

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD-500 031

**ACCREDITED BY NAAC WITH A++ GRADE**

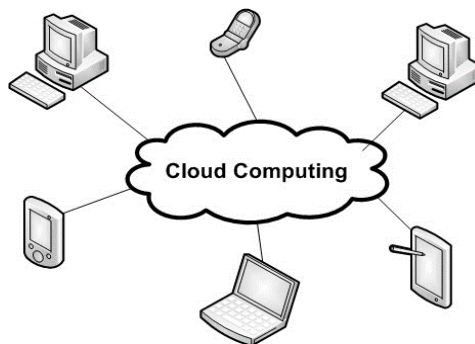
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**VASAVI ACADEMY OF EDUCATION  
Hyderabad**



**SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR  
B.E. (IT) III and IV Semesters with effect from 2022-2023  
(For the batch admitted in 2021-22)  
(R-21)**



**DEPARTMENT OF INFORMATION TECHNOLOGY**

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**VASAVI COLLEGE OF ENGINEERING  
(AUTONOMOUS)  
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 centre of excellence in core Information Technology and multidisciplinary learning and research, where students get trained in latest technologies for professional and societal growth.

**Mission**

To enable the students acquire skills related to latest technologies in IT through practice-oriented teaching and training.



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

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**Programme Educational Objectives (PEOs) for IT Program**

The Programme will produce graduates

PEO1. With theoretical and practical knowledge to obtain employment or pursue higher studies and solve problems in Information Technology.

PEO2. With effective written and oral communication skills that will help them to work in diversified and dynamic working environments.

PEO3. With competence to succeed in their professional lives with ethical values.

**Program Specific Outcomes (PSOs) for IT Program**

The Students will demonstrate

PSO1. Competency in programming using different programming languages to implement algorithms.

PSO2. Competency in the analysis and design of a software solution using different modelling tools.

PSO3. Competency in Electronic Design and Embedded System Design using different simulation tools.

**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:

<b>1</b>	B.E(4yrs)	<b>Attendance:</b> Minimum aggregate attendance required to eligible to attend semester end exams is 75% and 65% with Medical Condonation respectively.
		<b>Sessional Marks:</b> 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 least 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 least 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-21)**  
**B.E. – INFORMATION TECHNOLOGY : THIRD SEMESTER (2022 - 2023)**

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	
U21BS330MA	Discrete Mathematics	3	-	-	3	60	40	3
U21ES310IT	Digital Electronics & Logic Design	3	-	-	3	60	40	3
U21PC310IT	Data Structures	3	-	-	3	60	40	3
U21PC320IT	Object Oriented Programming	3	-	-	3	60	40	3
U21OE3XXXX	Open Elective – I	2	-	-	3	60	40	2
U21HS320EH	Skill Development Course - I : Communication Skills in English–I	1	-	-	2	40	30	1
U21BS330MA	Skill Development Course - II : Aptitude – I	1	-	-	2	40	30	1
PRACTICALS								
U21PC311IT	Data Structures Lab	-	-	3	3	50	30	1.5
U21PC321IT	Object Oriented Programming Lab	-	-	3	3	50	30	1.5
U21PC331IT	Network Engineering Lab	-	-	2	3	50	30	1
U21PW319IT	Mini Project – I	-	-	2	3	50	30	1
	Co-Curricular Activities-I	-	-	-	-	-	-	-
	Extra-Curricular Activities-I	-	-	-	-	-	-	-
	Library / Sports / Mentor Interaction	-	-	-	-	-	-	-
Student should acquire one online certification course equivalent to 2 credits during III to VII Semesters.								
<b>Total</b>		<b>16</b>	<b>-</b>	<b>10</b>	<b>-</b>	<b>580</b>	<b>380</b>	<b>21</b>
<b>Grand Total</b>		<b>26</b>			<b>--</b>	<b>960</b>		
<i>Note:</i>								
1. One hour is allotted to Library / Sports / Personality Development Programme / Mentor Interaction.								
2. The left over hours are to be allotted to CC / RC / TC based on the requirement.								

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF MATHEMATICS****DISCRETE MATHEMATICS**

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

Instruction: 3 + 1 Hours per week	Semester End Exam Marks: 60	Subject Reference Code: <b>U21BS330MA</b>
Credits : 3	Sessional Marks : 40	Duration of Semester End Exam : 3 Hrs.

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<i>The course will enable the students to:</i>	<i>At the end of the course students will be able to:</i>
<ol style="list-style-type: none"> <li><b>Understand</b> Propositions and their equivalences, predicates and quantifiers and learn various proof strategies.</li> <li><b>Study</b> the concepts of number theory such Modular Arithmetic, Congruences and basic cryptography etc.,</li> <li><b>Understand</b> the basics of counting, combinatorial, and various methods of solving Recurrence relations.</li> <li><b>Understand</b> Relations, Equivalence relations, Posets and Hasse diagrams.</li> <li><b>Analyze</b> the concepts of Graphs.</li> </ol>	<ol style="list-style-type: none"> <li><b>Use</b> logical notation to define and reason about fundamental mathematical concepts and synthesize induction hypothesis and simple Induction proofs.</li> <li><b>Prove</b> elementary properties of modular arithmetic and basic cryptography and apply in Computer Science.</li> <li><b>Calculate</b> number of possible outcomes of elementary combinatorial processes such as permutations and combinations Model and analyze computational processes using analytic and Combinatorial methods.</li> <li><b>Prove</b> whether a given relation is an equivalence relation/poset and will be able to draw a Hasse diagram.</li> <li><b>Apply</b> graph theory models of data structures and to solve problems of connectivity.</li> </ol>

**UNIT – I (10 Hours)****Logic:** Logic- Logical connectives- Propositional equivalences– Predicates and quantifiers – Nested quantifiers.**Mathematical Reasoning, Induction:** Proof Strategy- Methods of Proofs- Mathematical Induction- Second Principle of Mathematical Induction.**UNIT – II (10 Hours)****Number Theory:** The Integers and Division- Division Algorithm- Fundamental Theorem of Arithmetic –Modular Arithmetic-Integers and Algorithms- Euclidean Algorithm. Applications of Number Theory-Linear Congruences- The Chinese Remainder Theorem (without Proof)- Fermat's Little Theorem- Public key cryptography- RSA Encryption and Decryption.**UNIT – III (12 Hours)****Counting:** Basics of counting- Pigeonhole principle- Permutations and combinations – Pascal's Identity- Vandermonde's Identity- Generalized Permutations and combinations.**Advanced Counting Techniques:** Recurrence relations: Solving Recurrence Relations- Linear Homogeneous and Non-Homogeneous Recurrence relations.**UNIT – IV (10 Hours)****Relations:** Relations – Properties -Representing relations - Equivalence Relations - Partial Orderings- Poset- Hasse diagrams – Maximal & Minimal Elements.**UNIT –V (10 Hours)****Graph Theory:** Introduction- Types of graphs- Graph terminology- Basic theorems- Representing Graphs and Graph Isomorphism - Connectivity- Euler and Hamiltonian paths - Planar graphs- Euler's Formula- Graph coloring- Basic Definitions.**Learning Resources:**

- Kenneth H.Rosen – Discrete Mathematics and its application – 5<sup>th</sup> edition, Mc Graw – Hill, 2003.
- Joel. Mott. Abraham Kandel, T.P.Baker, Discrete Mathematics for Computer Scientist & Mathematicans, Prentice Hall N.J., 2<sup>nd</sup> edn, 1986.
- Discrete and Combinatorial Mathematics by Ralph P. Grimaldi , Pearson International
- J.P.Tremby, R.Manohar, Discrete Mathematical Structure with Application to Computer Science, Mc Graw- Hill – 1997.
- R.K. Bisht, H.S.Dhami - Discrete Mathematics, Oxford University Press, 2015.
- <http://mathworld.wolfram.com/topics>
- <http://www.nptel.ac.in/course.php>

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal 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 INFORMATION TECHNOLOGY****DIGITAL ELECTRONICS AND LOGIC DESIGN**

## SYLLABUS FOR III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U21ES310IT</b>
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
The Course will enable the students to design combinational and sequential circuits.	<ol style="list-style-type: none"> <li>1. Simplify Boolean Functions using algebraic and K-map techniques to specific number of literals.</li> <li>2. Design combinational circuits using fundamental logic gates and programmable logic devices for a given problem.</li> <li>3. Draw the circuits of different types of flipflops and explain their operation using Truth tables and excitation tables.</li> <li>4. Analyze any given synchronous or asynchronous sequential circuit and design synchronous or asynchronous sequential circuits for a given specification of the problem.</li> <li>5. Implement combinational and sequential circuits using VHDL programming language.</li> </ol>

**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 Electronics Theory & 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			

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

**DATA STRUCTURES**  
SYLLABUS FOR III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U21PC310IT</b>
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
<b>The Objectives of the course:</b>	<b>At the end of the course student will be able to:</b>
1. Demonstrate linear and non-linear data structures and their applications.	1. Understand asymptotic notations, operations on arrays and stacks, and evaluate arithmetic expressions.
2. Illustrate searching and sorting techniques.	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, Polynomials, 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), Minimum 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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IBRAHIMBAGH, HYDERABAD – 500 031  
**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 : <b>U21PC320IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
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. **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, Date, Calendar.

**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 and Applets : AWT Class Hierarchy, Swing Class Hierarchy, Swing Components, Containers, Layout Managers, Event Handling : The Delegation Event Model, Model View Controller Architecture, Modifying Look and Feel, Working with Graphics and Applets.

**Learning Resources:**

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

Hyderabad-500031, Telangana State

**DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES****Course Name : Skill Development Course-I : Communication Skills-I  
(Common to all branches) SYLLABUS FOR B.E. 2/4-III SEMESTER**

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

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

1. Get students proficient in both receptive and productive skills especially virtual
2. Enable students to understand the importance and method of exchanging information in a formal space- both written and spoken
3. Introduce students to an ideal structure for a presentation and discussion- individually and in groups
4. Develop and improve reading skills needed for college work and reproduce the content based on the situational need.

**COURSE OUTCOMES****At the end of the course the learners will be able to:**

- 
1. Introduce themselves effectively and converse in a formal environment especially in the online space
  2. Write emails with appropriate structure and content
  3. Use appropriate structure based on the content employing appropriate transitions in written and spoken communication
  4. Paraphrase content and write an effective summary

**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**

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

**ASSESSMENTS**

- Online assignments
- Individual and Group

**Learning Resources:** learn.talentsprint.com**The break-up of CIE: Internal Tests+ Assignments + Quizzes**

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	20
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: <b>90 Minutes</b>				

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

Hyderabad- 500031, Telangana State

**DEPARTMENT OF MATHEMATICS****Course Name :: Skill Development Course II : Aptitude I  
(Common to all branches) SYLLABUS FOR B.E. 2/4- III SEMESTER**

L : T : P (Hrs/Week) : 2	SEE Marks : 40	Course Code: <b>U21BS330MA</b>
Credits: 1	CIE Marks : 30	Duration of SEE : 120 minutes

<p><b>COURSE OBJECTIVES</b>  <b>The course will enable the learners to:</b></p> <ol style="list-style-type: none"> <li>1. Students will be trained to enhance their employability skills.</li> <li>2. Students will be introduced to higher order thinking and problem solving skills in the following areas - Arithmetic Ability, Numerical Ability and General Reasoning.</li> <li>3. Students will be trained to work systematically with speed and accuracy while problem solving.</li> <li>4. Students will be trained to apply concepts like percentages and averages to solve complex problems.</li> <li>5. Students will be trained to use effective methods like elimination of options and shortcuts to solve problem accurately.</li> </ol>	<p><b>COURSE OUTCOMES</b>  <b>At the end of the course the learners will be able to: -</b></p> <ol style="list-style-type: none"> <li>1. Solve questions in the mentioned areas using shortcuts and smart methods.</li> <li>2. Understand the fundamentals concept of Aptitude skills.</li> <li>3. Perform calculations with speed and accuracy.</li> <li>4. Solve complex problems using basic concepts.</li> <li>5. Use shortcuts with ease for effective problem solving.</li> </ol>
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**UNIT 1: QUANTITATIVE APTITUDE - NUMERICAL ABILITY**

1.1 Introduction to higher order thinking skills

1.2 Speed Math

1.3 Number systems

1.4 LCM &amp; HCF

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

2.1 Ratio proportions

2.2 Partnership

2.3 Ages

2.4 Allegations and mixtures

2.5 Averages

**UNIT 3: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 1**

3.1 Percentages

3.2 Profit and loss

**UNIT 4: REASONING ABILITY- GENERAL REASONING PART 1**

4.1 Blood Relations

4.2 Number Series

4.3 Coding and decoding

**UNIT 5: QUANTITATIVE APTITUDE- WORD PROBLEMS PART 2**

5.1 Time and Work

5.2 Chain Rule

5.3 Pipes and Cisterns

**Learning Resources:**

1. Quantitative Aptitude S.CHAND by Dr. R S Aggarwal
2. A Modern Approach to Verbal & Non-Verbal Reasoning S.CHAND by Dr. R S Aggarwal
3. Learn.talentsprint.com/References Courses
4. Quantitative Aptitude Disha Publications
5. 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****DATA STRUCTURES LAB**

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:3	SEE Marks : 50	Course Code : <b>U21PC311IT</b>
Credits : 1.5	CIE Marks : 30	Duration of SEE : 3 Hours

<b>Course Objectives</b>	<b>Course Outcomes</b>
<b>The Objectives of the course:</b>	<b>At the end of the course student will be able to:</b>
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.

- Menu driven program that implements Stacks using arrays for the following operations  
a)create b)push c)pop d) peek
- Implementation of Infix to Postfix Conversion and evaluation of postfix expression.
- Menu driven program that implements Queues using arrays for the following operations  
a)create b)insert c)delete d) display
- Menu driven program that implements Circular Queues for the following operations  
a)create b)Insert c)delete d) display
- Implementation of Singly Linked List, Stack using Singly Linked List, Queue using Singly Linked List.
- Implementation of polynomial operations using Linked List.
- Implementation of Doubly Linked List, Circular linked list.
- Implementation of Operations on Binary Tree (Insert, Delete, Level Order, Search)
- Implementation of Recursive and Iterative Traversals on Binary Trees.
- Implementation of Operations on Priority Queues and Heaps.
- Implementation of Operations on Binary Search Tree.
- Implementation of operations on AVL Tree.
- Implementation of Breadth First search Traversal on Graphs.
- Implementation of Depth First search Traversal on Graphs.
- Implementation of Insertion Sort, Heap Sort.
- Implementation of B-Trees

**Learning Resources**

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

**Online Resources:**

- <http://nptel.ac.in/courses/106106127/>
- <http://nptel.ac.in/courses/106103069/>
- <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:	2Hours		

**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 : <b>U21PC321IT</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The course will enable the students to	<i>On completion of the course, students will be able to</i>
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 handling and multithreading. 3. Execute I/O and String manipulation operations using java libraries. 4. Implement data structures using collections framework. 5. Develop GUI using java libraries.

**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 exception handling by using throw, finally & multiple catch statements.
9. A program to illustrate the concept of user-defined exception.
10. A program to create multiple threads using Thread class and Runnable interface.
11. A program to illustrate the concept of thread synchronization.

**JAVA API (java.io package)**

- 12.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 the use of ObjectInputStream and ObjectOutputStream.

**JAVA API (java.util package)**

- 13.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 Date and Calendar.
14. A program to demonstrate the use of Collection framework classes and algorithms.

**JAVA API (java.awt , java.awt.event and , javax.swing package)**

15. a) An application involving GUI with different controls using AWT.
- b) An application involving GUI with different controls using Swing.
- c) An application using Applet.

**Learning Resources:**

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

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Day-to-day laboratory class work which will be awarded based on the average of assessment for each experiment considering at the end of the course			18
Duration of Internal Test:	2 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 : <b>U21PC331IT</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
1. Introduce the fundamental concepts in Networking, OSI and TCP/IP protocol suite.	1. Identify and Configure LAN switching technologies
2. Demonstrate Switching, Routing and Wireless networking concepts using Packet Tracer tool.	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:**

- Basic Networking Commands**-The networking commands like ipconfig, netstat, ping, system info, lookup, traceroute, hostname, Arp are discussed.
- 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).
- 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
- Subnet an IPv4 Network**- Create an IPv4 Network Subnetting Scheme, configure the devices, test the network and troubleshoot it.
- 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.
- 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.
- 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
- 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.
- 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.
- Implement VLANs and Trunking**- To configure and implement Virtual LANs by assigning ports and create static and dynamic trunks.
- 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.
- 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.
- Implement Port Security**-In the given Topology Implement Port Security on Switches and verify.
- Configure a Wireless Network**- To connect wired and wireless devices to a wireless router, configure and add access point to extend wireless coverage.

**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
Day-to-day laboratory class work which will be awarded based on the average of assessment for each experiment considering at the end of the course			18
Duration of Internal Test:	2 Hours		

**DEPARTMENT OF INFORMATION TECHNOLOGY****MINI PROJECT-I**  
SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks : 50	Course Code : <b>U21PW319IT</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hrs

<b>Course Objectives</b>	<b>Course Outcomes</b>
<b>The course will enable the students to:</b>	<b>At the end of the course student will be able to:</b>
Develop and implement a project using any of the programming languages/simulation tools/electronic components.	<ol style="list-style-type: none"> <li>1. Apply theoretical knowledge to design solutions for real life problems.</li> <li>2. Demonstrate the ability to locate and use technical information from multiple sources.</li> <li>3. Develop team spirit and demonstrate an understanding of professional ethics.</li> <li>4. Demonstrate the ability to communicate effectively in speech and in writing.</li> <li>5. Develop the capability for lifelong learning through advanced technology.</li> </ol>

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.

**III – Semester Open Electives**

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



VASAVI COLLEGE OF ENGINEERING (Autonomous)  
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IBRAHIMBAGH, HYDERABAD – 500 031  
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: <b>U21OE310CE</b>
Credits: 2	CIE Marks: 40	Duration of SEE: 3 Hrs

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

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

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

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

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

**Learning Resources:**

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

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

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

Duration of Internal Tests: 90 Minutes

**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
 IBRAHIMBAGH, HYDERABAD – 500 031  
**Department of Computer Science & Engineering**  
**Principles of Python Programming (Open Elective-I)**  
 (Common for CIVIL, ECE, EEE & MECH)  
 SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code : <b>U210E310CS</b>
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

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

**Iteration:** while statement

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

**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:**

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

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

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

Duration of Internal Tests : 90 Minutes

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
 IBRAHIMBAGH, HYDERABAD – 500 031  
 DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING  
**Cyber Security (OPEN ELECTIVE-I)**  
 (Common for CIVIL, ECE, EEE & MECH)  
 SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code : <b>U210E320CS</b>
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
1 To safeguard from threats and infection spread through the internet	1 Explain the concepts of confidentiality, availability and integrity 2 Explain the basics of fraud techniques used by a hacker  3 Explore the common exploitation mechanisms and inspect data sniffing over the network 4 Determine the ways an organization attempts to discover threats.

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

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

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

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

**Learning Resources:**

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

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

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

Duration of Internal Tests : 90 Minutes

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

IBRAHIMBAGH, HYDERABAD – 500 031

ACCREDITED BY NAAC WITH 'A++' GRADE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

**Introduction to Signals & Systems (Open Elective - I)**

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

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: <b>U21OE310EC</b>
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 and discrete time domain 2. Apply the properties of different transformation techniques to analyze continuous time domain signals and systems in frequency domain 3. Determine the response of an LTI system using Convolution 4. Apply the properties of different transformation techniques to convert a discrete time domain signal to frequency domain

**CO-PO-PSO Mapping**

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

**UNIT - I**

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

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

**UNIT - II**

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

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

**UNIT - III**

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

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

**UNIT - IV**

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

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

Applications: Basic network Analysis, Servo Motor

**Learning Resources:**

- P. Ramakrishna Rao, Signals and Systems, McGraw Hill, 2008.
- Alan V. Oppenheim, Alan S. Willsky and S. Hamid Nawab, Signals and Systems, 2<sup>nd</sup> ed., PHI, 2009.
- Nagoor kani, Signals and Systems McGraw Hill, 2013
- [https://onlinecourses.nptel.ac.in/noc19\\_ee07/preview](https://onlinecourses.nptel.ac.in/noc19_ee07/preview)  
(Principle of Signals and Systems by Prof. Aditya K Jagannatham)
- <https://www.edx.org/course/signals-and-systems-part-1-1>
- <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	:	<input type="text" value="2"/>	Max. Marks for each Internal Tests	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="2"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="2"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests: 90 Minutes

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
 IBRAHIMBAGH, HYDERABAD – 500 031  
 ACCREDITED BY NAAC WITH 'A++' GRADE  
 DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING  
**Principles of Communication Engineering** (Open Elective - I)  
 SYLLABUS FOR B.E. III – SEMESTER (for EEE, CSE & IT)

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

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

**CO-PO-PSO Mapping**

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

**UNIT - I**

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

**UNIT - II**

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

**UNIT - III**

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

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

**UNIT - IV**

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

**Learning Resources:**

- Louis E. Frenzel, Principles of Electronic Communication Systems, 3<sup>rd</sup> Edition. Tata Mcgraw Hill.
- Wayne Tomasi, Electronic Communications Systems, 5<sup>th</sup> Edition, Pearson Education.

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)  
ACCREDITED BY NAAC WITH 'A++' GRADE  
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:U210E310EE
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<p>The course will enable the students to: To provide a survey of the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state-of-the-art energy systems.</p>	<p>On completion of the course, students will be able to</p> <ol style="list-style-type: none"> <li>1. Demonstrate the generation of electricity from various Non-Conventional sources of energy and solar power generation</li> <li>2. Illustrate the generation of energy from wind and generation of energy from waste</li> <li>3. Demonstrate the generation of energy by biomass and fuel cells</li> <li>4. Illustrate the ocean and geo thermal energy generation</li> </ol>

#### 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:

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

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

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

Duration of Internal Tests: 90 Minutes

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Information Technology****Introduction to Internet and Web Page Development**

(Open Elective-I)

SYLLABUS FOR III-SEMESTER

(for other Branches)

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

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

**UNIT – I:**

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

HTML: Standard HTML document structure, Basic Tags and attributes, Images, Hypertext

Links, Lists, Tables, Frames, HTML Forms.

**UNIT – II:**

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

**UNIT – III:**

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

**UNIT – IV:**

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

**Learning Resources :**

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

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

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

Duration of Internal Tests : 90 Minutes

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

**Introduction to Linux**

(Open Elective – I) SYLLABUS FOR –III SEMESTER

(Common for CIVIL, ECE, EEE & MECH)

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

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

**UNIT – I:**

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

**UNIT – II:**

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

**UNIT – III:**

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

**UNIT – IV:**

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

**Learning resources:**

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

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

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



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

**Geometric Modelling**

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

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: <b>U210E310ME</b>
Credits :02	CIE Marks:40	Duration of SEE:03Hours

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

### UNIT-I: INTRODUCTION TO CAD

product life cycle, conventional design and computer aided design.

Wire Frame Modelling: wire frame entities and their definitions. Interpolation and approximation of curves. Concept of parametric and non-parametric representation of circle and helix curves, demonstration of 2D geometry through CAD software.

### UNIT-II: SYNTHETIC CURVES

Parametric representation of cubic spline, Bezier and B-spline curves, continuity, properties and characteristics of splines. Concepts of NURBS, synthetic curves demonstration.

2D transformation and their mathematics: Translation, scaling, rotation, Homogeneous co-ordinates, Concatenated transformations.

### UNIT-III: SURFACE MODELING

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

### UNIT-IV: SOLID MODELLING

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

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

### Learning Resources:

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

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

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

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

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

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

**Unit-I: Introduction to UAV**

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

**Unit-II: Basics of Flight**

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

**Unit-III: UAV Elements, Navigation and Guidance**

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

**Unit-IV: Design & Simulation of UAV**

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

**Learning Resources:**

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

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

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

Duration of Internal Test: 1 Hour 30 Minutes

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

**Basic Heat Transfer for Electronic Systems**

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

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

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

### UNIT-I: BASIC THERMODYNAMICS

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

### UNIT-II: heat transfer: Conduction

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

### UNIT-III: Heat transfer: Convection

Extended surfaces: Fins - Applications of fins, Fin Equation, Fin Effectiveness and Efficiency. Convection Heat Transfer: Heat transfer coefficient - Forced and Natural Convection in Electronic Devices, non dimensional numbers - Nusselt number, Reynolds number, Grashoff number and Prandtl number, forced and free convection correlations - flat plates and cylinders. Numerical problems.

### UNIT-IV: COOLING OF ELECTRONIC EQUIPMENT

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

#### Learning Resources:

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

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

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

Duration of Internal Test: 1 Hour 30 Minutes

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CHEMISTRY

**Battery Science and Technology**

SYLLABUS FOR B.E. III - SEMESTER

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

Course Objectives	Course Outcomes
<p><b>The course will enable the students to:</b></p> <ol style="list-style-type: none"> <li>1. Introduce the various terms to understand the efficiency of batteries.</li> <li>2. Know the relevant materials required for the construction of primary and secondary batteries.</li> <li>3. Familiarize with the reactions involved during charging and discharging processes.</li> <li>4. Emphasise the need of fuel cells and the concept of their construction and functioning.</li> </ol>	<p><b>At the end of the course students should be able to:</b></p> <ol style="list-style-type: none"> <li>1. Discuss the construction, electrochemistry, technology and applications of selected primary batteries</li> <li>2. Discuss the construction, electrochemistry, technology and applications of few secondary batteries</li> <li>3. Explain the working principle, electrochemistry, technology and applications of prominent fuel cells</li> <li>4. Evaluate different batteries or fuel cells in order to select a suitable battery or fuel cell for a given application</li> </ol>

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

**UNIT-I: BATTERIES – FUNDAMENTALS**

Introduction and types of batteries: Primary and secondary.

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

**UNIT-II: PRIMARY BATTERIES**

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

Primary lithium batteries: Soluble cathode cells, solid cathode cells - Lithium manganese dioxide, solid electrolyte cells- Lithium polymer electrolyte battery - Applications. Reserve battery - Electrochemistry of perchloric acid cell - applications.

**UNIT-III: SECONDARY BATTERIES**

Construction, chemistry and technology of maintenance free lead acid battery (MFLA), valve regulated lead acid battery (VRLA), absorbed glass mat lead acid battery (AGMLA) - comparison between lead acid battery and VRLA along with advantages - Construction, electro chemistry and applications of Nickel - Cadmium battery, Nickel metalhydride battery.

Lithium ion batteries: Construction, chemistry and applications of liquid organic electrolyte cells, polymer electrolyte cells, lithium ion cells.

**UNIT- IV: FUEL CELLS**

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

**Books:**

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

**Suggested Reading:**

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

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

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="2"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="2"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>
3. Duration of Internal Tests: 90 Minutes					

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CHEMISTRY

**Corrosion and its Prevention**

SYLLABUS FOR B.E. III - SEMESTER

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

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES:</b>
<p><b>The course will enable the students to:</b></p> <ol style="list-style-type: none"> <li>Acquaint with the causes and factors influencing the rate of corrosion</li> <li>Understand the different types of corrosion like dry, wet and galvanic corrosion and their relative impact</li> <li>Familiarize with various preventive methods of corrosion such as cathodic protection, use of inhibitors, coatings, etc.</li> <li>Familiarize with industrial coating methods like electroplating, electrolessplating.</li> </ol>	<p><b>At the end of the course students should be able to:</b></p> <ol style="list-style-type: none"> <li>Explain different types of corrosion and factors that affect corrosion and passivation of metals.</li> <li>Select a suitable metallic coating, organic coating and inhibitors for corrosion control of the equipment in a given application.</li> <li>Discuss the principles and applications of cathodic protection and surface conversion coatings for corrosion control.</li> <li>Apply the knowledge of various methods of corrosion control to suggest a solution for corrosion control of a given equipment in a given industrial application.</li> </ol>

<b>CO-PO MAPPING FOR CORROSION AND ITS PREVENTION</b>												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	1	-	-	-	-	-	-	-	-	-	1
2	3	1	1	-	-	-	-	-	-	-	-	1
3	3	2	1	-	-	-	-	-	-	-	-	2
4	3	2	1	-	-	-	-	-	-	-	-	2

**UNIT-I: CHEMICAL AND ELECTROCHEMICAL CORROSION**

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

**Factors influencing corrosion**

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

**UNIT-II: CORROSION CONTROL BY METALLIC COATINGS**

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

**UNIT-III: CORROSION CONTROL BY ORGANIC COATINGS AND INHIBITORS**

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

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

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

**Books:**

- P. C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub, Co., New Delhi (2002)
- S. S. Dara "A text book of engineering chemistry" S. Chand and Co. Ltd., New Delhi (2006).
- Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi (2008).
- Wiley Engineering chemistry, Wiley India pvt Ltd, 11 edition.
- Chemistry in engineering and technology by J. C. Kuriacose and Rajaram.

**Suggested Reading:**

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

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)  
IBRAHIMBAGH, HYDERABAD – 500 031  
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

**Learning to Learn**

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

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

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: <b>5.</b> Develop effective study skills, and enable students to cut down on the number of hours spent studying. <b>6.</b> Explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving. <b>7.</b> Handle procrastination and learn for long term. <b>8.</b> Plan, prioritise and carry out tasks based on goals and priority.	At the end of the course the learners will be able to: - <b>5.</b> Get learners maximize their learning in a stipulated amount of time. <b>6.</b> Become competent learners and learn creatively. <b>7.</b> Meet deadlines, submit progress reports and recall what has been learnt for effective usage. <b>8.</b> Set Performance Standards and take initiative based on set goals.

**OVERVIEW:**

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

**UNIT 1: STUDY SKILLS**

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

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

**UNIT 2: Chunking**

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

- 2.1 Knowledge Chunking
- 2.2 Skill and Will
- 2.3 Sleep and Learning

**UNIT 3: Procrastination and Memory**

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

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

**UNIT 4: Renaissance Learning and Unlocking Your Potential**

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

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

**LEARNING RESOURCES**

learn.talentsprint.com

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

1	No. of Internal tests	:	<input style="width: 40px; border: 1px solid black;" type="text" value="2"/>	Max. Marks	:	<input style="width: 40px; border: 1px solid black;" type="text" value="30"/>
2	No. of assignments	:	<input style="width: 40px; border: 1px solid black;" type="text" value="2"/>	Max. Marks	:	<input style="width: 40px; border: 1px solid black;" type="text" value="5"/>
3	No. of Quizzes	:	<input style="width: 40px; border: 1px solid black;" type="text" value="2"/>	Max. Marks	:	<input style="width: 40px; border: 1px solid black;" type="text" value="5"/>
Duration of Internal Tests		:	90 Minutes			

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

**Linear Algebra**

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

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

COURSE OBJECTIVES	COURSE OUTCOMES
<p>The course will enable the students to:</p> <ol style="list-style-type: none"> <li><b>Study</b> the concept of Vector Spaces and understand the meaning of Basis and Dimension of a vector Space and Co-ordinates.</li> <li><b>Understand</b> the meaning of Linear transformation, properties.</li> <li><b>Understand</b> Range and Kernel, Rank-Nullity and Matrix of Linear Transformation.</li> <li><b>Understand</b> Inner Product Spaces, Orthonormal sets, Gram-Schmidt's Oorthogonalization process.</li> </ol>	<p>At the end of the course students will be able to:</p> <ol style="list-style-type: none"> <li><b>Solve the</b> problems on Vector Spaces and determine the Basis and Dimension of a Vector Space and find the Co-ordinates.</li> <li><b>Determine</b> Linear Transformation, Range and Kernel and Matrix of Linear Transformation.</li> <li><b>Determine</b> Range and Kernel, Rank-Nullity and Matrix of Linear Transformation.</li> <li><b>Determine</b> distance, orthogonal, orthonormal sets and construct orthonormal basis based on Gram-Schmidt's Oorthogonalization process.</li> </ol>

**UNIT – I** (8 classes)

**Vector Spaces**-Definition of a Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis.

**UNIT – II** (6 classes)

**Linear Transformation -I**

Definition of Linear Transformation- Properties of Linear Transformations – Product of Linear Transformations – Algebra of Linear Operators- Linear sum- Scalar multiple-Composition of maps.

**UNIT – III** (6 classes)

**Linear Transformation -II**

Range and kernel of a linear map – Dimension of Range and Kernel - Rank and nullity – Inverse of linear transformation - Rank nullity theorem (without Proof)- Matrix of Linear Transformation.

**UNIT – IV** (8 classes)

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

**Learning Resources:**

- Introduction to Linear Algebra with Application, Author : Jim DeFranza, Daniel Gagliardi, Publisher : Tata McGraw-Hill
- An Introduction to Linear Algebra, V.Krishna Murthy, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd

**Reference Books:**

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

**Online Resources:**

- <http://mathworld.wolfram.com/topics>
- <http://www.nptel.ac.in/course.php>

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

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

Duration of Internal Tests: 90 Minutes

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

**Smart Materials and Applications**

SYLLABUS FOR B.E. III - SEMESTER

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

Course Objectives	Course Outcomes	BTL
<p><b>The student will be able to</b></p> <ol style="list-style-type: none"> <li>1. grasp the concepts of piezo and ferro electric materials</li> <li>2. Learn fundamentals of pyro and thermo electric materials</li> <li>3. gain knowledge on shape memory alloys</li> <li>4. acquire fundamental knowledge on chromic materials</li> </ol>	<p><b>the student should at least be able:</b></p> <ol style="list-style-type: none"> <li>1. summarize various properties and applications of piezo and ferro electric materials</li> <li>2. apply fundamental principles of pyro and thermo electricity in relevant fields of engineering</li> <li>3. Explain types of shape memory alloys and their properties and applications</li> <li>4. Outline the importance of chromic materials in engineering fields.</li> </ol>	<p>2</p> <p>3</p> <p>3</p> <p>2</p>

**UNIT I: PIEZO AND FERRO MATERIALS (8 hours)**

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

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

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

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

**UNIT III: SHAPE MEMORY MATERIALS (8 hours)**

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

**UNIT-IV: (6 hours)**

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

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

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

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

**Learning Resources:**

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

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

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

Duration of Internal Tests: 90 Minutes



**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**SCHEME OF INSTRUCTION AND EXAMINATION (R-20)**  
**B.E. – INFORMATION TECHNOLOGY : THIRD SEMESTER (2022 - 2023)**

<b>B.E (IT) III-Semester (BRIDGE COURSE)</b>								
<b>Course Code</b>	<b>Course Name</b>	<b>Scheme of Instruction</b>			<b>Scheme of Examination</b>			<b>Credits</b>
		<b>Hours per week</b>			<b>Duration in Hrs</b>	<b>Maximum Marks</b>		
		<b>L</b>	<b>T</b>	<b>P/D</b>		<b>SEE</b>	<b>CIE</b>	
<b>THEORY</b>								
UB21BS300MA	Matrix Theory and Vector Calculus	2	-	-	3	50	-	-
UB21ES310CS	Computer Programming	2	-	-	3	50	-	-
<b>Grand Total</b>		<b>4</b>			<b>-</b>	<b>100</b>		

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

IBRAHIMBAGH, HYDERBAD-500031

**DEPARTMENT OF MATHEMATICS****MATRIX THEORY & VECTOR CALCULUS**

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

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

**UNIT-I: (4 Hours)****DIFFERENTIATION & INTEGRATION**

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

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

**UNIT – II (6 Hours)****VECTOR DIFFERENTIATION**

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

**UNIT – III (6 Hours)****VECTOR INTEGRATION**

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

**UNIT- IV(8 Hours)****MATRIX THEORY**

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

**Suggested Books:**

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

**VASAVICOLLEGE OF ENGINEERING (AUTONOMOUS)**  
IBRAHIMBAGH, HYDERABAD – 500031

**Department of Computer Science & Engineering**

Course Name: COMPUTER PROGRAMMING  
SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code : <b>UB20ES310CS</b>
Credits :--	CIE Marks : --	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
1. Acquire problem solving skills 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)**  
**SCHEME OF INSTRUCTION AND EXAMINATION (R-21)**  
**B.E. – INFORMATION TECHNOLOGY : FOURTH SEMESTER (2022 - 2023)**

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	
U21BS420MA	Probability and Statistics	3	-	-	3	60	40	3
U21PC410IT	Computer Organization	3	-	-	3	60	40	3
U21PC420IT	Database Management Systems	3	-	-	3	60	40	3
U21PC430IT	Design & Analysis of Algorithms	3	-	-	3	60	40	3
U21PC440IT	Software Engineering	3	-	-	3	60	40	3
U21OE4XXXX	Open Elective – II	3	-	-	3	60	40	3
UI21HS010EH	Human Values and Professional Ethics – II	1	-	-	2	40	30	1
U21BS430MA	Skill Development Course - III : Aptitude – II	1	-	-	2	40	30	1
U21XX430XX	Skill Development Course - IV : Technical Skills – I	1	-	-	2	40	30	1
PRACTICALS								
U21PC411IT	Database Management Systems Lab	-	-	2	3	50	30	1
U21PC421IT	Design and Analysis of Algorithms Lab	-	-	2	3	50	30	1
U21PC431IT	Software Engineering Lab	-	-	2	3	50	30	1
Co-Curricular Activities-II		-	-	-	-	-	-	-
Library /Sports/ Mentor Interaction		-	-	-	-	-	-	-
Student should acquire one online certification course equivalent to 2 credits during III-VII Semesters.								
<b>Total</b>		<b>21</b>	<b>-</b>	<b>6</b>	<b>--</b>	<b>630</b>	<b>420</b>	<b>24</b>
<b>Grand Total</b>		<b>27</b>			<b>--</b>	<b>1050</b>		
<i>Note:</i>								
1. One hour is allotted to Library / Sports / Mentor Interaction.								
2. The left over hours are to be allotted to CCA-II / RC / CC / TC based on the requirement.								

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

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

**DEPARTMENT OF MATHEMATICS****PROBABILITY & STATISTICS**

for B.E., IV- Sem., (CBCS)

*(For IT only)*

Instruction : 3 Hours per week	Sem. End Exam Marks : 60	Subject Reference Code : <b>U21BS420MA</b>
Credits : 3	Sessional Marks: 40	Duration of Semester End Exam : 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<i>The course will enable the students to:</i>	<i>At the end of the course students will be able to:</i>
<ol style="list-style-type: none"> <li><b>Study</b> the concepts and application of conditional probability</li> <li><b>Understand</b> various concepts of Random variables and standard Statistical Distributions</li> <li><b>Study</b> various methods of testing large samples</li> <li><b>Analyze</b> standard statistical tests employed for small samples</li> <li><b>Understand</b> fitting of a straight line to a given data and measuring Correlation between variables.</li> </ol>	<ol style="list-style-type: none"> <li><b>Apply</b> conditional probability to the real world problems</li> <li><b>Apply</b> various statistical distributions to solve practical problems, to estimate unknown parameters of populations and apply the tests of hypotheses.</li> <li><b>Infer</b> properties of population conducting tests on samples</li> <li><b>Categorize</b> population based on tests on small samples</li> <li><b>Solve</b> problems on fitting of a straight line to the given data and also to find co-efficient of correlation and to determine regression lines and their application problems.</li> </ol>

**UNIT –I (10 Hours)****Probability :**

Basic terminology- Definition of Probability – Addition Law of probability- Independent events- Conditional Probability- Multiplication law of probability - Baye's Theorem.

**UNIT –II (12 Hours)****Probability Distributions:**

Random Variables - Probability Distribution and Density function for Discrete and Continuous Random variables - Normal Distributions-Properties-Standard Normal variate.

**UNIT-III (12 Hours)****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.

**UNIT-IV (8 Hours)****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..

**UNIT-V (10 Hours)****Curve Fitting:**

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

**Learning Resources:**

- R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
- Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.
- Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
- A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.
- Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand & sons, New Delhi.
- <http://mathworld.wolfram.com/topics>
- <http://www.nptel.ac.in/course.php>

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal 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 Information Technology****COMPUTER ORGANIZATION**

SYLLABUS FOR IV-SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U21PC410IT</b>
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b> The course will enable the students to	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
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, 5<sup>th</sup> Edition, McGraw Hill, 2002.
2. M. M. Mano, Computer System Architecture, 3<sup>rd</sup> 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, 2<sup>nd</sup> 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 : <b>U21PC420IT</b>
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
Apply the concepts of database management systems and design relational databases.	<ol style="list-style-type: none"> <li>1. Understand functional components of the DBMS and develop ER model for a given problem and map ER it to Relational model</li> <li>2. Devise queries using Relational Algebra and SQL</li> <li>3. Design a normalized database schema using different normal forms.</li> <li>4. Understand transaction processing, concurrency control and recovery techniques.</li> <li>5. Understand the concepts of NoSQL and types of real time implementations.</li> </ol>

**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, 6<sup>th</sup> 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 : <b>U21PC430IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
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. <b>Understand asymptotic notations and analyze the complexity of recursive and non-recursive algorithms.</b> 2. <b>Illustrate divide and conquer and greedy algorithm design strategies.</b> 3. <b>Apply dynamic programming strategy to solve optimization problems.</b> 4. <b>Solve problems using backtracking and branch and bound.</b> 5. <b>Understand NP hard and NP completeness.</b>

**UNIT 1:**

**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 2:**

**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, Dijkstra's algorithm.

**UNIT 3:**

**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 4:**

**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 5:**

**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: <b>90 Minutes</b>				



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

**SOFTWARE ENGINEERING**  
SYLLABUS FOR B.E IV- SEMESTER

L:T:P (Hrs/week): 3:0:0	SEE Marks : 60	Course Code : <b>U21PC440IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
Understand the various SDLC models and stages in Software design lifecycle.	<ol style="list-style-type: none"> <li>1. Select the most suitable software process model out of several, for the development of a given software project.</li> <li>2. Develop the ability to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project.</li> <li>3. Understand the software design principles and learn how to apply them towards implementation.</li> <li>4. Compare different ways and techniques of ensuring software quality and apply various test processes and techniques on conventional applications.</li> <li>5. Develop an understanding of risks inherent to software development, and provide continuous quality improvement</li> </ol>

**UNIT I**

**Introduction to Software Engineering:** Definition of Software Engineering, application areas of software engineering, Process Framework, Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process.

**Process Models:** Prescriptive Models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, and the Unified Process.

**An Agile view of Process:** What is Agility. What is an Agile Process, and Agile Process Models.

**UNIT II**

**Understanding requirements:** Requirement Analysis, Data Modeling Concepts, Scenario-Based Modeling, Flow-Oriented Modeling, Class-Oriented Modeling, Creating a Behavioral Modeling

**Design Engineering:** Design within the context of SE, Design Process, Design Concepts, and the Design Model.

**UNIT III**

**Architectural Design:** Software Architecture, Architecture Genres, Architecture Styles, Architectural Design.

**Component level Design:** What is a Component, Designing Class-Based Components, Conducting Component-Level Design, Component-Based development and Object Constraint Language.

**Performing User Interface Design:** The Golden rules, User Interface Analysis and Design, Interface Design Steps, and design Evaluation.

**UNIT IV**

**Software Testing Strategies:** A Strategic Approach to Software Testing, Strategic Issues, Validation Testing, System Testing, Black-box and White-box testing, Basis path testing, and Control Structure testing and the Art of Debugging.

**Software Quality Assurance (SQA):** Elements of Software Quality Assurance, SQA Tasks, Goals and Metrics, and SQA Plan, Software Configuration Management CMMI, ISO 9000 Quality Standards.

**UNIT-V: Product Metrics, Risk Management**

**Product Metrics:** A Framework for Product Metrics, Metrics for the Requirements Model, Metrics for the Design Model, Metrics for Testing, and Metrics for Maintenance.

**Risk Management:** Software Risks, Reactive Vs Proactive Risk Strategies, Risk Mitigation, Monitoring and management, and RMMM Plan.

**Learning Resources:**

1. Roger S.Pressman, Software Engineering: A Practitioners Approach, Seventh Edition, McGraHill, 2009.
2. Pankaj Jalote "An Integrated Approach to Software Engineering, Third Edition, Narosa Publishing house, 2008.
3. James F.Peters, WitoldPedrycz, Software Engineering-An engineering Approach, John Wiley Inc., 2000.
4. Ali Behforoz and Frederic J.Hadson, Software Engineering Fundamentals, Oxford University Press, 1997.
5. <https://nptel.ac.in/downloads/106105087/>

**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 HUMANITIES &amp; SOCIAL SCIENCES

**COURSE NAME-HUMAN VALUES AND PROFESSIONAL ETHICS-II**

(Common to all branches) SYLLABUS FOR B.E./4 – III &amp; IV SEMESTERS

L: T: P (Hrs/Week): 1	SEE Marks: 40	Course Code: <b>U21HS010EH</b>
Credits: 1	CIE Marks: 30	Duration of SEE: Hours: 02

<p><b>COURSE OBJECTIVES</b>  <b>The course will enable the learners to:</b></p> <ol style="list-style-type: none"> <li>1. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations</li> <li>2. Understand professionalism in harmony with self and society.</li> <li>3. Develop ethical human conduct and professional competence.</li> <li>4. Enrich their interactions with the world around, both professional and personal.</li> </ol>	<p><b>COURSE OUTCOMES</b>  <b>At the end of the course the learners will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Distinguish between Personal and Professional life goals—constantly evolving into better human beings and professionals.</li> <li>2. Work out the strategy to actualize a harmonious environment wherever they work.</li> <li>3. Distinguish between ethical and unethical practices, and start implementing ethical practices</li> <li>4. Apply ethics and values in their personal and professional interactions.</li> </ol>
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**UNIT 1: NORMATIVE ETHICS & SOCIETAL ETHICS**

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

- 1.1 Ethical Accountability
- 1.2 Society & Ethics
- 1.3 Rights & Responsibilities

**UNIT 2: PROFESSIONAL ETHICS - NEED FOR ETHICAL CODES**

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

- 2.1 Professional Ethics
- 2.2 Ethical Code
- 2.3 Flipped Classroom

**UNIT 3: PRIVACY**

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

- 3.1 Basics of Cyber Ethics
- 3.2 Privacy
- 3.3 Flipped Classroom

**UNIT 4: MEDIA AND MEDICAL ETHICS**

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

4.1 Media Ethics

4.2 Medical Ethics

4.3 Flipped Classroom

**MODE of DELIVERY**

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

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

**Learning Resources:**

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

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

1	No. of Internal tests	:	<input type="text" value="1"/>	Max. Marks	:	<input type="text" value="20"/>
2	No. of assignments	:	<input type="text" value="2"/>	Max. Marks	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="2"/>	Max. Marks	:	<input type="text" value="5"/>
	Duration of Internal Tests	:	90 Minutes			

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

**COURSE NAME: SKILL DEVELOPMENT COURSE- III : APTITUDE- II**  
(Common to all branches) SYLLABUS FOR B.E. 2/4- IV SEMESTER

L: T: P (Hrs/Week): 1	SEE Marks: 40	Course Code: <b>U21BS430MA</b>
Credits: 1	CIE Marks: 30	Duration of SEE: Hours: 02

<p><b>COURSE OBJECTIVES</b>  <b>The course will enable the learners to:</b></p> <ol style="list-style-type: none"> <li>1. Students will be trained to enhance their employability skills.</li> <li>2. Students will be introduced to higher order thinking and problem solving skills in the following areas - Arithmetic Ability, Numerical Ability and General Reasoning.</li> <li>3. Students will be trained to work systematically with speed and accuracy while problem solving.</li> <li>4. Students will be trained to apply concepts like percentages and averages to solve complex problems.</li> <li>5. Students will be trained to use effective methods like elimination of options and shortcuts to solve problem accurately.</li> </ol>	<p><b>COURSE OUTCOMES</b>  <b>At the end of the course the learners will be able to: -</b></p> <ol style="list-style-type: none"> <li>1. Solve questions in the mentioned areas using shortcuts and smart methods.</li> <li>2. Understand the fundamentals concept of Aptitude skills.</li> <li>3. Perform calculations with speed and accuracy.</li> <li>4. Solve complex problems using basic concepts.</li> <li>5. Use shortcuts with ease for effective problem solving.</li> </ol>
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**UNIT 1: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -1**

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

**UNIT 2: REASONING ABILITY- LOGICAL REASONING**

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

**UNIT 3: REASONING ABILITY- NON VERBAL REASONING**

- 3.1 Figure Series
- 3.2 Directions
- 3.3 Clocks
- 3.4 Calendars

**UNIT 4: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -2**

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

**UNIT 5: QUANTITATIVE APTITUDE- ENGINEERING MATHEMATICS**

- 5.1 Permutations and combinations
- 5.2 Probability

**Prescribed textbook for theory:**

6. Quantitative Aptitude S.CHAND by RS AGARWAL
7. 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**

**DATABASE MANAGEMENT SYSTEMS LAB**  
**SYLLABUS FOR B.E. IV SEMESTER**

L:T:P(Hrs/week): 0:0:2	SEE Marks :50	Course Code: <b>U21PC411IT</b>
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
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.****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/Accessutorials/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: 2Hours

**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 : <b>U21PC421IT</b>
Credits : 1	CIE Marks : 30	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
Develop skills in design and implementation of abstractions of various algorithm strategies and their practical applications.	<ol style="list-style-type: none"> <li>1. Apply divide and conquer approach to solve searching and sorting problems.</li> <li>2. Design and implement algorithms using Greedy strategy for the problems; Fractional knapsack, Huffman codes, shortest path finding (Dijkstra's algorithm).</li> <li>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.</li> <li>4. Solve N-Queens problem and Graph colouring problem using Backtracking approach.</li> <li>5. Implement Branch &amp; Bound algorithm for 0/1 Knapsack problem and Travelling Salesman problem.</li> </ol>

- 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) Dijkstra'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.

**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-computerscience/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: 2Hours			

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

**SOFTWARE ENGINEERING LAB**  
 SYLLABUS FOR B.E. IV SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks : 50	Course Code : <b>U21PC431IT</b>
Credits : 1	CIE Marks : 30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
Understand the concepts related to analysis, design, testing and Management techniques related to Object Oriented Software development.	1. Understand fundamental concepts and object-oriented techniques of systems analysis and design. 2. Be able to gather and document system requirements. 3. Generate and run test cases for various levels of testing by applying different testing methods. 4. Demonstrate the ability to use project management tools 5. Use of computer based tools to aid in system analysis and design.

1. System Definition
  - a) Requirements Management
  - b) Data Modeling
2. Design Modeling
  - a) Use case Diagram
  - b) Class Diagram
  - c) Sequence Diagram
  - d) Collaboration Diagram
  - e) State Chart Diagram
  - f) Activity Diagram
  - g) Component Diagram
  - h) Deployment Diagram
3. Software Development
  - a) Application & Web modeling
  - b) Configuration Management
  - c) Unit Testing
4. Content Management
5. System Testing
  - a) Functional Testing
  - b) Reliability Testing
  - c) Performance Testing
  - d) Defect & Change Tracking
6. Change Management
  - a) Configuration Management
  - b) Requirement Management
  - c) System Documentation
7. Project Management

**Learning Resources:**

1. Grady Booch, James Rumbaugh, Ivor Jacobson, The Unified Modeling Language-User Guide(Covering UML 2.0), Second Edition, Pearson Education, India,2007.
2. Ivor Jacobson, Grady Booch, James Rumbaugh, The Unified Software Development Process, Pearson Education, India, 2008.
3. [http://nptel.iitg.ernet.in/Comp\\_Sci\\_Engg/IIT%20Madras/Object%20Oriented%20System%20Design.htm](http://nptel.iitg.ernet.in/Comp_Sci_Engg/IIT%20Madras/Object%20Oriented%20System%20Design.htm)
4. <http://nptel.ac.in/courses/106105153/>

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2Hours			



**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)  
 SCHEME OF INSTRUCTION AND EXAMINATION (R20)  
 B.E. – IT : FOURTH SEMESTER (2022 - 2023)**

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	
<b>THEORY</b>									
1	UB21HS410EH	English Language Communication	2	-	-	3	50	-	-
<b>PRACTICAL</b>									
1	UB21HS411EH	English Language Communication Skills Lab	-	-	2	3	50	-	-
<b>Total</b>			<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>100</b>	<b>-</b>	<b>-</b>
<b>Grand Total</b>			<b>4</b>			<b>-</b>	<b>100</b>		<b>-</b>

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

**ENGLISH LANGUAGE COMMUNICATION (Theory)**  
**Bridge Course for Lateral Entry Students**

2022-2023 Batch – IV Semester

L: T: P (Hrs/Week) : 2	SEE Marks: 50	Course Code: UB21HS410EH
Credits: nil	CIE Marks: nil	Duration of SEE: Hours : 2

COURSE OBJECTIVES	COURSE OUTCOMES
<b>The Course will enable the Learners to:</b>	<b>At the end of the course the students will be able to :</b>
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.

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

**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB (ELCS)**

**Bridge Course for Lateral Entry Students**

(Common to all branches)

2022-2023 Batch – IV Semester

L: T: P (Hrs/Week) : 2	SEE Marks: 50	Course Code: UB21HS411EH
Credits: nil	CIE Marks: nil	Duration of SEE: Hours : 2

COURSE OBJECTIVES	COURSE OUTCOMES
<b>The Course will enable the learners to:</b>	<b>At the end of the course the learners will be able to :</b>
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**

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

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

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

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

**Prescribed textbook for laboratory:**

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

Longman Dictionary of Contemporary English - 6<sup>th</sup> Edition, 2020. (The students will be given the PDF format).

**Learning Resources:**

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

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)  
IBRAHIMBAGH, HYDERBAD-500031  
DEPARTMENT OF CIVIL ENGINEERING  
**Disaster Management**  
(Open Elective-II) SYLLABUS FOR B.E.IV-SEMESTER

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

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

**UNIT-I**

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

**UNIT-II**

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

**UNIT-III**

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

**UNIT-IV**

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

**UNIT-V**

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

**Learning Resources:**

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

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

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

Duration of Internal Test: 90 minutes

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
 IBRAHIMBAGH, HYDERABAD – 500 031  
 Department of Computer Science & Engineering  
**INTRODUCTION TO SOFTWARE ENGINEERING**  
**(OPEN ELECTIVE-II)**  
 SYLLABUS FOR B.E. IV-SEMESTER  
 (COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U210E410CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

**UNIT-I:****Introduction to Software Engineering:**

**A generic view of Process:** Software Engineering, Process Framework, CMMI, Process Patterns, Process Assessment.

**Process Models:** Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process.

**An Agile view of Process:** What is an Agile Process, Agile Process Models- SCRUM, XP.

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

**UNIT-III:**

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

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

**UNIT-IV:**

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

**Architectural Modelling:** Artifacts, Artifact diagrams, Deployment diagrams.

**UNIT-V:**

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

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

**Learning Resources:**

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

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
 IBRAHIMBAGH, HYDERABAD – 500 031  
 Department of Computer Science & Engineering  
**FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING**  
 (OPEN ELECTIVE-II)  
 SYLLABUS FOR B.E. V-SEMESTER  
 (COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U21OE420CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

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

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

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

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

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

**Util:** Date, Calendar, Random, Timer, Observable

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

**UNIT-V: Applet:** Applet Class, Applet architecture

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

**GUI Development:** AWT: Classes, Working with Graphics, Frames, Menu, Layout Managers.

**Learning Resources:**

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

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

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

Duration of Internal Tests : 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  
**Mathematical Programming for Engineers (Open Elective)**  
SYLLABUS FOR B.E. IV – SEMESTER (for other branches)

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

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

**CO-PO Mapping**

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

**UNIT - I : Introduction:**

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

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

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

**UNIT - II : Scripts and Functions**

Script Files, Function Files, Debugging methods in MATLAB.

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

**UNIT - III : Numerical Methods Using MATLAB**

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

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

**UNIT - IV : Nonlinear Equations**

System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions polyval and polyfit, cubic fit using least square method. Finding roots of a polynomial -roots function, Newton-Raphson Method.

**UNIT - V :**

**Solution of Ordinary differential Equations(ODEs)-**The 4<sup>th</sup> order Runge-kutta Method, ODE Solvers in MATLAB, Solving First –order equations using ODE23 and ODE45.

**Structures and Graphical user interface using app Designer:** Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

**Learning Resources:**

- Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxford publications.
- 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.
- Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition- Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Math works.
- An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siau Alexandre Bayen, Elsevier-18th April 2014.
- <https://nptel.ac.in/courses/103106118/2>
- <https://www.udemy.com/numerical-methods/>

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

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

Duration of Internal Tests: 90 Minutes



**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
ACCREDITED BY NAAC WITH 'A++' GRADE  
IBRAHIMBAGH, HYDERABAD – 500 031  
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING  
**Introduction to Communication Systems (Open Elective)**  
SYLLABUS FOR B.E. IV – SEMESTER (for other branches)

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

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

**CO-PO Mapping**

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

**UNIT - I :**

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

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

**UNIT - II :**

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

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

**UNIT - III :**

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

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

**UNIT - IV :**

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

**UNIT - V :**

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

**Learning Resources:**

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

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)  
ACCREDITED BY NAAC WITH 'A++' GRADE  
IBRAHIMBAGH, HYDERABAD – 500 031  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING  
**Mathematical Programming for Numerical Computation**

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

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U21OE410EE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

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

**UNIT - I : Introduction:**

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

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

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

**UNIT - II : Scripts and Functions**

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

**UNIT - III : Numerical Methods Using MATLAB**

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

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

**UNIT - IV : Nonlinear Equations**

System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions polyval and polyfit , cubic fit using least square method. Finding roots of a polynomial - roots function, Newton-Raphson Method.

**UNIT - V :**

**Solution of Ordinary differential Equations(ODEs)-**The 4<sup>th</sup> order Runge-kutta Method, ODE Solvers in MATLAB, Solving First – order equations using ODE23 and ODE45.

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

**Learning Resources:**

- Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxford publications.
- 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.
- Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition- Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Mathworks.
- An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siau/Alexandre Bayen, Elsevier-18th April 2014.
- <https://nptel.ac.in/courses/103106118/2>

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

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

Duration of Internal Tests: 90 Minutes

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF INFORMATION TECHNOLOGY****INTRODUCTION TO OBJECT ORIENTED PROGRAMMING**

(Open Elective-II) (Common for CIVIL, ECE, EEE &amp; MECH)

SYLLABUS FOR B.E. IV SEMESTER

L:T:P (Hrs/week):3:0:0	SEE Marks: 60	Course Code: <b>U21OE410IT</b>
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
	<i>On completion of the course, students will be able to</i>
Explain the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, building simple GUI applications.	<ol style="list-style-type: none"> <li>1. Understand fundamental concepts in Object oriented approach.</li> <li>2. Develop object-oriented programs using the concepts of exception handling.</li> <li>3. Demonstrate the usage of Java I/O streams to handle user input and output.</li> <li>4. Design and develop GUI programs.</li> <li>5. Develop Applets for web applications.</li> </ol>

**UNIT- I**

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

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

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

**Interfaces:** Defining interfaces, extending interfaces, implementing interfaces.

**UNIT- II**

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

**UNIT- III**

**Basic I/O Streams:** Java I/O classes and interfaces, Files, Stream and Byte classes, Character Streams.

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

**UNIT- IV**

**Introducing Awt,Awt Controls:**

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

Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckboxGroup, Choice Controls, Using Lists, Managing Scroll Bars, Using TextField, Using TextArea, Understanding Layout Managers, Menu bars and Menus, Dialog Boxes, FileDialog, Exploring the controls, Menus and Layout Managers.

**UNIT- V**

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

**Learning Resources:**

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

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

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

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

**Introduction to Scripting Languages**  
(Open Elective-II) (Common for CIVIL, ECE, EEE & MECH)  
SYLLABUS FOR B.E. IV SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks: 60	Course Code : <b>U21OE420IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
This course will enable the students to acquire basic skills for writing python scripts.	On completion of the course, students will be able to <ol style="list-style-type: none"> <li>1. Write a python script to solve a basic problem using structured programming constructs</li> <li>2. Write a python script to solve a basic problem using object oriented programming constructs</li> <li>3. Create and use python modules</li> <li>4. Handle file related operations</li> <li>5. Encode and decode strings</li> </ol>

**UNIT – I**

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

**UNIT – II**

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

**UNIT – III**

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

**UNIT – IV**

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

**UNIT – V**

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

**Learning Resources**

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

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

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

Duration of Internal Tests : 90 Minutes

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DEPARTMENT OF MECHANICAL ENGINEERING

**Optimization Methods**

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

Instruction: 3Hours/week	SEE Marks : 60	Course Code: <b>U210E410ME</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

### UNIT-I

#### Optimization-An overview

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

### UNIT-II

#### Advanced topics in Linear programming

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

### UNIT-III

#### Transportation Model

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

#### Project Scheduling

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

### UNIT-IV

#### Non linear programming problems

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

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

### UNIT-V

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

#### Learning Resources:

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

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 HUMANITIES & SOCIAL SCIENCES

**COURSE NAME- CRITICAL THINKING**

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

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

COURSE OBJECTIVES	COURSE OUTCOMES
<p>The course will enable the learners to:</p> <ol style="list-style-type: none"> <li>1. Identify the core skills associated with critical thinking.</li> <li>2. Comprehend the various techniques of critical thinking</li> <li>3. Evaluate data and draw insights from it to make the right decisions</li> <li>4. Understand where to look for bias and assumptions in problem</li> <li>5. Understand structure, standards and ethics of critical writing</li> </ol>	<p>At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none"> <li>1. Analyse and compare techniques for comparing alternate solutions</li> <li>2. Demonstrate the difference between deductive and inductive reasoning and construct logically sound arguments</li> <li>3. Check for accuracy of data and use it as a tool for problem solving</li> <li>4. Evaluate, identify and distinguish between relevant and irrelevant information to formulate a thesis or hypothesis.</li> <li>5. Employ evidence and information effectively</li> </ol>

**UNIT 1: COMPONENTS OF CRITICAL THINKING**

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

**UNIT 2: NON-LINEAR THINKING**

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

**UNIT 3: LOGICAL THINKING**

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

**UNIT 4: INFER MEANING FROM INFORMATIVE TEXTS**

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

**UNIT 5: PROBLEM SOLVING**

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

**METHODOLOGY**

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

- Online assignments

**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

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2	No. of assignments	:	<input type="text" value="3"/>	Max. Marks	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks	:	<input type="text" value="5"/>

Duration of Internal Tests : 90 Minutes