VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
Ibrahimbagh, Hyderabad-31
Approved by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

Sponsored
by
VASAVI ACADEMY OF EDUCATION
Hyderabad

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR
B.E. (CSE)III and IV Semesters
With effect from 2021-22
(For the batch admitted in 2020-21)
(R-20)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Phones: +91-40-23146020, 23146021
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With effect from the Academic Year 2020-21

Institute Vision

Striving for a symbiosis of technological excellence and human values

Institute Mission

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

Department Vision

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

Department Mission

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

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

B.E. (CSE) PROGRAM OUTCOMES (PO's) Engineering Graduates will be able to:	
PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
P1O	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
P11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
P12	**Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

B.E (CSE) PROGRAM SPECIFIC OUTCOMES (PSO's)	
PSO I	Graduates will have knowledge of programming and designing to develop solutions for engineering problems.
PSO II	Graduates will be able to demonstrate an understanding of system architecture, information management and networking.
PSO III	Graduates will possess knowledge of applied areas of computer science and engineering and execute them appropriately.

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION(R-20)
FOR B.E 2020-21 ADMITTED BATCH III SEMESTER (A.Y 2021-22)

B.E (CSE) III Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
THEORY								
UI20BS320MA	Transform Techniques, Probability and Statistics	3	-	-	3	60	40	3
UI20PC310CS	Logic and Switching Theory	3	-	-	3	60	40	3
UI20PC320CS	Data Structures	3	-	-	3	60	40	3
UI20PC330CS	Object Oriented Programming	3	-	-	3	60	40	3
UI20PC340CS	Computer Architecture	3	-	-	3	60	40	3
UI20OE3XXXX	Open Elective-I	2	-	-	3	60	40	2
UI20HS330EH	Skill Development Course- I (Communication Skills-I)	1	-	-	2	40	30	1
UI20BS350MA	Skill Development Course- II (Aptitude-I)	1	-	-	2	40	30	1
UI20HS010EH	Human Values and Professional Ethics-I	1	-	-	2	40	30	1
UI20MC310ME	Introduction to Entrepreneurship	1	-	-	2	40	30	0
PRACTICALS								
UI20PC321CS	Data Structures Lab	-	-	2	3	50	30	1
UI20PC331CS	Object Oriented Programming Lab	-	-	2	3	50	30	1
UI20PW319CS	Mini Project-I	-	-	2	3	50	30	1
	TOTAL	**21**	**0**	**6**		**670**	**450**	**23**
	GRAND TOTAL	**27**				**1120**		
Student should acquire one online course certification equivalent to two credits during III Sem to VII Sem								
Left over hours are allocated for Extra Curricular Activities, Co-Curricular Activities, Sports / Library / Mentor Interaction / CC / RC / TC								

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

TRANSFORM TECHNIQUES, PROBABILITY & STATISTICS

SYLLABUS FOR B.E. III-SEMESTER

L :T:P(Hrs/week): 3:0:0	SEE Marks :60	Course Code:**UI20BS320MA**
Credits :3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 **Study** the Fourier series, conditions for expansion of function and half range series	1 **Expand** any function which is continuous, Discontinuous, even or odd in terms of its Fourier series.
2 **Study** the concept of Fourier, Sine, Cosine and inverse Fourier Transform Sine and Cosine transform of a function and various properties.	2 **Determine** Fourier transform, Fourier sine and cosine transform and inverse Fourier, Sine and Cosine transform of a function.
3 **Study** various methods of testing large samples	3 **Infer** properties of population conducting tests on samples
4 **Analyze** standard statistical tests employed for small samples	4 **Categorize** population based on tests on small samples
5 **Understand** fitting of a straight line to a given data and measuring Correlation between variables	5 **Solve** problems on fitting of a straight line to the given data and also to find co-efficient of correlation and to determine regression lines and their application problems.

UNIT-I: Fourier series:

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

UNIT-II: Fourier Transforms:

Fourier Integral Theorem (without Proof) - Fourier Transforms – Inverse Fourier Transform - Properties of Fourier Transform –Fourier Cosine & Sine Transforms.

UNIT-III: Probability:

Random Variables - Discrete and Continuous Random variables-Properties-Distribution functions and densities - Expectation – Variance –Normal Distributions.

UNIT-IV: Test of Hypothesis:

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

UNIT-V: Regression & Correlation :

The Method of Least Squares - Fitting of Straight line- Regression - Lines of Regression- Correlation – Karl Pearson's Co-efficient of Correlation

Learning Resources:

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

Reference Books:

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

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

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

Department of Computer Science & Engineering

LOGIC AND SWITCHING THEORY

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week):3:0:0	SEE Marks:60	Course Code:**UII20PC310CS**
Credits :3	CIE Marks :40	Duration of SEE : 3Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On *completion of the course, students will be ab*le to
1 Understand the use of logic minimization methods and to solve the Boolean logic expressions. 2 Design combinational and sequential circuits.	1 Apply Boolean logic postulates and Karnaugh-Map to simplify Boolean expressions. 2 Apply tabulation method to minimize Boolean expressions. 3 Design combinational circuits such as adders, encoders and multiplexers. 4 Design sequential circuits like counters and registers. 5 Design a circuit using programmable logic devices.

UNIT-I:Boolean Algebra:
Axiomatic definition of Boolean Algebra, Postulates and Theorems, Boolean Functions, Canonical Forms and Standard Forms, Simplification of Boolean Functions Using Theorems and Karnaugh Map Method.

UNIT-II:
Minimization of Switching Functions: Quine-McCluskey Tabular Method, Determination of Prime Implicants and Essential Prime Implicants.
Implementation of Boolean Functions: Single-Output and Multiple-Output Combinational Circuit Design, AND-OR, OR-AND and NAND &NOR Realizations, Exclusive-OR and Equivalence functions.

UNIT-III:

Design of Combinational Logic Circuits: Analysis Procedure, Design Procedure, Modular Combinational Logic Elements- Decoders, Encoders, Priority Encoders, Multiplexers and De-multiplexers.

Design of Integer Arithmetic Circuits using Combinational Logic: Integer Adders – Binary Adders, Subtractors, Ripple Carry Adder and Carry Look Ahead Adder, and Carry Save Adders.

UNIT-IV:

Introduction to Sequential Circuit Elements: Latches, Various types of Flip-Flops, Excitation Tables.

Models of Sequential Circuits: Moore Machine and Mealy Machine, Analysis of Sequential Circuits-State Table and State Transition Diagrams. Design of Sequential Circuits-Counters. Moore and Mealy State Graphs for Sequence Detection, Methods for Reduction of State Tables and State Assignments.

UNIT-V:

Design of Combinational Circuits using Programmable Logic Devices (PLDs): Read Only Memory (ROM), Programmable Logic Array (PLA), Programmable Array Logic (PAL) devices.

Learning Resources:

1. Morris Mano M and Michael D Ciletti, Digital Design, 4th Edition (2008), Prentice Hall of India.
2. ZviKohavi, Switching and Finite Automata Theory, 2nd Edition(1978), Tata McGraw Hill.
3. Charles H. Roth, Jr., Larry L. Kenny, Fundamentals of Logic Design, 7th Edition(2013), Cengage Learning.
4. Anand Kumar A, Switching Theory and Logic Design, 2nd Edition(2014), PHI Publishers.
5. CH Roth , Fundamentals of Logic Design, 4th Edition(2006), Jaico Publishers.
6. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-111-introductory-digital-systems-laboratory-spring-2006/
7. http://www.facweb.iitkgp.ernet.in/~isg/SWITCHING/

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATA STRUCTURES

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week):3:0:0	SEE Marks: 60	Course Code:**UI20PC320CS**
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

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

UNIT-I:

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

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

UNIT-II:

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

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

UNIT-III:

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

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

UNIT-IV:

Sorting: Insertion Sort, Quick sort, Merge sort, Heap sort, Sorting on Several Keys, List and Table Sorts.

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

UNIT-V:

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

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.

Learning Resources:

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

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OBJECT ORIENTED PROGRAMMING

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks:60	Course Code:**UI20PC330CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply object oriented principles for developing an application using Java constructs. 2 Design model view and controller enabled Java application.	1 Apply the object oriented programming concepts to solvea problem 2 Employ runtime error handling, concurrent programming practices to develop a parallel processing application 3 Perform I/Ooperationstodevelop aninteractive Javaapplication. 4 Design a Java utility using the collection framework 5 Apply functional programming constructs and understand a large scale project development architecture style.

UNIT-I:

Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Concepts, Benefits of Object Oriented Development.

Java Programming Fundamentals: Introduction, Overview of Java, JVM Architecture, Data types, Variables and Arrays, Operators, Control Statements, Classesand Methods, Garbage Collection, this keyword, final, Inheritance, Method Overriding.

UNIT-II: Singleton class, Abstract class, Nested class, Interface, Package. Exception Handling, Multithreaded Programming, Deadlock.

UNIT-III:
StringHandling: String, StringBuffer and StringBuilder
Java.lang: Type Wrapper, Process, Runtime, Object class, Generics
IO: Java I/O Classes and Interfaces, Files and Directories, Byte and Character Streams, Serialization.
Regular Expressions: Pattern, Matcher, Regular expression Syntax

UNIT-IV: **Collections:**
Overview, Collection Interfaces, Collection Classes, Iterators, List, Set, Maps, Comparator, Arrays, Legacy Classes and Interfaces, StringTokenizer, BitSet, Date, Calendar, Random, Flow, Timer.

UNIT-V:
Lambda expressions: Expressions, Functions, lambda as argument
Stream API: Basics, Filter,Sort, Map, Collect
RegularExpressions: Pattern,Matcher,RegularexpressionSyntax
MVC: Architecture, Usecase

Learning Resources:

1. Herbert Schildt, The Complete Reference Java, 10th Edition, Tata McGraw Hill 2018.
2. Joshua Bloch, Effective Java, 3rd Edition, Pearson, 2017
3. Timothy Budd, An introduction to Object-Oriented Programming, 3rd Edition, Pearson Education, 2008
4. Eric Freeman, Bert Bates, Kathy Sierra , Head First Design Patterns: A Brain-Friendly Guide, 1st Edition, O'Reilly, 2016
5. P. RadhaKrishna, Object Oriented Programming through Java, UniversitiesPress,2007.
6. Sachin Malhotra, Saurabh Choudhary, Programming in Java, 2nd Edition, Oxford Press, 2014.
7. https://docs.oracle.com/javase/tutorial/java

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

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

Department of Computer Science & Engineering
COMPUTER ARCHITECTURE

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**UI20PC340CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Learn the structure and behavior of various functional modules of a computer and identify how they interact to provide the processing needs of the user. 2 Design memory modules and enhance performance of a CPU using pipelining techniques	1 Draw the functional block diagram of single bus architecture of a computer and describe the register transfer notations of instruction execution sequencing. 2 Compare Hardwired control unit and micro programmed control unit in the design of CPU. 3 Explain the techniques used by a computer to communicate with I/O devices. 4 Design a memory module using memory organization techniques 5 Apply design techniques to enhance the performance of CPU using pipelining.

Unit I:
Basic Structure of Computers: Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multicomputer.
Machine Instructions: Instructions and Instruction Sequencing, Addressing Modes.

Unit II:

Basic Processing Unit: Fundamental Concepts- Register Transfers, Performing Arithmetic, Logic Operations, Execution of a Complete Instruction, Multiple Bus Organization, Hardwired Control.

Micro programmed Control: Microinstructions, Microprogram Sequencing, Microprogram Example, Design of Control Unit, Hardwired Control &Micro programmed Control.

Unit III: Input Output organization: Peripheral devices, Standard I/O Interfaces, Accessing I/O Devices, Interrupts, Direct Memory Access and Buses.

Unit IV: Memory System: Basic Concepts, Semiconductor RAM Memory, Read-Only memory, Associative Memory, Cache Memory, Performance Considerations, Virtual Memory, Memory Management Requirements.

Unit V:

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data Path and Control Considerations, Super Scalar Operation, Performance Considerations.

Processor Family: Intel IA-64.

Learning Resources:

1. Carl. V Hamacher, Vranesic Z.G, Zaky S.G, Computer Organization, 5th Edition (2011), McGraw Hill.
2. M.Morris Mano, Computer System Architecture, 3rd Edition (2007), Pearson Education Asia.
3. William Stallings, Computer Organization & Architecture, 8th Edition (2011), Pearson Education Asia.
4. David A Patterson, John L Hennessy, Computer Organization and Design, 4th Edition (2014), Morgan Kaufmann.
5. Pal Chaudhuri.P, Computer Organization and Design, 3rd Edition (2009), Prentice Hall of India.
6. http://nptel.ac.in/courses/106102157/
7. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-823-computer-system-architecture-fall-2005/

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

OPEN ELECTIVES OFFERED IN B.E. III SEMESTER (2021-22)

Dept	Title (Open Elective-I)	Code	Credits
CIVIL	Green Buildings	U20OE310CE	2
CSE	Principles of Python Programming	U200E310CS	2
CSE	Cyber Security	U200E320CS	2
ECE	Introduction to Signals & Systems	U20OE310EC	2
	Principles of Communication Engineering	U20OE320EC	2
EEE	Non Conventional Energy Sources	U20OE310EE	2
Mech	Geometric Modelling	U20OE310ME	2
	Introduction to Unmanned Aerial Vehicles	U20OE320ME	2
	Basic Heat Transfer for Electronic Systems	U20OE330ME	2
IT	Object Oriented Programming Using Java	U20OE310IT	2
	Introduction to Scripting Languages	U20OE320IT	2
Maths	Linear Algebra and its Applications	U190E310MA	2
H& SS	Learning to Learn	U20OE310EH	2
Phy.	Smart Materials and Applications	U21OE310PH	2
Chem.	Battery Science And Technology	U20OE310CH	2

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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: U20OE310CE
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

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

UNIT-I: Planning of buildings: Principles of planning, Relevant building bylaws, site selection for buildings, orientation of buildings, common errors in planning, 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 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 – usage of low energy materials – effective cooling and heating systems – effective electrical systems – effective water conservation systems

UNIT-IV: Certification Systems: Certification systems- Green Rating for Integrated Habitat Assessment (GRIHA), Indian Green Building Council

(IGBC) and Leadership in Energy and Environmental Design (LEED), case studies

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2021-22

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 :**U200E310CS**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

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

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

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

Iteration: while statement

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

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

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

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

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

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2021-22

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 :**U200E320CS**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 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

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INTRODUCTION TO SIGNALS & SYSTEMS (OPEN ELECTIVE-I)

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

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U20OE310EC**
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

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:

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

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: **U20OE320EC**
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.

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:

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Non Conventional Energy Sources

Open Elective-I

SYLLABUS FOR B.E. III SEMESTER

L: T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:**U20OE310EE**
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

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

UNIT-I: Introduction and Solar Energy:

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

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

UNIT-II: Wind Energy and Waste to Energy:

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

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

UNIT-III: Biomass Energy and Fuel Cells:

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

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

UNIT-IV: Ocean Energy and Geothermal Energy:

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

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

Learning Resources:

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

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

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

Duration of Internal Tests :90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

GEOMETRIC MODELLING (Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U20OE310ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
The objective of this course is to understand wire-frame modelling & transformations, surface, solid modelling and assembly modelling techniques.	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

With effect from the Academic Year 2021-22

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: **U20OE320ME**
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

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

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,
4. Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.
5. 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

With effect from the Academic Year 2021-22

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: **U20OE330ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
The objective of this course is to study the basic laws of thermodynamics and the cooling of electronic equipment along with basic modes of heat transfer	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 Prandlt 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. Yunus Cengel & 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. Yunus Cengel & 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

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY

OBJECT ORIENTED PROGRAMMING USING JAVA

(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: **U20OE310IT**
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

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

UNIT- I

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

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

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

Interfaces: Defining interfaces, extending interfaces, implementing interfaces.

UNIT- II

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

UNIT- III

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

Exploring java.lang: Object, Wrapper classes, 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.

Learning Resources:

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

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

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

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO SCRIPTING LANGUAGES

(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 :**U200E320IT**
Credits : 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
This course will enable the students to acquire basic skills for writing python scripts.	1. Demonstrate basic knowledge of Python script. 2. Demonstrate an understanding of fundamental Python syntax and semantics and be fluent in the use of Python control flow statements and functions. 3. Construct python data structure programs using list, tuples, dictionaries, sets and numpy arrays. 4. Develop programs using Object oriented paradigm, and handle file related operations.

Unit – I

Introduction to Python, running a python script, writing comments, using variables, operators, expressions, 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.

Defining functions, passing arguments to functions, returning values from functions, recursion.

Unit – III

Data structures: lists, operations on list, tuples, operations on tuples, sets, operations on sets, dictionaries, operations on dictionaries.

Numpy arrays: creation, access, slicing, matrix operations.

Unit – IV

Modules, Classes and Objects, is – a relationship: inheritance, has-a relationship: composition, Exception handling, File handling: reading and writing files, serialization using JSON.

Intro to Python Standard Library & other useful libraries: Scipy, Scikit, Pandas, Seaborn.

Learning Resources

1. Allen B. Downey, Think Python, 2nd Edition, Green Tea Press
2. "Learning Python", 5th Edition, O'reilly
3. https://www.python.org
4. https://nptel.ac.in/courses/106106182/
5. The Python Standard Library — Python 3.9.6 documentation
6. Python Tutorial (w3schools.com)
7. Best Python Libraries for Every Python Developer | by Claire D. Costa | Towards Data Science
8. Search results · PyPI

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

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

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mathematics

LINEAR ALGEBRA AND ITS APPLICATIONS

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U200E310MA**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

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.

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, Application: Least Squares Approximation

Learning Resources:

1. Introduction to Linear Algebra with Application, Author : Jim Defranza, Daniel Gagliardi, Publisher : Tata McGraw-Hill

2. An Introduction to Linear Algebra, V.Krishna Murthy, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd

Reference Books:

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

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

With effect from the Academic Year 2021-22

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

Department of Humanities and Social Sciences

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

L:T:P(Hrs/Week):2:0:0	SEE Marks: 60	Course Code: **U20OE310EH**
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

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

- Study Skills Checklist
- Learning Styles
- Habits of Effective Students
- Using the Focused and Diffuse Modes
- 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.

- Knowledge Chunking
- Skill and Will
- 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.

- Controlling Procrastination
- Ranking the importance of tasks with a to- do list
- Finding their most productive time
- Keeping track of time spent on different tasks
- 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!

- Psychology of Goal Setting
- Criteria for Goal Setting
- Steps in Goal Setting
- Visioning
- Strategy & Action Plan
- Goal Progress Review

METHODOLOGY	**ASSESSMENTS**
- Case Studies - Demonstration - Presentations - Expert lectures - Writing and Audio-visual lessons - Games & Activities - Learning Tool	- Online assignments - Individual and Group - Tracking Journal - Checklist

Learning Resources:

learn.talentsprint.com

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

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING(Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Physics

SMART MATERIALS AND APPLICATIONS

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

Instruction :2Hrs/Week	SEE Marks : 60	Course Code : **U21OE310PH**
Credits: 2	CIE Marks : 40	Duration of Semester End Exam:3 hrs

Course Objectives	Course Outcomes
The student will be able to 1. grasp the concepts of peizo and ferro electric materials 2. Learn fundamentals of pyro and thermo electric materials 3. gain knowledge on shape memory alloys 4. acquire fundamental knowledge on chromic materials	**The student should at least be able:** 1. summarize various properties and applications of peizo and ferro electric materials 2. apply fundamental principles of pyro and thermo electricity in relevant fields of engineering 3. Explain types of shape memory alloys and their properties and applications 4. Outline the importance of chromic materials in engineering fields.

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, Structure of Barium Titanate, 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 sensors.

Thermoelectricity: thermoelectric effect, Seebeck effect, Peltier effect, thermocouple and laws of thermocouples, 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) different phases of Shape memory alloys, Austenite, Martensite, Properties and characteristics of engineering SMAs**,** Super elasticity, one and two way shape memory effects, Properties of Ni-Ti shape memory alloy, Cu-based shape memory alloys, biomedical Materials and their applications, Advantages, disadvantages of SMAs, 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
4. D. Patranabis, Sensors and Transducers, PHI Learning Pvt. Ltd., 2013

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

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING(Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department Of Chemistry

BATTERY SCIENCE AND TECHNOLOGY

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

Instruction :2Hrs / Week	SEE Marks : 60	Course Code : **U20OE310CH**
Credits: 2	CIE Marks : 40	Duration of SEE : 3Hours

LEARNING OBJECTIVES:	**LEARNING OUTCOMES**
The course will enable the students to:	At the end of the course, students should be able to:
1. To introduce the various terms to understand the efficiency of batteries. 2. To know the relevant materials required for the construction of primary and secondary batteries. 3. To familiarize with the reactions involved during charging and discharging processes. 4. To focus on the need of fuel cells and the concept of their construction and functioning.	1. Discuss the construction, electrochemistry, technology and applications of selected primary batteries 2. Discuss the construction, electrochemistry, technology and applications of few secondary batteries 3. Explain the working principle, electrochemistry, technology and applications of prominent fuel cells 4. Choose a suitable battery or a fuel cell for a given application.

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) - comparision 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).

Learning Resources:

Text 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).

Reference Books:

1. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.
2. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning
3. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi,2008.
4. Derek Pletcher and Frank C. Walsh, "Industrial Electrochemistry", Chapman and Hall, New York, 1993.

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

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING(Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

Skill Development Course - I (Communication Skills-I)

SYLLABUS FOR BE -III SEMESTER

(COMMON FOR ALL BRANCHES)

L:T:P(Hrs/Week):1:0:0	SEE Marks: 40	Course Code: **UI20HS330EH**
Credits: 1	CIE Marks: 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to:	On completion of this course the student will be able to :
Get students proficient in both receptive and productive skills especially virtually	Introduce themselves effectively and converse in a formal environment especially in the online space
Enable students to understand the importance and method of exchanging information in a formal space- both written and spoken	Write emails with appropriate structure and content
Introduce students to an ideal structure for a presentation and discussion- individually and in groups	Use appropriate structure based on the content employing appropriate transitions in written and spoken communication
Develop and improve reading skills needed for college work and reproduce the content based on the situational need	Paraphrase content and write an effective summary

Unit 1: Delightful Descriptions

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

Unit 2: Formal Conversation Skills

- Ask for Information
- Give Information

- Give Feedback
- Seek Permission

Unit 3: Technical Expositions and Discussions

- Classification
- Sequence
- Compare and Contrast
- Cause and Effect
- Problem and solution

Unit 4: Rational Recap

- Paraphrasing
- Summarizing

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

Learning Resources:
learn.talentsprint.com

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

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING(Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

Skill Development Course II -Aptitude I

SYLLABUS FOR III Semester

L : T : P (Hrs/Week) : 1:0:0	SEE Marks : 40	Course Code: UI20BS350MA
Credits: 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of this course the student will be able to :
This is a foundation course and aims at enhancing employability skills.	Solve questions in the mentioned areas using shortcuts and smart methods.
Students will be introduced to higher order thinking and problem solving skills in the following areas - Arithmetic Ability, Numerical Ability and General Reasoning.	Understand the fundamentals concept of Aptitude skills.
Students will be trained to work systematically with speed and accuracy while problem solving.	Perform calculations with speed and accuracy.

UNIT 1: QUANTITATIVE APTITUDE - NUMERICAL ABILITY

- Introduction to higher order thinking skills
- Speed Math
- Number systems
- LCM & HCF

UNIT 2: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY FOUNDATION

- Ratio proportions
- Partnership
- Ages

- Allegations and mixtures
- Averages

UNIT 3: QUANTITATIVE APTITUDE

- Percentages
- Profit and loss

UNIT 4: REASONING ABILITY- GENERAL REASONING PART 1

- Blood Relations
- Number Series
- Coding and decoding

UNIT 5: QUANTITATIVE APTITUDE

- Time and Work
- Chain Rule
- Pipes and Cisterns

Learning Resources:
Learn.talentsprint.com

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

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

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities & Social Sciences

Human Values and Professional Ethics-1

SYLLABUS FOR B.E- III SEMESTER
(COMMON FOR ALL BRANCHES)

L:T:P(Hrs/Week):1:0:0	SEE Marks: 40	Course Code: **U20HS010EH**
Credits: 1	CIE Marks: 30	Duration of SEE: 02 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to:	On completion of this course the student will be able to :
1. Get a holistic perspective of value- based education.	1. Understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations.	2. Distinguish between Personal and Professional life goals– constantly evolving into better human beings and professionals.
3. Understand professionalism in harmony with self and society.	3. Work out the strategy to actualize a harmonious environment wherever they work.
4. Develop ethical human conduct and professional competence.	4. Distinguish between ethical and unethical practices, and start implementing ethical practices
5. Enrich their interactions with the world around, both professional and personal.	5. Apply ethics and values in their personal and professional interactions.

UNIT-1Understanding the need and process for Value Education

a) Basic Human Aspirations -Philosophy, purpose & objective of Life
Understanding and living in harmony at various levels-with self, family, society and nature.

b) **Ethical and moral values -** Truth, honesty, empathy, integrity, consistency, cooperation, confidentiality, trustworthiness, self-respect, self-restraint, self-assertion, self-reliance.

UNIT-2Holistic Understanding of Professional Ethics and Human Values

a) At the level of individual: as socially and ecologically responsible engineers and technologists.
b) At the level of society: as mutually enriching organizations, being work conscious.
c) Recognizing the value of time and respecting time of self and others.

MODE Of DELIVERY

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

Relevant Websites, CD's and Documentaries

- Value Education website, Http://www.universalhumanvalues.info UPTU website, Http://www.uptu.ac.in
- Story of stuff, Http://www.storyofstuff.com
- AlGore, 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 marks for CIE :
Internal Tests +Quiz Tests+ Assignments

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

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

INTRODUCTION TO ENTREPRENEURSHIP

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):1:0:0	SEE Marks:40	Course Code: **UI20MC310ME**
Credits :0	CIE Marks:30	Duration of SEE: 2 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
Inspire students develop an entrepreneurial mind-set, educate about the resources and schemes available to start enterprises in India.	1 Get awareness about entrepreneurship and potentially become an entrepreneur. 2 Discern the characteristics required to be a successful entrepreneur 3 Know the importance of effective communication. 4 Demonstrate effective sales skills

Unit-I: Sources of new ideas, techniques for generating ideas.
Team formation, how entrepreneurship has changed the country and world, entrepreneurial myths, E-cells and their significance, success story of entrepreneurs, eg: Practo, global entrepreneurs, entrepreneurial journeys, challenges, and successes, characteristics of a Successful Entrepreneur, entrepreneurial styles, sources of new ideas, techniques for generating ideas, introduction to business model.

Unit-II:
Importance of effective communication for entrepreneurs, communication barriers, miscommunication, incorrect assumptions about people, importance of listening, design thinking-a problem solving process, sales skills, understanding the customer-centric approach, personal selling techniques, show and tell, elevator pitch, managing risks and learning from

failures, women entrepreneurs, State and Central level organisations supporting entrepreneurship.

Learning Resources:

1. Bruce R. Barringer and R. Duane Ireland, "Entrepreneurship: successfully launching new ventures", 3rd edition, Pearson Prentice Hall, 2009.
2. P. Denning and R. Dunham, "The Innovator's Way", MIT Press: Cambridge, Massachusetts, 2010.
3. Arya Kumar, "Entrepreneurship", Pearson Education, Delhi, 2012.
4. Michael H. Morris, D.F.Kuratko, J G Covin, "Corporate Entrepreneurship and Innovation", Cengage learning, New Delhi,2010
5. Peter F. Drucker, "Innovation and Entrepreneurship", Routledge Classics, 2015.
6. Eric Ries, "The Lean Start-up", Currency, 1st edition, 2011.

Web Resources:

7. http://www.learnwise.org

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

1	No. of Internal Tests:	01	Max. Marks for each Internal Test:	20
2	No. of Assignments:	01	Max. Marks for each Assignment:	05
3	No. of Quizzes:	01	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 1 Hour

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATA STRUCTURES LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks : 50	Course Code:**UI20PC321CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

Programming Exercise:

1. Implementation of Formula based representation.
2. Implementation of Singly Linked List, Doubly Linked List and Circular Linked List.
3. Implementation of Polynomial Arithmetic using Linked List.
4. Implementation of String Matching algorithms.
5. Implementation of Stacks, Queues.(Using both Arrays and Linked Lists)
6. Implementation of Infix to Postfix Conversion, Postfix Expression Evaluation.
7. Implementation of Recursive and Iterative Traversals on Binary Tree.
8. Implementation of Binary Search Tree.
9. Implementation of Operations on Binary Tree (Delete Entire Tree, Copy Entire Tree, Mirror Image, Level Order, Search for a Node etc.)
10. Implementation of Traversal on Graphs.
11. Implementation of Selection, Merge, Quick, Heap, and Insertion Sort.

12. Implementation of Binary Search and Hashing
13. Implementation of operations on AVL Trees.
14. Implementation of B-Trees.
15. Develop application using appropriate data structures.

Learning Resources:

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

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

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OBJECT ORIENTED PROGRAMMING LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks: 50	Course Code:**UI20PC331CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Implement object oriented system development using Java constructs 2 Develop robust Java application applying right data structures and streams .	1 Implement a use-case using OOP concepts 2 Develop applications using multi threaded programming 3 Implement I/O operations using console and file streams 4 Apply collection framework to implement a given scenario 5 Apply functional programming constructs

Programming Exercise:

1. A program to illustrate the concept of class with constructors, methods and overloading.
2. A program to illustrate the concept of inheritance and dynamic Polymorphism
   A program oil lustrate the usage of abstract class & Interface
3. A program to create Packages.
4. A program to illustrate Exception Handling.
5. A program to illustrate Thread Synchronization.
6. A program to work on strings using String classes.
7. A program to illustrate the usage of Filter and Buffered I/Ostreams
8. A program to demonstrate Serialization and Deserialization
9. A program using List & Set interfaces, Iterator & List Iterator
10. A program using Mapinterface, Date, Calendar &Timer.
11. A program to implement object comparison using comparator
12. A program to implement Lambda Functions

13. A program to implement Stream API
14. A program to demonstrate usage of Regular Expressions
15. A program to implement event handling using JFrame

Learning Resources:

1. Herbert Schildt, The Complete Reference Java, 10th Edition, Tata McGraw Hill 2018.
2. Joshua Bloch, Effective Java, 3rd Edition, Pearson, 2017
3. TimothyBudd, An introduction to Object-Oriented Programming, 3rd Edition, Pearson Education, 2008
4. Eric Freeman, Bert Bates, Kathy Sierra , Head First Design Patterns: A Brain-Friendly Guide, 1st Edition, O'Reilly, 2016
5. P. RadhaKrishna, Object Oriented Programming through Java, UniversitiesPress,2007.
6. Sachin Malhotra, Saurabh Choudhary, ProgramminginJava,2ndEdition,Oxford Press,2014.
7. https://docs.oracle.com/javase/tutorial/java

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

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MINI PROJECT

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks: 50	Course Code:**UI20PW319CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Develop an application in the relevant area of Computer Science. 2 Learn contemporary technologies.	1 Review the literature survey to identify the problem. 2 Design a model to address the proposed problem. 3 Develop and test the solution. 4 Demonstrate the work done in the project through presentation and documentation. 5 Adapt to contemporary technologies.

The students are required to carry out mini projects in any areas such as Data Structures, Microprocessors &interfacing, Database Management Systems, Operating Systems and Design & Analysis of Algorithms.

Students are required to submit a report on the mini project at the end of the semester.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION(R-20)
FOR B.E BRIDGE COURSE III SEMESTER (A.Y 2021-22)

B.E III Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P**		**SEE**	**CIE**	
THEORY								
UB20BS300MA	Matrix Theory & Vector Calculus	2	-	-	3	50	-	-
UB20ES310CS	Computer Programming	2	-	-	3	50	-	-
	TOTAL	**4**	**-**	**-**	-	**100**	**-**	**-**
	GRAND TOTAL	**4**				**100**		

With effect from the Academic Year 2021-22

VASAVICOLLEGEOFENGINEERING(Autonomous)

IBRAHIMBAGH,HYDERABAD– 500031

DEPARTMENT OF MATHEMATICS

Course Name:MATRIX THEORY & VECTOR CALCULUS

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

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code :**UB20BS300MA**
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:

- B.S. Grewal, Higher Engineering Mathematics

With effect from the Academic Year 2021-22

VASAVICOLLEGEOFENGINEERING(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 :**UB20ES310CS**
Credits :--	CIE Marks : --	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Acquire problem solving skills 2. Develop flow charts 3. Understand structured programming concepts 4. Write programs in C Language	1. Design flowcharts and algorithms for solving a problem and choose appropriate data type for writing programs in C language 2. Design modular programs involving input output operations, decision making and looping constructs 3. Apply the concept of arrays for storing, sorting and searching data 4. Apply the concept of pointers for dynamic memory management and string handling 5. Design programs to store data in structures and files

UNIT-I

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

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

UNIT-II

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

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

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

UNIT-III

Recursion-Recursive Functions, Preprocessor Commands.

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

UNIT-IV

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

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

UNIT-V

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

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

Learning Resources:

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

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

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

SCHEME OF INSTRUCTION AND EXAMINATION(R-20)
FOR B.E 2020-21 ADMITTED BATCH IV SEMESTER (A.Y 2021-22)

B.E (CSE) IV Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
THEORY								
UI20PC410CS	Database Management Systems	3	-	-	3	60	40	3
UI20PC420CS	Operating Systems	3	-	-	3	60	40	3
UI20PC430CS	Design and Analysis of Algorithms	3	-	-	3	60	40	3
UI20PC440CS	Machine Learning	3	-	-	3	60	40	3
UI20OE4XXXX	Open Elective-II	3	-	-	3	60	40	3
UI20BS430MA	Skill Development Course-III (Aptitude-II)	1	-	-	2	40	30	1
UI20PE430CS	Skill Development Course -IV (Technical Skills-I)	1	-	-	2	40	30	1
UI20MC010CE	Environmental Science	2	-	-	3	60	40	0
PRACTICALS								
UI20PC411CS	Database Management Systems Lab	-	-	2	-	3	50	30
UI20PC421CS	Operating Systems Lab	-	-	2	-	3	50	30
UI20PC431CS	Design and Analysis of Algorithms Lab	-	-	2	1	3	50	30
	TOTAL	**19**	**-**	**6**		**590**	**390**	**20**
	GRAND TOTAL	**25**				**980**		
Student should acquire one online course certification equivalent to two credits during III Sem to VII Sem								
Left over hours are allocated for Extra Curricular Activities, Co-Curricular Activities, Sports / Library / Mentor Interaction / CC /RC / TC								

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATABASE MANAGEMENT SYSTEMS

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:**UI20PC410CS**
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Identify issues involved in the design and implementation of a database system. 2 Understand transaction processing, concurrency control and recovery techniques.	1 Identify the functional components of database management system. Design conceptual data model using Entity Relationship Diagram. 2 Transform a conceptual data model into a relational model. 3 Apply normalization techniques in database design. 4 Apply indexing and hashing techniques for effective data retrieval. 5 Analyze strategies for managing security, backup and recovery of data.

UNIT-I:

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

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

UNIT-II:

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

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

UNIT-III:

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

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

UNIT-IV:

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

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

UNIT-V:

Concurrency Control: Lock Based Protocols, Timestamp – Based Protocols Validation Based Protocols, Multiple Granularity, Multi version Schemes, Deadlock Handling.

Recovery System: Failure Classification, Storage Structure Recovery and Atomicity, Log Based Recovery, Recovery with Concurrent Transactions, Advanced Recovery Techniques and Remote Backup Systems.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
2. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System , 8th Edition(2006) Pearson Education.
3. Raghu Ramakrishna, and Johannes Gehrke, Database Management Systems, 3rd Edition(2003), McGraw Hill.
4. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
5. Peter Rob, Carlos coronel, Database Systems, (2007), Thomoson.
6. http://nptel.ac.in/courses/106106093/

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OPERATING SYSTEMS

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks: 60	Course Code:**UI20PC420CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

UNIT-I:

Introduction to operating systems: Definition, User view and System view of the Operating system, Computer- system organization, Computer-system architecture, Operating system structure, Operating system operations, Operating system services, System calls

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

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

UNIT-II:

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

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

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

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

UNIT –III:

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

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

UNIT –IV:

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

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

UNIT-V:

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

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

Windows - Design Principles, System components ,File system

Android: Architecture, Activity and Service life cycle.

Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 9th Edition (2016), Wiley India.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition (2001), Pearson Education, Asia.
3. Dhananjay, Dhamdhere.M, *Operating System-concept based approach*, 3rd edition (2009), Tata McGraw Hill, Asia
4. Robet Love: *Linux Kernel Development*, (2004)Pearson Education
5. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
6. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php
7. https://nptel.ac.in/courses/106106144/

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DESIGN AND ANALYSIS OF ALGORITHMS

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):3:0:0	SEE Marks:60	Course Code:**UI20PC430CS**
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

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

UNIT – I:

Introduction: Introduction to Algorithm, algorithm specification.

Performance analysis: space complexity, time complexity. Asymptotic notations, amortized analysis

UNIT – II:

Divide and Conquer: General method, Binary search, finding maximum and minimum, Merge sort, Quick sort, Expected Running Time of Randomized Quick Sort, Strassen's Matrix Multiplication Algorithm, Karatsuba's large Integer Multiplication, Masters theorem.

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

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

UNIT – IV:

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

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

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

Learning Resources:

1. Ellis Horowitz, SartajSahani, SanguthevarRajasekaran," Fundamentals of computer Algorithms", Second edition (2008),Universities Press.
2. Thomas H. Cormen, Leiserson C.E, Rivest.R.L , Stein.C, Introduction to Algorithm, 2nd edition (2001), MIT press, USA.
3. Michael T. Goodrich, Roberto Tamassia, Algorithm Design, foundations, analysis, and internet examples, WIELEY student edition (2006).
4. Aho, Hopcroft, Ulman, The Design and Analysis of Computer Algorithms, (2000), Pearson Education.
5. Steven S.Skiena, The Algorithm Design Manual, Springer (1997).
6. Algorithm Design, 1st Edition, Jon Kleinberg and ÉvaTardos, Pearson.

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MACHINE LEARNING

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:**UI20PC440CS**
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

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

UNIT-I:

Introduction: Well-Posed Learning Problems, Designing a Learning System, Issues in Machine Learning.

The Concept Learning: A concept Learning Task, General –to- Specific Ordering of Hypothesis, Find-S, The List-Then-Eliminate Algorithm, Candidate Elimination Learning Algorithm, Inductive bias.

UNIT-II:

Decision Tree Learning: Introduction, Decision Tree Representation, The Basic Decision Tree Algorithm, Hypothesis space search in Decision Tree Learning, Issues in Decision Tree Learning.

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

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

UNIT-III:

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

Computational Learning Theory: Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Spaces, Sample Complexity for Infinite Hypothesis Spaces, The Mistake Bound Model of Learning.

UNIT-IV:

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

Reinforcement Learning: Introduction, Learning Task, Q Learning.

UNIT-V:

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

Deep Learning: Convolutional neural networks, recurrent neural networks.

Learning Resources:

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

8. http://www.holehouse.org/mlclass
9. https://in.udacity.com/course/intro-to-machine-learning--ud120
10. https://github.com/JannesKlaas/MLiFC

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

OPEN ELECTIVES OFFERED IN B.E. IV SEMESTER (2021-22)

Dept	Title Open Elective-II	Code	credits
CIVIL	Disaster Management	U20OE410CE	3
CSE	Principles of Data Structures	U20OE410CS	3
	Data Structures and Algorithms	U20OE420CS	3
ECE	Mathematical Programming For Engineers	U20OE410EC	3
	Introduction to Communication Systems	U20OE420EC	3
EEE	Mathematical Programming for Numerical Computation	U20OE410EE	3
Mech.	Optimization Methods	U20OE410ME	3
H&SS	Critical Thinking	U20HS430EH	3

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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: U20OE410CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. 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.	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.

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.

Suggested Books:

1. Rajib, S and Krishna Murthy, R.R.(2012) "Disaster Management Global Challenges and Local Solutions", Universities Press, Hyderabad, 2012.
2. Navele, P & Raja, C.K. (2009), Earth and Atmospheric Disasters Management, Natural and Manmade, B.S. Publications, Hyderabad, 2009.
3. 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:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

PRINCIPLES OF DATA STRUCTURES (OPEN ELECTIVE-II)

SYLLABUS FOR B.E. IV-SEMESTER
(COMMON FOR CIVIL & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **U20OE410CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Understand Basic linear and non-linear data structures and learn techniques of recursion 2. Understand concepts of Linked lists 3. Understand Concepts of Stacks and queues 4. Understand Concepts of Trees 5. Understand Concepts of Graphs and different sorting and searching techniques and their complexities.	1. Understand the basic concepts of data structures. 2. Understand the notations used to analyze the performance of algorithms. 3. Choose and apply an appropriate data structure for a specified application. 4. Understand the concepts of recursion and its applications in problem solving. 5. Demonstrate a thorough understanding of searching and sorting algorithms

UNIT-I

Introduction: Data Types, Data structures, Types of Data Structures, Operations, ADTs, Algorithms, Comparison of Algorithms, Complexity, Time-space tradeoff.

Recursion: Introduction, format of recursive functions, recursion Vs. Iteration, examples.

UNIT-II

Linked Lists: Introduction, Linked lists and types, Representation of linked list, operations on linked list, Comparison of Linked Lists with Arrays and Dynamic Arrays.

UNIT-III

Stacks and Queues: Introduction to stacks, applications of stacks, implementation, and comparison of stack implementations. Introduction to queues, applications of queues and implementations, Priority Queues and applications.

UNIT-IV

Trees: Definitions and Concepts, Operations on Binary Trees, Representation of binary tree, Conversion of General Trees to Binary Trees, Representations of Trees, Tree Traversals, Binary search Tree.

UNIT-V

Searching and Sorting: Linear searching, binary Searching, sorting algorithms: bubble sort, selection sort, quick sort, merge sort.

Textbooks:

1. Narasimha Karumanchi, "Data Structures and Algorithms MadeEasy", Career Monk Publications, 2017
2. Horowitz E, Sahni S., and Susan Anderson-Freed," Fundamentals ofData structures in C", Silicon Pr; 2 edition (1 August 2007)
3. ReemaThareja, "Data Structures using C", Oxford, 2014.

Reference Books:

1. Kushwaha D. S. and Misra A. K, "Data structures A ProgrammingApproach with C", PHI.
2. Seymour Lipschutz," Data Structures with C", McGraw Hill Education,2017.

Learning Resources:

1. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2. https://www.edx.org/course/foundations-of-data-structures
3. https://sites.google.com/site/merasemester/data-structures

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

PRINCIPLES OF DATA STRUCTURES LAB

SYLLABUS FOR B.E. IV-SEMESTER
(COMMON FOR CIVIL & MECH)

Each Department will conduct under Technical Skills

Course Objectives	**Course Outcomes**
The course will enable the students to:	At the end of the course student will be able to:
Design and implement abstractions of various data structures and their practical applications.	1. Perform operations on Abstractions like stacks, queues, linked lists. 2. Implement problems involving trees and graphs. 3. Choose the right data structure based on the requirements of the problem.

1. Menu driven program that implements Stacks using arrays for the following operations
   a) create b)push c)pop d) peek
2. Implementation of Infix to Postfix Conversion and evaluation of postfix expresstion.
3. Menu driven program that implements Queues using arrays for the following operations
   a)create b)insert c)delete d) display
4. Menu driven program that implements Circular Queues for the following operations
   a)create b)Insert c)delete d) display
5. Implementation of Singly Linked List,Stack using Singly Linked List, Queue using Singly Linked List.
6. Implementation of polynomial operations using Linked List.

7. Implementation of Doubly Linked List, Circular linked list.
8. Implementation of Operations on Binary Tree (Insert, Delete, Level Order, Search)
9. Implementation of Recursive and Iterative Traversals on Binary Trees.
10. Implementation of Operations on Binary Search Tree.
11. Implementation of Quick Sort.
12. Implementation of merge Sort.

Suggested Reading:

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 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

Online Resources:

1. http://nptel.ac.in/courses/106106127I
2. http://nptel.ac.in/courses/106103069/

With effect from the Academic Year 2021-22

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DATA STRUCTURES AND ALGORITHMS
(OPEN ELECTIVE-II)

SYLLABUS FOR B.E. IV SEMESTER
Common for ECE and EEE

L : T : P(Hrs./week): 3	SEE Marks:60	Course Code: **U20OE420CS**
Credits: 3	CIE Marks :40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are	At the end of the course, students will be
1. Understand Basic linear and non-linear data structures and learn techniques of recursion 2. Understand concepts of Linked lists 3. Understand Concepts of Stacks and queues 4. Understand Concepts of Trees	1. Understand the basic concepts of data structures. 2. Understand the notations used to analyze the performance of algorithms. 3. Choose and apply an appropriate data structure for a specified application. 4. Understand the concepts of recursion and its applications in problem

Unit I

Algorithm Specification- Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations. **Arrays:** Arrays - ADT, Polynomials, Sparse matrices

Unit II

Strings-ADT, Pattern Matching, **Linked Lists:** Singly Linked Lists and Chains, Linked Stacks and Queues, Polynomials, Operations for Circularly linked lists, Equivalence Classes, Sparse matrices, Doubly Linked Lists.

Unit III

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

Unit IV

Sorting: Insertion Sort, Quick sort, Merge sort, Heap sort, Sorting on Several Keys, List and Table Sorts. **Hashing :**Introduction, Static Hashing, Hash tables, Hash functions, Overflow handling.

Unit V

Trees: Introduction, Binary Trees, Binary Tree Traversals, Heaps, Binary Search trees (BST): Definition, Searching a BST, Insertion into a BST, Deletion from a BST. **Graphs:** The Graph ADT, Elementary graph operations, Minimum Cost Spanning Trees- Kruskal's Algorithm, Prim's Algorithm.

Learning Resources:

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

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

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

1 No. of Internal Tests : 2 Max. Marks for each Internal Tests : 30

2 No. of Assignments : 3 Max. Marks for each Assignment : 5

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVICOLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH,HYDERABAD- 500 031

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DATA STRUCTURES AND ALGORITHMS LAB

SYLLABUS FOR B.E. IV SEMESTER

Common for ECE and EEE

Each Department will conduct under Technical Skills

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Design and implement abstractions of various data structures and their practical applications.	1. Perform operations on Abstractions like stacks, queues, linked lists. 2. Implement problems involving trees and graphs. 3. Choose the right data structure based on the requirements of the problem.

Programming Exercise:

1. Implementation of Formula based representation.
2. Implementation of Singly Linked List, Doubly Linked List and Circular Linked List.
3. Implementation of Polynomial Arithmetic using Linked List.
4. Implementation of String Matching algorithms.
5. Implementation of Stacks, Queues.(Using both Arrays and Linked Lists)
6. Implementation of Infix to Postfix Conversion, Postfix Expression Evaluation.
7. Implementation of Recursive and Iterative Traversals on Binary Tree.
8. Implementation of Binary Search Tree.
9. Implementation of Operations on Binary Tree
   (Delete Entire Tree, Copy Entire Tree, Mirror Image, Level Order, Search

for a Node etc.)

10. Implementation of Traversal on Graphs.
11. Implementation of Selection, Merge, Quick, Heap, and Insertion Sort.
12. Implementation of Binary Search and Hashing
13. Develop application using appropriate data structures.

Learning Resources:

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

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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:**U20OE410EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

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

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 ployval and polyfit ,

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

UNIT - V :

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

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

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxfordpublications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt.Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition- Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Mathworks.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition byTimmy Siauw Alexandre Bayen, Elsevier-18th April2014.

5. https://nptel.ac.in/courses/103106118/2

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

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

Duration of Internal Tests :90 Minutes

With effect from the Academic Year 2021-22

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MATHEMATICAL PROGRAMMING FOR ENGINEERS

(OPEN ELECTIVE-II)

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

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20OE410EC**
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.

UNIT - I : Introduction:
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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.

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UNIT - V :

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

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

Learning Resources:

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

April 2014.
5. https://nptel.ac.in/courses/103106118/2
6. https://www.udemy.com/numerical-methods/

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INTRODUCTION TO COMMUNICATION SYSTEMS (OPEN ELECTIVE-II)

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

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20OE420EC**
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.

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:

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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: **U20OE410EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To provide fundamental knowledge of programming language for solving problems.	On completion of the course, students will be able to 6. Generate arrays and matrices for numerical problems solving. 7. Represent data and solution in graphical display. 8. Write scripts and functions to easily execute series of tasks in problem solving. 9. Use arrays, matrices and functions in Engineering applications 10. Design GUI for basic mathematical applications.

UNIT - I : Introduction:

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

UNIT - V :

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

5. https://nptel.ac.in/courses/103106118/2

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 o

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

OPTIMIZATION METHODS (Open Elective-II)

SYLLABUS FOR B.E. IV-SEMESTER

Instruction :3Hours /week	SEE Marks : 60	Course Code: U20OE410ME
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 method as per customer requirements to suit for various Organizations. 3. Minimization of total cost to apply for transportation techniques for the transhipment 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, Dichtomous 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, Powel method, steepest decent method.

Learning Resources:

1. SingiresuS.Rao, "Engineering optimization- Theory and Practice", 4th 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: 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

CRITICAL THINKING (Open Elective-II)

SYLLABUS FOR B.E. - IV Semester

Instruction : 3 Hours	SEE : 60	Course code **: U20HS430EH**
Credits : 3	CIE : 40	Duration of SEE : 3 Hours

Course Objectives	**Course Outcomes**
To help students: • Identify the core skills associated with critical thinking. • Comprehend the various techniques of critical thinking. • Evaluate data and draw insights from it to make the right decisions • Understand where to look for bias and assumptions in problem • Understand structure, standards and ethics of critical writing	At the end of the course the student will be able to • Analyse and use techniques for comparing alternative solutions • Demonstrate the difference between deductive and inductive reasoning and construct logically sound arguments • Check for accuracy of data and use it as a tool for problem solving • Evaluate, identify and distinguish between relevant and irrelevant information to formulate a thesis or hypothesis • Employing evidence and information effectively

UNIT I - COMPONENTS OF CRITICAL THINKING

1. Applying Reason
2. Open Mindedness
3. Analysis
4. Logic

UNIT II - NON-LINEAR THINKING

1. Step Out of Your Comfort Zone

2. Don't Jump to Conclusions
3. Expect and Initiate Change
4. Being Ready to Adapt

UNIT III - LOGICAL THINKING

1. Ask the Right Questions
2. Organize the Data
3. Evaluate the Information
4. Draw Conclusions

UNIT IV - EVALUATE INFORMATION

1. Making Assumptions
2. Watch out for Bias
3. Ask Clarifying Questions
4. SWOT Analysis

UNIT-V - PROBLEM SOLVING

1. Identify Inconsistencies
2. Trust Your Instincts
3. Asking Why?

METHODOLOGY	**ASSESSMENT**
- Case Studies - Demonstration - Expert lectures - Writing and Audio-visual lessons	**-** Online assignment - Individual and group

LEARNING RESOURCES

learn.talentsprint.com

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

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

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING(Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

Skill Development - III : Aptitude II

SYLLABUS FOR B. E -IV SEMESTER

L : T : P (Hrs/Week) : 1:0:0	SEE Marks : 40	Course Code: **UI20BS430MA**
Credits: 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Build further on aptitude skills and enhance employability skills	Solve questions in the mentioned areas using shortcuts and smart methods
Enhance higher order thinking skills and problem solving in the following areas - Arithmetic ability, Numerical ability and General reasoning	Understand the fundamentals concept of Aptitude skills
Train to work systematically with speed and accuracy while problem solving	Perform calculations with speed and accuracy

UNIT 1: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED

- Time speed and distance
- Boats and Streams
- Problems on trains

UNIT 2: REASONING ABILITY- LOGICAL REASONING

- Seating Arrangements- Linear; Circular; Complex
- Venn diagrams
- Syllogism
- Cubes & Cuboids
- Dices

UNIT 3: REASONING ABILITY- NON VERBAL REASONING

- Figure Series
- Directions
- Clocks
- Calendars

UNIT 4: QUANTITATIVE APTITUDE -

- Mensuration Part -1
- Mensuration Part -2
- Logarithms

UNIT 5: QUANTITATIVE APTITUDE

- Permutations and combinations
- Probability

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

Learning Resources:
learn.talentsprint.com

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

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

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING(Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

Skill Development Course-IV (Technical Skills-I)

Industry Standard Coding Practices – 2023

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):1:0:0	SEE Marks : 60	Course Code:**UI20PE430CS**
Credits : 1	CIE Marks : 40	Duration of SEE : 2 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Understand importance of problem solving approaches for programming complex data structure problems. 2. Understand importance of optimized solutions for problems solving and its relevance to industry. 3. Implement mathematical and logical understanding approaches to implement test driven development practices. 4. Start participating in global coding competitions relevant to the syllabus. 5. Implement Time efficient codes for complex problems using algorithmic approaches	1 Choose suitable non linear data structure to design a solution to a problem. 2 Select the hashing technique to perform dictionary operations. 3 Explain operations on Efficient Binary Search Trees and Multiway Search Trees.

Abstract Data-structures: Stacks & Queues

Problem solving using Stacks, Coding solutions for the implementation of stack/queue using an array, Coding solutions for the implementation of stack/queue using a linked list. Problem solving on expression conversion and evaluation, Problem solving implementing stacks &queues

Sorting Algorithms
Coding solutions for Search operation simple menting linear/binary search. Problem solving using Sorting algorithms: Bubble Sort, Selection Sort, Insertion Sort, Evaluation of sorting Algorithms. Problem solving using Quick Sort, Merge Sort, O(n log n) algorithms. Problem Solving using sorting techniques

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

Non-Linear Data structures – Trees - II
Problems solving on key search on binary search trees, Time comparison and analysis on Binary Search Trees, Coding on a binary search tree problems, Search/probe sequence validation, Example problems

Algorithms– Greedy Methods - I
Greedy Strategy, Problem solving on greedy problems: coin change, fractional Knapsack, Scenario based problem solving implementing Greedy Methods, Practice problems

Algorithms– Greedy Methods - II
Job sequencing solutions, Activity selection problem, Scenario based problem solving implementing Greedy Methods, Practice Problems

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

1	No. of Internal Tests	:	1	Max. Marks for each Internal Test	:	30

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

ENVIRONMENTAL SCIENCE

SYLLABUS FOR B.E. IV-SEMESTER

L: T:P(Hrs./week): 2:0:0	SEE Marks:60	Course Code:**UI20MC010CE**
Credits : - - -	CIE Marks:40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *Upon the completion of this course students will be able to*
1. Describe various types of natural resources available on the earth surface. 2. Explain the concepts of an ecosystem and the biotic and abiotic components of various aquatic ecosystems. 3. Identify the values, threats of biodiversity, endangered and endemic species of India along with the conservation of biodiversity. 4. Explain the causes, effects and control measures of various types of environmental pollutions. 5. Describe the methods for water conservation, the causes, effects of global warming, climate change, acid rain, ozone layer depletion, population explosion.	1. Describe the various types of natural resources. 2. Differentiate between various biotic and abiotic components of ecosystem. 3. Examine the values, threats of biodiversity, the methods of conservation, endangered and endemic species of India. 4. Illustrate causes, effects, control measures of various types of environmental pollutions. 5. Explain the methods of water conservation, causes, effects of climate change, global warming, acid rain and ozone layer depletion, population explosion.

UNIT-I

Environmental Studies: Definition, importance of environmental studies. Natural resources: Water resources; floods, drought, conflicts over water, dams-benefits and problems. Food resources; Effects of modern agriculture, fertilizer-pesticide problems, water logging salinity. Energy resources: Renewable and non-renewable energy resources. Land Resources, soil erosion and desertification.

UNIT-II

Ecosystems: Structure and function of an ecosystems, producers,

consumers and decomposers, food chains, food webs, ecological pyramids, aquatic ecosystems (ponds, oceans, estuaries).

UNIT-III

Biodiversity: Genetic, species and ecosystem diversity. Values of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

UNIT-IV

Environmental Pollution: Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution and solid waste & e-waste management.

UNIT-V

Social Aspects and the Environment: Water conservation, Climate change, global warming, acid rain, ozone layer depletion. Environmental Impact Assessment, population explosion.

Learning Resources:

1. Deswal S. and Deswal A., A Basic Course on Environmental studies, DhanpatRai& Co Pvt. Ltd. 2016
2. Benny Joseph, Environmental Studies, Tata McGraw-Hill, 2017
3. Suresh K. Dhameja, Environmental Studies, S.K. Kataria& Sons, 2010.
4. De A.K., Environmental Chemistry, New Age International, 2003.
5. Odum E.P., Fundamentals of Ecology, W.B. Sunders Co., USA, 2004.
4. Rajagopalan R., Environmental Studies, Second Edition, Oxford University Press, 2015

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 : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATABASE MANAGEMENT SYSTEMS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:**UI20PC411CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply SQL commands on a database. 2 Develop an application using forms, reports and PL/SQL.	1 Design and implement a database schema. 2 Apply DDL, DML, DCL and TCL commands on a database. 3 Create database by applying normal forms. 4 Implement PL/SQL programs for creating stored procedures, cursors & triggers. 5 Design and implement an application using forms and reports.

Programming Exercise:

I. SQL

1. Creation of database (Exercising the commands like DDL, DML, DCL and TCL)
2. Creating tables using combination of constraints.
3. Usage of Stored Functions.
4. Exercising all types of Joins.
5. Creating tables in I Normal, II Normal, III Normal Form.
6. Exercising complex Queries.
7. Usage of file locking, Table locking facilities in Applications.

II. PL/SQL

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

III. FORMS

1. Creation of forms for colleges Information System, Library Information System and Recruitment Cell.

IV. REPORTS

1. Creation of Reports based on different queries.
2. Creation of full-fledged Database Application.

Learning Resources:

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

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

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

Department of Computer Science & Engineering
OPERATING SYSTEMS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:**UI20PC421CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

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

Programming Exercise:

1. Implement system calls for
   i) File system management
   ii) Process management

2. Implementation of CPU scheduling algorithms (FCSF, SJF, Priority, RR, Multi level)

3. Implement contiguous Memory management techniques
   i) Best Fit
   ii) Worst Fit
   iii) First Fit

4. Implementation of Page Replacement algorithms
   a) FIFO
   b) LRU
   c) OPTIMAL
5. Implement Inter-process communication using
   i) Pipes
   ii) Message Queues
   iii) Shared Memory
6. Implementation of Process Synchronization for Bounded buffer, Readers-Writers and Dining philosophers problems
7. Implementation of Deadlock handling
   i) Resource Allocation Graph
   ii) Safety Algorithm
   iii) Resource Request algorithm
   iv) Wait for graph
8. Implementation of Disk Scheduling algorithms a) FCFS b) SSTF c) SCAN
9. Build a real operating system kernel by using an open source operating system (Linux) kernel to implement services such as Process Scheduling, Process synchronization, Virtual memory and File system

Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 9th Edition (2016), Wiley India.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition (2001), Pearson Education, Asia.
3. Dhananjay, Dhamdhere.M, *Operating System-concept based approach*, 3rd edition (2009), Tata McGraw Hill, Asia
4. Robet Love: *Linux Kernel Development*, (2004)Pearson Education
5. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
6. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php
7. https://nptel.ac.in/courses/106106144/

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

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DESIGN & ANALYSIS OF ALGORITHMS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks : 50	Course Code:**UI20PC431CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

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

Programming Exercise:

1. Implementation of Merge Sort, Quick Sort, Heap Sort, Binary Search and Hashing.
2. Implementation of Traversal on Graphs.
3. Implementation of Traversal on Trees and DAG.
4. Implement Single source shortest path algorithm.
5. Implement Minimum cost spanning tree algorithm.
6. Implement fractional Knapsack algorithm.
7. Implement Optimal merge patterns -Huffman encoding algorithm.

8. Implement Matrix–chain multiplication algorithm with dynamic programming.
9. Implement LCS algorithm and print Longest common subsequence.
10. Implement All-pairs shortest path algorithm.
11. Implement 0/1 Knapsack algorithm.
12. Implement multi-stage graph.
13. Implementation of N-queens problem with back tracking.
14. Implement Graph coloring problem with back tracking.
15. Implement TSP by branch and bound.
16. Implement 0/1 knapsack by branch and bound.

Learning Resources:

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

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

With effect from the Academic Year 2021-22

SCHEME OF INSTRUCTION AND EXAMINATION(R-20)
FOR B.E BRIDGE COURSE IV SEMESTER (A.Y 2021-22)
Common for CSE, CSE(AI&ML), IT

B.E IV Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P**		**SEE**	**CIE**	
THEORY								
UB20HS410EH	English Language & Communication	2	-	-	3	50	-	-
PRACTICAL								
UB20HS411EH	English Language & Communication Skills Lab	-	-	2	3	50	-	-
	TOTAL	**2**	**-**	**2**	-	**50**	**-**	**-**
	GRAND TOTAL	**4**				**100**		-

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE COMMUNICATION

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

L :T:P(Hrs/week): 2	SEE Marks :50	Course Code: **UB20HS410EH**
Credits :-	CIE Marks :-	Duration of SEE : 2 Hours

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

Unit-5 5.0: Reading

5.1 **Prose text-** On shaking hands

With effect from the Academic Year 2021-22

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

(Common to all branches)

L :T:P(Hrs/week): 2	SEE Marks :50	Course Code: **UB20HS411EH**
Credits :-	CIE Marks :-	Duration of SEE : 2 Hours

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

	ELCS – Component - INTERACTIVE COMMUNICATION SKILLS LAB
1	**Group discussion:** Objectives of GD, Types of GDs; Initiating, Continuing, and concluding a GD.
2	**Debate:** Understanding the differences between a debate and a group discussion, essentials of debate, concluding a debate.
3	**Role Plays:** Types of Role plays (formal and informal), usage of discourse markers.
4	**Presentation Skills:** Making effective presentations, using non-verbal communication, coping with stage fright, use of Audio visual aids researching on various topics.