYLLABUS FOR IV-SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks :60	Course Code : **U23PC410IT**
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The Objectives of the course:	**COURSE OUTCOMES** *On completion of the course, students will be able to:*
1. Provide the fundamentals of Computer Organization, basic processing units. 2. Explain input and output interfacing, memory and pipelining concepts.	1. Understand fundamentals of computer organization and instruction formats. 2. Analyse operations of arithmetic, logic, shift and control units. 3. Identify peripheral devices and analyse modes of data transfer. 4. Analyse the efficiency of cache, main memory and secondary storage. 5. Apply pipelining process to address structural, data and control hazards.

UNIT – I
Basic Structure of Computers :
Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Memory locations and Addresses, Memory operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly language, Additional Instructions

UNIT – II
Basic Processing Unit:
Register Transfer Language and Micro operations: Register Transfer Language, Register Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic logic shift unit.
MICROPROGRAMMED CONTROL: Control memory, address sequencing, micro program example, Design of control unit, hardwired control, micro programmed control.

UNIT – III
Input Output Organization:
Peripheral devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, and Priority interrupt, Direct Memory Access.

UNIT – IV

Memory System

Some Basic Concepts, Semiconductor RAM Memories, Read-Only memories, Cache Memories, Performance considerations, Virtual Memories, Memory Management Requirements, Secondary Storage-Magnetic Hard disks, Optical Disks, Magnetic Tape Systems

UNIT – V

Pipelining:

Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data path and control considerations, Super Scalar Operation.

Learning Resources:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization, 5th Edition, McGraw Hill, 2002.
2. M. M. Mano, Computer System Architecture, 3rd Edition, Prentice Hall, 1994.
3. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002.
4. J .P. Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.
5. Pal Chouduri, Computer Organization and Design, 2nd Ed. Prentice Hall of India, 2007
6. D. A. Patterson and J. L. Hennessy, "Computer Organization and Design - The Hardware/Software Interface", 2005.
7. https://nptel.ac.in/courses/106106092/

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

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

Duration of Internal Test: **90 Minutes**

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

DATABASE MANAGEMENT SYSTEMS

SYLLABUS FOR IV-SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks :60	Course Code : **U23PC420IT**
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Explain the concepts of database management systems. 2. Demonstrate conceptual and logical database design. 3. Explain the essential DBMS concepts like database security, integrity, concurrency, NoSQL databases.	1. Identify the functional components of the DBMS, develop ER model for a given problem and map ER to Relational model. 2. Formulate relational database principles using Relational Algebra and SQL Queries. 3. Design a normalized database schema using different normal forms. 4. Understand transaction processing and compare different concurrency control and recovery techniques. 5. Understand NoSQL databases like HBase, Firebase, MongoDB, Cloud DB.

UNIT – I

Introduction to DBMS: Overview, File system vs DBMS, Advantages of DBMS, Database System Applications, Relational Databases, Object – Based and Semi-structured Databases, Data Storage and Querying, Database Architecture, Database Users and Administrators.

Database Design and the E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E–R Design Issues, Weak Entity Sets, Extended E-R Features.

UNIT – II

Relational Model: Structure of Relational Databases, Reduction to Relational Schemas, Other Aspects of Database Design. Relational Algebra: Fundamental Relational-Algebra Operations, Additional Relational – Algebra Operations, Extended Relational -Algebra Operations, Null Values, Modification of the Databases.

Structured Query Language: Data Definition, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Complex Queries, Views, Joined Relations, Indexing: Basic Concepts, Bitmap Indices, Index Definition in SQL.

UNIT – III

Advanced SQL and PLSQL: SQL Data Types and Schemas, Integrity Constraints, Authorization, SQL functions, procedural SQL, embedded SQL, cursors, ODBC and JDBC, triggers.

Schema Refinement: Features of Good Relational Design, Functional-Dependency Theory, Decomposition Using Functional Dependencies, Normalization, First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT – IV

Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Testing for serializability.

Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes, Deadlock Handling.

Recovery System: Failure Classification, Storage Structure, Log-Based Recovery, Aries, Media recovery.

UNIT – V

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

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

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

Duration of Internal Test: **90 Minutes**

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

DESIGN AND ANALYSIS OF ALGORITHMS

SYLLABUS FOR B.E IV-SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **U23PC430IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Explain Asymptotic notations, time and space complexity analysis. 2. Discuss different algorithm design strategies and their applications. 3. Introduce NP-Hard and NP-Completeness concepts.	1. Understand asymptotic notations and analyze the complexity of recursive and non-recursive algorithms. 2. Illustrate divide & conquer and greedy algorithm design strategies. 3. Apply dynamic programming strategy to solve optimization problems. 4. Solve problems using backtracking and branch and bound. 5. Understand NP hard and NP completeness

UNIT-I

Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method, Amortized analysis, Disjoint Set-union-find, merge-find.

UNIT-II

Divide and conquer: The general method, Iterative and Divide and conquer for Binary search, Merge sort, Quick sort, Strassen's Matrix Multiplication Algorithm Masters' theorem.

Greedy Method: The general method, Knapsack problem, Job sequencing with deadlines, Optimal storage on tapes, Optimal merge patterns, Huffman Codes, Dijikstra's algorithm.

UNIT-III

Dynamic Programming: The general method, Bellman-Ford Algorithm, Multistage graph, All-Pairs Shortest Paths, Matrix chain multiplication, Optimal

Binary Search trees, 0/1 Knapsack, Reliability design, Traveling Salesman Problem.

UNIT-IV

Backtracking: The general method, 8-Queens Problem, Graph Coloring, Hamiltonian cycles, Knapsack Problem

Branch and Bound: The general method, 0/1 Knapsack Problem, Traveling salesperson problem

UNIT-V

NP-Hard and NP-Completeness: Basic concepts, NP-hard graph problems-Clique Decision Problem, Node Cover Decision Problem, NP-Hard Scheduling Problem - scheduling identical processors, NP-Hard code scheduling problems – Code generation with common sub-expression.

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.Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson,
3. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
4. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
5. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.
6. https://nptel.ac.in/courses/106101060/
7. https://ocw.mit.edu/courses/electrical-engineering-and-computerscience/6-006-introduction-to-algorithms-fall-2011/lecture-videos

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

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

Duration of Internal Test: **90 Minutes**

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

FULL STACK DEVELOPMENT

SYLLABUS FOR B.E IV- SEMESTER

L:T:P (Hrs./week):: 3:0:0	SEE Marks : 60	Course Code: **U23PC440IT**
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Provide basic skills for designing static and dynamic Web Applications using HTML, CSS, Java script & frame works like Bootstrap 2. Demonstrate how to design and develop web applications using SpringBoot, Node JS, React and Mongo DB.	1. Design static web pages using HTML and CSS. 2. Create dynamic web pages with client-side validations using XML and JavaScript. 3. Develop responsive web applications using Bootstrap and SpringBoot framework. 4. Build cross-platform single page applications using React. 5. Develop web applications using Node.js and MongoDB.

UNIT-I

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

HTML & CSS: Standard HTML document structure, Basic Tags, Images, Hypertext Links, Lists, Tables, Frames. Introduction to Cascading style sheets.

UNIT-II

JavaScript: Introduction, Basics of JavaScript-variables, data types and operators, Control Structures, Arrays, Functions, HTML Forms, Events and event handling, Asynchronous JavaScript

XML : XML: The Syntax of XML, XML Document Structure, Document Type Definitions.

UNIT-III

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

SpringBoot: Introduction to Spring, SpringBoot Architecture, Installation of SpringBoot- Spring Initializr, building a web application using SpringBoot, Dependency Injection, Database connectivity using SpringBoot.

UNIT-IV

React

Introduction to React, Add React to a website, create a new React App, Introducing JSX, Rendering Elements, Components and Props, State and Lifecycle,

Handling Events, Conditional Rendering, Lists and Keys, Forms. Building Single-Page applications with React.

UNIT-V

Application using Node JS and MongoDB:

Introduction to Node.js-Installing Node.js- Using Events, Listeners, Timers, and Callbacks in Node.js, Introduction to Mongo DB - Accessing MongoDB from Node.js

Learning Resources:

1. Programming the World Wide Web, Robert W. Sebesta, 7th Edition (2014), Pearson Education.
2. Web Technologies, Uttam K.Roy, 7th Edition, 2012.
3. Internet & World Wide Web How to Program, Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, 5th Edition, Pearson Education.
4. Learning React Functional Web Development with React and Redux by Alex Banks, Eve Porcello, Alex Banks, Eve Porcello
5. Pro MERN Stack- Full Stack Web App Development with Mongo, Express, React, and Node 2nd Edition, Vasan Subramanian.
6. Learning SpringBoot 3.0, Greg L.Turnquist, 3rd Edition, 2022
7. SpringBoot in Action, Craig Walls, Manning Publications, 2016
8. http://getbootstrap.com/
9. https://reactjs.org/
10. https://nodejs.org/en/

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

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

Duration of Internal Test: **90 Minutes**

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

HUMAN VALUES AND PROFESSIONAL ETHICS-II

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

L:T:P (Hrs./week):: 1:0:0	SEE Marks : 40	Course Code: **U23HS030EH**
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

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

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

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

1	No. of Internal tests	:	1	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

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

SKILL DEVELOPMENT COURSE- III : (APTITUDE)

(Common to CSE, CSE-AIML & IT)
SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week): 1:0:0	SEE Marks: 40	Course Code: **U23BS430MA**
Credits: 1	CIE Marks: 30	Duration of SEE: 02 Hrs

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

UNIT 1
QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -1
1.1 Time speed and distance
1.2 Boats and Streams
1.3 Problems on trains

UNIT 2
REASONING ABILITY- LOGICAL REASONING
2.1 Seating Arrangements- Linear; Circular; Complex
2.2 Venn diagrams
2.3 Syllogism
2.4 Cubes & Cuboids
2.5 Dices

UNIT 3

REASONING ABILITY- NON VERBAL REASONING

3.1 Figure Series
3.2 Directions
3.3 Clocks
3.4 Calendars

UNIT 4
QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -2

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

UNIT 5
QUANTITATIVE APTITUDE- ENGINEERING MATHEMATICS

5.1 Permutations and combinations
5.2 Probability

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

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

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

SKILL DEVELOPMENT COURSE- III : (TECHNICAL SKILLS- II)

SYLLABUS FOR IV-SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks :40	Course Code : **U23PE410IT**
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
❖ Understand the Nonlinear data structures and their applications. ❖ Prepare the students for the contests relative to the concepts learnt. ❖ Build confidence in coding using Non Linear Data structures ❖ 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.

Phase II

#7: 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

#8: 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

#9: 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.

#10: Problem Solving implementing Algorithms - Greedy Methods II

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

#11: Problem Solving using DBMS I

Industry Standards of leveraging DBMS concepts: SQL Queries, Entity Relationship Models, Question, and answers

#12: Problem Solving using DBMS II

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

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

DATABASE MANAGEMENT SYSTEMS LAB

SYLLABUS FOR B.E. IV SEMESTER

L:T:P(Hrs/week): 0:0:2	SEE Marks :50	Course Code: **U23PC411IT**
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
Demonstrate SQL and PL/SQL constructs to develop a database application.	1. Design and implement a database schema. 2. Implement queries using SQL commands and SQLite. 3. Develop application programs using PL/SQL. 4. Develop a 2-tier Database Application.

1. **DDL Commands:**
   a. Creation of tables with appropriate integrity constraints
   b. Usage of alter, drop commands

2. **DML Commands:**
   a. Data Insertion and Updating
   b. Usage of truncate command

3. **TCL and DCL Commands:**
   a. Setting privileges
   b. save point, commit and rollback commands

4. **SQL Queries:**
   a. Simple SQL queries using Select
   b. SQL Built-in functions
   c. SQL Operators and Nested queries

5. Joins and aggregate functions
6. Grouping and ordering commands

7. **PL/SQL:**
   a. Blocks, Select Statement and control statements
   b. Stored procedures and functions
8. a. Packages and Exception Handling

b. Cursors
c. Triggers

9. SQLite: Simple Application Development using SQLite (DDL,DML Operations on SQLite).
10. Creation of full-fledged Database Application.

Virtual Lab:

11. ER Modelling from the given problem statements: http://vlabs.iitkgp.ac.in/se/4/exercise/

Learning Resources:

1. Ivan Bayross, SQL, PL/SQL, The Programming Language of Oracle,4th Edition, PBP Publications. Reference Books 1. NileshShah, Database Systems Using Oracle, 2nd Edition(2007), PHI.
2. Rick F Van der Lans, Introduction to SQL, 4thEdition(2007), Pearson Education.
3. Benjamin Rosenzweig Elena Silvestrova, Oracle PL/SQL by Example, 3rdEdition(2004), Person Education.
4. Albert Lulushi, Oracle Forms Developer's Handbook, 1st Edition(2006), Pearson Education.
5. https://www.sqlite.org/index.html
6. https://www.lynda.com/Accesstutorials/Welcome/195854/373426-4.html

No. of Internal Tests:	02
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)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

DESIGN AND ANALYSIS OF ALGORITHMS LAB

SYLLABUS FOR B.E. IV SEMESTER

L:T:P (Hrs/week):0:0:2	SEE Marks : 50	Course Code : **U23PC421IT**
Credits : 1	CIE Marks : 30	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The Objectives of the course:	*On completion of the course, students will be able to:*
Develop skills in design and implementation of abstractions of various algorithm strategies and their practical applications.	1. Apply divide and conquer approach to solve searching and sorting problems. 2. Design and implement algorithms using Greedy strategy for the problems; Fractional knapsack, Huffman codes, shortest path finding (Dijkstra's algorithm). 3. Use Dynamic programming approach to solve problems including, shortest path finding (Bellman ford algorithm, All pair shortest path), Matrix chain multiplication, 0/1 Knapsack problem. 4. Solve N-Queens problem and Graph colouring problem using Backtracking approach. 5. Implement Branch & Bound algorithm for 0/1 Knapsack problem and Travelling Salesman problem.

1) A) Implement a stack using a linked list such that the push and pop operations of stack still take O(1) time.
   B) Implement a queue using a linked list such that the enqueue and dequeue operations of queue take O(1) time
2) Implement Linear Search, Binary Search and Hashing.
3) Implement a parallelized Merge Sort algorithm and Quick sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator. Program to be executed for various sizes of input. Fill the given table. Obtaining a constant value in the column "time taken" would prove that the complexity of merge sort is same in all case.

Size	Ascending		Descending		Random Order	
	Input	Time taken	Input	Time taken	Input	Time taken
4						
8						
16						
32						

4) Implement Knapsack Algorithm using Greedy Strategy.
5) Implement optimal merge patterns – Huffman encoding algorithm.
6) From a given vertex in a weighted connected graph, find single source shortest path to other vertices using a) Dijikstra's algorithm b) Bellman ford algorithm.
7) Implement Matrix –chain multiplication algorithm using dynamic programming.
8) Implement All-pairs shortest path algorithm.
9) Implement 0/1 Knapsack algorithm.
10) Implementation of N-queens problem using back tracking.
11) Implement Graph coloring problem using back tracking.
12) Develop a program to check whether a given graph is connected or not using DFS method.
13) Implement 0/1 knapsack using branch and bound.
14) Implement Travelling salesman problem using branch and bound.

Virtual Lab:

15) Dijktra's Algorithm: https://ds2-iiith.vlabs.ac.in/exp/dijkstra-algorithm/index.html
16) Merge Sort & Quick Sort: https://ds1-iiith.vlabs.ac.in/exp/merge-sort/index.html

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.Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson,
3. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
4. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
5. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.
6. B.A.Forouzan & Richard F.Gilberg, "A Structured Programming Approach using C" 2nd Edition, Cengage Learning, 2007.
7. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition(2002), Pearson
8. https://ocw.mit.edu/courses/electrical-engineering-and-c: omputerscience/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:	02
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)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

FULL STACK DEVELOPMENT LAB

SYLLABUS FOR B.E IV- SEMESTER

L:T:P (Hrs./week):: 0:0:2	SEE Marks : 50	Course Code:**U23PC441IT**
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objective:	**Course Outcomes:**
The Objectives of the course:	*On completion of the course, students will be able to:*
Demonstrate the frameworks and technologies to design and develop web applications.	1. Design and develop Web pages using HTML, CSS, javascript. 2. Develop Responsive web pages using frameworks. 3. Develop applications using Bootstrap, SpringBoot. 4. Develop web applications using React, Node JS and MongoDB

I-HTML:

- Creation of HTML Document using basic tags.
- Creation of Menu using ordered and unordered list and other options.
- Creation of web page using table tags and their attributes
- Creation of web page using frames.
- Creation of document using CSS.

II-JAVASCRIPT & XML:

- Basic javascript programs using control statements, arrays and functions.
- Write a java script to validate the following fields in a registration page
  i) Name (should contains alphabets and the length should not be less than 6 characters)
  ii) Password(should not be less than 6 characters)
  iii) E-mail(should not contain invalid addresses)
- Creation of XML document and validating it using DTD

III-BOOTSTRAP

- Design Responsive web pages using Bootstrap.

IV- SpringBoot Framework

- Develop a web based application to perform Registration and Login using SpringInitilizr
- Create a SpringBoot application to perform basic CRUD (Create/ Read / Update/ Delete) operations using MySQL.

V-NODE JS, REACT and MONGODB

- Develop web application using Node JS, React and Mongo DB

Virtual Lab:

Basics of HTML: https://html-iitd.vlabs.ac.in/List%20of%20experiments.html

Learning Resources:

1. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.
2. "Web Technologies", 7th Edition, Uttam K.Roy,2012.
3. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
4. Learning React Functional Web Development with React and Redux by Alex Banks, Eve Porcello, Alex Banks, Eve Porcello
5. Craig Walls, SpringBoot in Action, Manning Publications, 2016
6. Brad Dayley, Brendan Dayley and Caleb Dayley, Node.js, MongoDB and Angular Web Development The definitive guide to using the MEAN stack to build web applications, 2nd Edition, Pearson Education, 2018
7. http://getbootstrap.com/
8. https://reactjs.org/
9. https://nodejs.org/en/

No. of Internal Tests:	02
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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

OPEN ELECTIVES - II			
Department	**Code**	**Title**	
Civil	U23OE410CE	Solid Waste Management	General
CSE	U23OE410CS	Basics of Java Programming	General
CSE	U23OE420CS	Mathematical Computing for AI & ML with Python	Stream
ECE	U23OE410EC	Sensors for Engineering Applications	General
ECE	U23OE420EC	Introduction to Principles of Communication Engineering	General
EEE	U23OE410EE	Solar Power and applications	General
IT			
Mechanical	U23OE410ME	Kinematics and Dynamics of Robotics (Stream: Robotics)	Stream
	U23OE420ME	Operations Research	General
English	U23OE430EH	Critical Thinking	General
	U23OE020EH	Technical Writing and Professional Presentations	General
Maths	U23OE420MA	Algebraic Structures	General
	U23OE410MA	Numerical Methods	General
Physics	U24OE420PH	Materials Science for Engineers Synthesis and Properties of Materials	
	U24OE410PH	Semiconductor Physics and Device Applications Basic Semiconductor Devices	

With effect from Academic Year 2024-25(R-23)

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

DEPARTMENT OF CIVIL ENGINEERING

SOLID WASTE MANAGEMENT (Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs./week):3:0:1	SEE Marks:60	Course Code:U23OE410CE
Credits: 3	CIE Marks:40	Duration of SEE : 3Hrs

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

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

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

collection system, Waste handling and Processing: unit operations used for separation and processing, materials recovery, Transfer and Transport of solid waste, transfer station.

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

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

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

Learning Resources:

1. P. A. Vesilind, Worrell W and Reinhart, "Solid Waste Engineering", Cengage Learning India Pvt. Ltd. 2nd Edition, 2016.
2. Tchobanoglous," Integrated Solid Waste Management", 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. https://archive.nptel.ac.in/courses/105/103/105103205/

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

BASICS OF JAVA PROGRAMMING
(OPEN ELECTIVE-II)

SYLLABUS FOR B.E. IV-SEMESTER

(COMMON FOR CIVIL, ECE, EEE & MECH)

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

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

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

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

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

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

UNIT-IV: String Handling: String constructors, operations, character extraction, comparison, search, modification. StringBuffer, methods, StringBuilder, StringTokenizer
Util: Date, Calendar, Random, Timer, Observable
IO: Files and Directories, I/O Classes and Interfaces, Byte Streams classes and Character Stream classes

Learning Resources:

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

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
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: **U23OE410EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO-PSO Mapping

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

UNIT - I

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

UNIT – II

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

UNIT – III

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

UNIT – IV

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

UNIT – V

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

Lab Experiments:

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

MAXSONAR ultrasonic sensor.

Learning Resources :

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from Academic Year 2024-25(R-23)

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

(General Pool: 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: **U23OE420EC**
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

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

CO-PO-PSO Mapping

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

UNIT - I

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

Lab Activity: Generation of AM using MATLAB and Simulink.

UNIT - II

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

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

UNIT - III

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

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

Lab Activity: Demonstration of Sampling using MATLAB.

UNIT - IV

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

Lab activity: Demonstration of ASK and BPSK using SIMULINK.

UNIT - V

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

Source Coding Techniques: Shannon-Fano coding, Huffman Coding

Lab activity: Entropy calculations using MATLAB

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Solar Power and applications (Open Elective-II)
SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U23OE410EE**
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 impart the basics of solar energy harnessing and solar panel and array.	1. Compare different energy resources. 2. Identify and choose proper type of meter for solar radiation measurement. 3. Use proper solar thermal system according to the load requirements. 4. Categorize and compare photovoltaic cells.

Unit – I

Fundamentals of Energy Sources: Oil crisis of 1973, Classifications of Energy Resources, Importance of Non-conventional energy sources, Advantages-disadvantages and salient features of Non-conventional energy sources.

Unit – II

Solar Energy Basics: Sun as a source of energy, the Earth, Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Depletion of solar Radiation, Pyranometer, Pyrheliometer, Sunshine Recorder.

Unit – III

Solar Thermal Systems: Solar Collectors, Solar Water Heater, Solar Passive space – heating and cooling systems, Solar Cookers, Solar furnaces, Solar thermal water pump, Vapour compression refrigeration and Solar pond Electric power plant.

Unit – IV

Solar Photovoltaic Systems: Solar Cell fundamentals, Cell characteristics, Cell classification, Module, Panel and Array, Maximizing the Solar PV output and load matching, MPPT.

Unit – V

Solar PV systems & Applications: Solar PV system classification - Stand-Alone Solar PV system and Grid-Interactive Solar PV system. Applications - Water Pumping, lighting, medical refrigeration, village power and Telecommunication.

Suggested Reading:

1. B H Khan, Non-Conventional Energy Resources, 2nd Edition, Tata McGraw Hill.
2. G. D. Rai, Non-Conventional Energy Sources, 13th Reprint 2014, Khanna 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 Tests :90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OFMECHANICAL ENGINEERING
Kinematics and Dynamics of Robotics (Open Elective-II)
(Stream: Robotics)
SYLLABUS FOR B.E. IV – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U23OE410ME
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 RR planar manipulators.

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

UNIT-III

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

Dynamics of serial manipulators

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

Unit-IV

Dynamics of serial manipulators

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

UNIT-V

Trajectory Generation

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

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

OPERATIONS RESEARCH

(General Pool : Open Elective-II)

SYLLABUS FOR B.E. IV-SEMESTER

Instruction : 3Hrs /week	SEE Marks : 60	Course Code : U23OE420ME
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 multi disciplinary areas through linear programming under different working conditions. 2. Analyze linear programming for a dynamic changes of a customer requirements to suit various Organizations. 3. Reduce total cost to apply for transportation techniques for the transshipment of Goods and products for a product based industry. 4. Estimate the time for replacement of a machine by considering or ignoring time value of money using individual/group replacement policy. 5. Estimate elapsed time for sequencing problem processed through different machines. Minimize waiting time of the customer and optimization of no. of servers.

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.

UNIT-III

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

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

UNIT-IV

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

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

Queuing theory: Introduction, single channel – poission 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", Kedarnnath, Ramnath& Co., Meerut, 2009.
3. Harvey M. Wagner, "Principles of Operations Research", 2nd Edition, PHI Pvt. Ltd., 1980.
4. V.K. Kapoor, "Operations Research", S. Chand Publishers, New Delhi, 2004.
5. S.S. Rao, "Engineering Optimization – Theory and Practice", 4th Edition, John Wiley & Sons Inc., 2009.

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

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

Duration of Internal Test: **90 Minutes**

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

COURSE NAME- CRITICAL THINKING

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

W.E.F-2024-2025

Instruction: 3 Hours	SEE: 60	Course code: U23OE430EH
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. Identify the core skills associated with critical thinking.	**1.** Analyse and compare techniques for comparing alternate solutions
2. Comprehend the various techniques of critical thinking	**2.** Demonstrate the difference between deductive and inductive reasoning and construct logically sound arguments
3. Evaluate data and draw insights from it to make the right decisions	**3.** Check for accuracy of data and use it as a tool for problem solving
4. Understand where to look for bias and assumptions in problem	**4.** Evaluate, identify and distinguish between relevant and irrelevant information to formulate a thesis or hypothesis.
5. Understand structure, standards and ethics of critical writing	**5.** Employ evidence and information effectively

UNIT 1: COMPONENTS OF CRITICAL THINKING

1.1 Applying Reason
1.2 Open Mindedness
1.3 Analysis
1.4 Logic

UNIT 2: NON-LINEAR THINKING

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

UNIT 3: LOGICAL THINKING

3.1 Ask the Right Questions
3.2 Organize Data
3.3 Evaluate Information
3.4 Draw Conclusions

UNIT 4: INFER MEANING FROM INFORMATIVE TEXTS

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

UNIT 5: PROBLEM SOLVING

5.1 Introduction to Problem Solving - Changing Your Perspective
5.2 Limitations of Point of View
5.3 Considering others viewpoints

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

LEARNING RESOURCES

learn.talentsprint.com

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

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

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

Duration of Internal Tests : 90 Minutes

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

TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS

(Open Elective) SYLLABUS FOR B.E. 2/4 – IV SEMESTER
W.E.F-2024-2025

Instruction: 3 Hours	SEE: 60	Course code: U23OE020EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to: **1.** Understand the principles and mechanics of technical writing for students of engineering. **2.** Identify different kinds of business correspondences and the dos and don'ts for each of them. **3.** Make effective presentations as part of today's workplace demands. **4.** Recognize the need for Video and Written CVs with focus on specific elements. **5.** Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs	**At the end of the course the learners will be able to: -** **1.** Write effective reports. **2.** Articulate business correspondences based on need. **3.** Make persuasive presentations. **4.** Design their videos CVs. **5.** Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose

UNIT 1: FORMAL & INFORMAL TECHNICAL REPORTS

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

UNIT 2: BUSINESS CORRESPONDENCE

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

UNIT 3: PROFESSIONAL PRESENTATIONS

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

UNIT 4: RESUME & CVs

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

UNIT 5: WRITING PROPOSALS & SOPs

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

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

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

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

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

Duration of Internal Tests : 90 Minutes

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

DEPARTMENT OF MATHEMATICS

ALGEBRAIC STRUCTURES

(OPEN ELECTIVE) for B.E., IV- Sem., (Common to CSE, CSE-AIML & IT)

Instruction: 3 Hours per week	Sem. End Exam Marks: 60	Subject Reference Code: U23OE420MA
Credits: 3	Sessional Marks: 40	Duration of Semester End Exam: 3 Hrs

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 – Automorphisms of groups and their properties. 3. Learn group Homomorphisms and related concepts. 4. Acquire knowledge of Rings, Integral domains and Fields, External and Internal direct products. 5. Identify Ring Homomorphisms, 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 homomorphisms in the study of formal languages, automata theory, and compiler design. 4. Use the knowledge of Rings, Integral domains and Fields in coding theory. 5. Compute the programming of modern computer algebra algorithms using ring homomorphisms.

Unit-I:

Groups (8 classes)

Groups – Definition, Elementary properties of Groups, Finite Groups, Subgroups, Cyclic Groups – Properties of Cyclic Groups, Classification of Subgroups of Cyclic Group.

Unit-II:

Group Isomorphisms (8 classes)

Isomorphism – Definition, Properties, Automorphisms, Cosets and Lagrange's theorem-properties of cosets, Lagrange's theorem.

Unit-III:

Group Homomorphisms (08 classes)

External Direct Products - Definition, Properties, Factor Groups and Normal Subgroups, Internal Direct Products, Group Homomorphisms – Definition, Properties.

Unit-IV:

Rings (8 classes)

Rings, Properties of Rings, Subrings, Integral Domains and Fields Ring Homomorphisms and Ideals, Prime and Maximal Ideals.

Unit-V:

Ring Homomorphisms (8 classes)

Properties of Ring Homomorphisms, Polynomials - Polynomial Rings, the Division Algorithm.

Text Books:

1. Contemporary Abstract Algebra, Joseph A. Gallian, CRC Press
2. A First Course in Abstract Algebra, John B. Fraleigh, Pearson Education Limited

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.

ONLINE RESOURCES:

1. https://ocw.mit.edu/
2. http://www.nptel.ac.in/course.php
3. *https:/www.coursera.org/in*

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

DEPARTMENT OF MATHEMATICS

NUMERICAL METHODS

(Open Elective) For B.E., IV - Semester – CBCS
(*for CSE, CSE-AIML & IT only)*

Instruction : 3 Hours per week	Sem. End Exam Marks : 60	Subject Reference Code : U23OE410MA
Credits : 3	Sessional Marks : 40	Duration of Semester End Exam : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	***At the end of the course students will be able to:***
1. Study various numerical methods to solve Algebraic and Transcendental equations. 2. Understand 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. Use various numerical methods in interpolation using central differences. 5. Find numerical solutions of ordinary differential equations.

Unit – I: (8 Hours)
Solution of Algebraic and Transcendental equations:
Intermediate value property of equations - Solution of Algebraic and Transcendental equations: Bisection method - Newton-Raphson method - Regula-Falsi method.

Unit – II: (8 Hours)
Solution of linear system of 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:

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

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

PHYSICS OE TRACKS (B.E-IV Semester)

MATERIALS SCIENCE FOR ENGINEERS
SYNTHESIS AND PROPERTIES OF MATERIALS

L : T : P	Credits	CIE		SEE		Course Code
		Marks	Exam Duration	Marks	Exam Duration	
03 :0 :0	3	30	90 min	60	3hours	**U24OE420PH**
CIE	Assignments (03)		Quizzes (03)	Internal Exams(01)		Total CIE Marks
Ave. Marks	5		5	30		40

UNIT I: SYNTHESIS OF MATERIALS-PHYSICAL METHODS (10 hours)
Solid state reaction, diffusion, melt quenching, vapor deposition, Chemical vapor deposition, physical vapor deposition, sputtering, mechanical milling, electron beam deposition.

UNIT II: SYNTHESIS OF MATERIALS-CHEMICAL METHODS (8 hours)
Introduction, slow evaporation at room temperature, high-temperature solution growth, Sol-gel process, Aerosol method, Hydro-thermal process, Solvo-thermal synthesis, Photo-chemical synthesis.

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UNIT III: Electrical Properties of Materials (8 hours)
The Boltzmann transport equation, Electrical conductivity, electrical conductivity at low temperatures, Matheissen's rule, Thermal conductivity, Widemann-Franz law, Hall-effect, Temperature variation of electrical conductivity

UNIT-IV: Physical properties of Materials (10 hours)
Fundamentals of magnetism, different types of magnetism, Permeability, Magnetic Hysteresis, Coercive force.
Young's modulus, Bulk modulus, Modulus of rigidity, tensile testing and tensile strength, breaking strength, plastic deformation, failure analysis, hardness-testing, Brinell's, Viker's impact testing – toughness, resilience, scratch test.

UNIT-V: Optical and Thermal Properties of Materials (10 hours)
Optical properties: photoconductivity, optical absorption & transmission, energy band gap determination, photoluminescence, phosphorescence, electroluminescence.
Thermal properties: concept of phonons, thermal conductivity, specific heat, exothermic & endothermic processes.

References:

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

DEPARTMENT OF PHYSICS

PHYSICS OE TRACKS (B.E-IV Sem)

Semiconductor Physics and Device Applications
Basic Semiconductor Devices

L : T : P	Credits	CIE		SEE		Course Code
		Marks	Exam Duration	Marks	Exam Duration	
03 :0 :0	3	30	90 min	60	3hours	U24OE410PH
CIE	Assignments (03)		Quizzes (03)	Internal Exams(01)		Total CIE Marks
Ave. Marks	5		5	30		40

UNIT I: Junction Diode (8 hours)
Basic structure of PN junction, Band bending, zero bias condition, Expression for built in potential, Electric field and space charge width, Abrupt and Graded junctions, Diode equation, Effect of temperature on PN junction diode, Capacitive effects in PN junction, Diode –applications.

UNIT II: Metal-Semiconductor Junction (10 hours)
Schottky and Ohmic contacts, Schottky barrier diode, Current voltage relationship, comparison of Schottky barrier diode and pn junction diode, Static Barrier Characteristics, Dynamic Characteristics, Ohmic Contact, Metal Oxide Semiconductor Capacitor-Capacitance-Voltage, Ideal MOS system-Threshold voltage.

UNIT III: Special Semiconductor Devices (8 hours)
Small signal equivalent circuits of PN-diode, short and long diode, Breakdown mechanisms in Zener diode, Varactor diode, Tunnel diode, Gunn diode, Shockley diode, IMPATT diode.

UNIT IV: BJT and Thyristor (8 hours)
BJT's – Construction and characteristics, Thyristor – Construction, working and characteristics, comparison of BJT and Thyristor, Heterojunction Bipolar junction transistor, Basics of gate turn-off thyristor (GTO), SiC based Bipolar Devices-Applications, Building a GaN Transistor-GaN Transistor Electrical Characteristics.

UNIT V: Fabrication Techniques (6 hours)
BJT fabrication: Diffused, point contact, fused or alloy and rate grown techniques,

molecular beam epitaxy (MBE), epitaxial vapour phase, Liquid phase growth.

References:

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

SCHEME OF INSTRUCTION AND EXAMINATION(R-23)
FOR B.E BRIDGE COURSE IV SEMESTER (A.Y 2024-25)
Common for CSE, CSE (AI&ML) and IT

SEMESTER - IV (BRIDGE COURSE)									
S No.	Course Code	Course Name	Scheme of Instruction			Duration in Hrs	Scheme of Examination		Credits
			Hours per week				Maximum Marks		
			L	T	P/D		SEE	CIE	
THEORY									
1	UB23HS410EH	English Language Communication	2	-	-	3	50	-	-
PRACTICAL									
1	UB23HS411EH	English Language Communication Skills Lab	-	-	2	3	50	-	-
		Total	**2**	**-**	**2**	**-**	**100**	**-**	**-**
		Grand Total	**4**			**-**	**100**		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD-31
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION (Theory)

Bridge Course for Lateral Entry Students

2023-2024 Batch – IV Semester

L: T: P (Hrs/Week) : 2 : 0 : 0	SEE Marks: 50	Course Code: **UB23HS410EH**
Credits: Nil	CIE Marks: Nil	Duration of SEE: 2 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.	1. Use language in appropriate contexts.
2. Listen for general and specific comprehension and write paragraphs.	2. Listen for global comprehension and infer meaning from spoken discourses.
3. Understand the elements of a good paragraph	3. Write paragraphs coherently.
4. Speak appropriately in daily conversations	4. Use phrases, essential vocabulary and polite expressions in every day conversations.

Unit-1 1.0: Communication & Functional English

1.1 Role and Importance of Communication, Process of Communication, Non-verbal communication, barriers to Communication, overcoming barriers. Conversational phrases: greetings, introductions, apology, compliments, agreeing and disagreeing, polite forms in everyday conversations.

Unit 2 2.0: Listening

2.1 Importance of listening, Active listening

Unit 3. 3.0: Writing

1.1 Paragraph writing, coherence and cohesion.

Unit 4 4.0: Grammar and Vocabulary

4.1 Common Errors, one word substitutes, collocations.

Unit-5 5.0: Reading

5.1 Prose text- Our Own Civilization—CEM Joad.

Prescribed textbook for theory:
Technical communication - Principles and Practice (2nd Edition 2014) - Meenakshi Raman and Sangeeta Sharma- Oxford University Press.

Suggested Reading
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.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD-31
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB (ELCS)

Bridge Course for Lateral Entry Students

(Common to all branches)

2023-2024 Batch – IV Semester

L: T: P (Hrs/Week) : 0:0:2	SEE Marks: 50	Course Code: **UB23HS411EH**
Credits: Nil	CIE Marks: Nil	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 :**
2. Converse in various situations.	1. Participate effectively in group discussions, public speaking, debates (formal and informal)
3. Make paper and power point presentations.	2. Research and sift information to make presentations.
4. Speak effectively using discourse markers.	3. Listen for gist and make inferences from various speeches.
	4. Use connectives and make transitions effectively while speaking.

ELCS – Component - INTERACTIVE COMMUNICATION SKILLS LAB

Public Speaking : Do's and Don'ts of public speaking, Listening and speeches of great personalities in history to understand the nuances of public speaking.
Group discussion: Objectives of GD, Types of GDs; Initiating, Continuing, and concluding a GD.
Presentation Skills: Making effective presentations, researching on various topics, use of Audio visual aids, coping with nerves.

Prescribed textbook for laboratory:

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

Learning Resources:

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