With effect from the Academic Year 2026-27

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

Ibrahimbagh, Hyderabad-31

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

Affiliated to Osmania University, Hyderabad-07

Sponsored

by

VASAVI ACADEMY OF EDUCATION

Hyderabad

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR M.Tech. (CSE) I to II Semesters (R-26) (For the Academic Year 2026-27)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Phones: +91-40-23146020, 23146021

Fax: +91-40-23146090

Institute Vision

Striving for a symbiosis of technological excellence and human values

Institute Mission

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

Department Vision

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.

.

M.Tech (CSE) Program Educational Objectives (PEO's)	
Graduates should be able to utilize the knowledge gained from their academic program to:	
PEO I	To provide students with the in depth knowledge in the area of Computer Science and Engineering to enable them to analyze and solve complex engineering problems.
PEO II	To provide the required knowledge to the students and prepare them to pursue research in the area of Computer Science and Engineering.
PEO III	To inculcate effective communication, teamwork and leadership skills and demonstrate an ability to relate engineering issues to social context.
PEO IV	To impart professional, ethical and social attitude and demonstrate the ability towards reflective learning needed for a successful career.

M.TECH. (CSE) PROGRAM OUTCOMES (PO's) **Engineering Graduates will be able to:**	
PO1	An ability to independently carry out research / investigation and development work to solve practical problems.
PO2	An ability to write and present a substantial technical report / document.
PO3	An ability to demonstrate a degree of mastery in the area of Computer Science & Engineering.
PO4	An ability to apply appropriate techniques and modern engineering tools in the design and development of solutions for complex Computer Science & Engineering problems.
PO5	An ability to apply engineering and management principles as a member and leader in a team, to manage projects in a multidisciplinary environment with lifelong learning capabilities.

M.Tech. (CSE) PROGRAM SPECIFIC OUTCOMES (PSO's)	
PSO 1	Graduates will be able to design efficient algorithms and develop solutions for real world problems.
PSO 2	Graduates will possess knowledge in specialized areas of computer science and Engineering.
PSO 3	Graduates will be able to learn advanced technologies towards higher education and Research and Development (R&D).

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-26)
M.TECH. – CSE : FIRST SEMESTER AY 2026 - 27

M.TECH (CSE) I 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								
PI26PC110CS	Mathematical Foundations of Computer Science	3	-	-	3	60	40	3
PI26PC120CS	Advanced Data Structures	3	-	-	3	60	40	3
PI26PE1XXCS	Professional Elective - I	3	-	-	3	60	40	3
PI26PE1XXCS	Professional Elective - II	3	-	-	3	60	40	3
PI26AC140ME	Research Methodology and IPR	2	-	-	3	60	40	2
PI26AC110EH	Audit Course-I: English for Research Paper Writing	2	-	-	3	60	40	0
PRACTICALS								
PI26PC121CS	Advanced Data Structures Lab	-	-	4	-	-	50	2
PI26PE131CS	Professional Elective - I Lab	-	-	4	-	-	50	2
	TOTAL	**16**	**-**	**8**	**-**	**360**	**340**	**18**
	GRAND TOTAL	**24**				**700**		

With effect from the Academic Year 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

SYLLABUS FOR M.TECH(CSE) – I SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks Marks:60	Course Code:**PI26PC110CS**
Credits: 3	CIE Marks : 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *At the end of the course, students will be able to*
1. Understand the mathematical fundamentals that is prerequisites for a variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, software Engineering, computer architecture, Operating Systems, distributed systems, Bioinformatics, Machine Learning. 2. Develop the understanding of the mathematical and logical basis to many modern techniques in information technology like machine learning, programming language design, and concurrency. 3. Study various sampling and regression analysis.	1. Understand the basic notions of discrete and continuous probability. 2. Solve simple real world problems of discrete and continuous distributions 3. Understand the methods of statistical inference, and the role that sampling distributions play in those methods. 4. Perform correct and meaningful statistical analyses of simple to moderate complexity.

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	2			1	3	2		
CO2	2			1	3	2		
CO3	2			1	3	2		
CO4	2			1	3	2		
CO5	2			1	3	2		

UNIT – I

Random Variables: Discrete and Continuous Random Variable, Probability Mass, Density and Cumulative Distribution Function, Expected Value, Variance, Moments, Moment Generating Function, Joint Probability

Density Function, Marginal, Conditional Probability Distribution, Conditional Expectation and Independent Random Variables.

UNIT – II

Applications of Univariate and Multivariate Random Variables: Central Limit Theorem, Special Discrete Distributions – Binomial and Poisson, Continuous Distributions – Uniform, Gamma, Normal Distributions (univariate and bivariate random variables), Markov Chains.

UNIT – III

Sampling Distributions: Random samples, Sampling Distributions of Estimators, Method of Moments and Maximum likelihood function.

UNIT – IV

Statistical Inference: Parameters and Statistics, Tests of Hypothesis and Tests of Significance, Critical Region and Level of Significance, Inferences concerning a mean - inferences concerning variances

UNIT – V

Regression Analysis: Curvilinear Regression, Multiple Regression, Correlation, Multiple linear Regression (Matrix Notation)

Learning Resources:

1. Miller & Freund's, Probability and Statistics For Engineers, by Richard A. Johnson, Eight Edition, PHI.
2. T. Veerarajan, Probability, Statistics and Random Processes, Second Edition, Tata McGraw-Hill.
3. John Vince, Foundation Mathematics for computer Science, Springer
4. K. Trivedi. Probability and Statistics with Reliability, Queuing, and Computer Science Applications, Wiley.
5. M. Mitzenmacher and E. Upfal.Probability and Computing: Randomized Algorithms and Probabilistic Analysis.
6. Alan Tucker, Applied Combinatorics, Wiley

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 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ADVANCED DATA STRUCTURES

SYLLABUS FOR M.TECH. (CSE) – I SEMESTER

L:T:P (Hrs./week):3:0:0	SEE Marks Marks:60	Course Code:**PI26PC120CS**
Credits: 3	CIE Marks : 40	Duration of SEE: 3 Hours

Course Objectives	**Course Outcomes**
	At the end of the course, Students will be able to
1. Use ADT/libraries to design algorithms for a specific problem. 2. Understand the necessary mathematical abstraction to solve problems. 3. Understand advanced paradigms and data structure to solve algorithmic problems. 4. Analyze the algorithm efficiency and proofs of correctness.	1. Design symbol table using hashing techniques. 2. Explain and design the operation on skip list 3. Develop and analyze algorithms for red-black trees, B-trees and Splay trees. 4. Develop algorithms for text processing applications. 5. Identify suitable data structures and develop algorithms for computational geometry problems.

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	2	1	3	3	1	3	2	1
CO2	2	1	3	3	1	3	2	1
CO3	3	2	3	3	2	3	3	2
CO4	3	2	3	3	2	3	3	2
CO5	3	2	3	3	2	3	3	2

UNIT-I

Dictionaries: Definition, Dictionary Abstract Data Type, Implementation of Dictionaries.

Hashing: Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing.

UNIT-II

Skip Lists: Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists

UNIT-III

Trees: Binary Search Trees, AVL Trees, Red Black Trees, 2-3 Trees, B-Trees, Splay Trees

UNIT-IV

Text Processing: Sting Operations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem.

UNIT-V

Computational Geometry: One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, Priority Range Trees, Quadtrees, k-D Trees.

Learning Resources:

1. M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002.
2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004.
3. Thomas H. Cormen, Leiserson .C.E, Rivest.R.L , Stein.C, Introduction to Algorithm ,2nd edition(2001), MIT press, USA.
4. Horowitz E. Sahani S, Fundamentals of computer Algorithms", Galgotia publications.
5. Aho, Hopcroft, Ulman, The Design and Analysis of Computer algorithms, Pearson Education, (2000).
6. Steven S.Skiena ,The algorithm design manual, Springer (1997).
7. Hari Mohan Pandy, "Design analysis and Algorithms", University Science Press,(2009).
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/index.htm.
9. http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=IntroToAlgorithms
10. http://nptel.ac.in/courses/106101060/
11. https://www.khanacademy.org/computing/computer-science/algorithms

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 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ADVANCED DATABASES
(PROFESSIONAL ELECTIVE-I)

SYLLABUS FOR M.TECH. (CSE) – I SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks Marks:60	Course Code:**PI26PE114CS**
Credits: 3	CIE Marks : 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
	At the end of the course, students will be able to
1. Apply knowledge of advanced database management techniques to provide solution for a database intensive problem.	1. Create and query tables in object relational and object oriented databases 2. Create, query and process data in xml files 3. Describe query processing mechanisms and query optimization 4. Explain inter query, intra query parallelism and distributed database processing techniques 5. Apply performance tuning methods and describe data representation in spatial, geographical and temporal databases

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	3	2				2	2	2
CO2	3	2				2	2	2
CO3	3	2				2	2	2
CO4	3	2				2	2	2
CO5	3	2				2	2	2

UNIT-I :

Object Based Databases: Overview, Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types

in SQL, Object-Identity and Reference Types in SQL, Implementing O-R features, Persistent Programming Languages, Object-Relational Mapping, Object-Oriented versus Object-Relational.

UNIT-II :
XML: Motivation, Structure of XML data, XML Document Schema, Querying and Transformation, Application program Interfaces to XML , Storage of XML Data, XML applications.

UNIT-III :
Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions.
Query Optimization: Overview, Transformation of Relational Expressions, Estimating Statistics of Expression Results, Choice of Evaluation Plans, Materialized Views.

UNIT-IV :
Parallel Databases: Introduction, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism, Query Optimization, Design of Parallel Systems.

Distributed Databases : Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases, Cloud-Based Databases, Directory Systems.

UNIT-V :
Advanced Application Development: Performance Tuning, Performance Benchmarks, Other Issues in Application Development, Standardization.
Spatial and Temporal Data and Mobility: Motivation, Time in Databases, Spatial and Geographic Data, Multimedia Databases, Mobility and Personal Databases.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
1. Ramez Elmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.

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. 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 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ADVANCED OPERATING SYSTEMS (PROFESSIONAL ELECTIVE-II)

SYLLABUS FOR M.TECH (CSE) – I SEMESTER

L:T:P (Hrs/week):3:0:0	SEE Marks Marks:60	Course Code:**PI26PE124CS**
Credits: 3	CIE Marks : 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *At the end of the course, Students will be able* to
1. Describe different components of distributed operating system and design suitable algorithms for the better functionality of distributed operating system.	1. Explain architectures and issues in distributed operating systems 2. Illustrate different distributed mutual exclusion algorithms and distributed deadlock algorithms 3. Design distributed scheduling algorithm and describe distributed shared memory 4. Explain failure recovery, fault tolerance and apply various cryptographic algorithms for the protection of given data 5. Differentiate architectures of multiprocessor system and concurrency control algorithms

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	3	2	3	3	1	3	3	2
CO2	3	1	3	3	1	3	3	2
CO3	3	2	3	3	2	3	3	2
CO4	3	1	3	3	1	3	3	3
CO5	3	2	3	3	1	3	3	2

UNIT-I

Architectures of Distributed Systems: System Architecture Types, Distributed OS, Issues in Distributed Operating Systems.

Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical clocks, Vector Clocks, Global State, Termination Detection.

UNIT-II

Distributed Mutual Exclusion: The classification of Mutual Exclusion Algorithms, Preliminaries, Non-Token-Based Algorithms, Lamport's Algorithm, The Ricart-Agrawala Algorithm, Token-Based Algorithms Suzuki-kasami's Broadcast Algorithm, Singhal's Heuristic Algorithm.

Distributed Deadlock Detection: Resource Vs Communication Deadlocks, A graph– theoretic Model, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Control Organizations for Distributed Deadlock Detection, Centralized Deadlock-Detection Algorithms, The completely Centralized Algorithm, The Ho-Ramamoorthy Algorithms. Distributed Deadlock Detection Algorithms-APath-Pushing, Edge-Chasing, Hierarchical Deadlock Detection Algorithms, The Menasce-Muntz and Ho-Ramamoorthy Algorithm.

Agreement protocols: The System Model, The Byzantine Agreement Problem, The Consensus Problem.

UNIT-III

Distributed File Systems: Mechanisms for Building Distributed File Systems, Design Issues.

Case Studies: Sun NFS, Sprite File System, Apollo DOMAIN, Coda File systems.

Distributed Shared Memory: Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues.

Case Studies: IVY, Mirage, Clouds

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributing Algorithm, Stability, Load Distributing Algorithms, Performance Comparison.

UNIT-IV

Failure Recovery: Backward and Forward Error Recovery in Concurrent Systems, Consistent Set of Checkpoints, Synchronous And Asynchronous check Pointing and Recovery.

Fault Tolerance: Commit Protocols, Non-blocking Commit Protocols, Voting Protocols.

Resource Protection and Security: The Access Matrix Model

Data Security: Cryptography: Private Key and Public Key Cryptography

Case Study: The Kerberos System.

UNIT-V

Multiprocessor System Architectures: Motivation, Basic Multiprocessor System Architectures, Interconnection Networks for Multiprocessor Systems, Caching, Hypercube Architectures.

Multiprocessor Operating Systems: Threads, Process Synchronization, Processor Scheduling, Memory management: The Mach Operating System.

Database Operating Systems: Concurrence Control Model, Problem of Concurrency Control, Distributed Database Systems, Concurrency Control Algorithms.

Learning Resources:

1. Mukesh Singhal,Niranjan G. Shivaratri, "Advanced concepts in Operating systems", Tata McGraw Hill Edition (2001),Tata McGraw Hill Education, New Delhi.
2. Pradeep K, Sinha, Distributed Operating Systems Concepts and Design, First Edition(2002), Prentice-Hall of India, Delhi.
3. Andrew S.Tanenbaum, Distributed Operating Systems, First Edition(2011), Pearson Education India, New Delhi.
4. http://nptel.ac.in/courses/106106107/1
5. https://www.youtube.com/watch?v=2L7jnaXuOc8
6. https://people.eecs.berkeley.edu/~kubitron/cs194-24/index_lectures.html

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 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department Of Mechanical Engineering

Research Methodology and IPR

SYLLABUS FOR M.TECH. (CSE) – I SEMESTER

L:T:P (Hrs./week):2:0:0	SEE Marks Marks: 60	Course Code: **PI26AC140ME**
Credits: 2	CIE Marks : 40	Duration of SEE: 3 hours

Course Objectives	**Course Outcomes** *At the end of the course, Students will be able to*
The objectives of this course are to: 1. Learn the research methodology and formulation. 2. Know the sources of literature, method for collection of research data and report writing. 3. Understand IPR laws and Acts.	On completion of the course, the student will be able to: 1. Explain objectives of research and research process. 2. Search the relevant literature and summarize information for formulating the research problem. 3. Collect and organize the data for the preparation of research report. 4. Explain different types of intellectual property rights and related laws. 5. Understand the patent administration system.

CO-PO mapping					
CO	**PO**				
	1	**2**	**3**	**4**	**5**
CO1	3	2	3	3	1
CO2	3	1	3	3	1
CO3	3	2	3	3	2
CO4	3	1	3	3	1
CO5	3	2	3	3	1

Unit-I

Research Methodology: Meaning of research, Objectives and motivation of research, types of research, research approaches, significance of research, research methods versus methodology, criteria of good research, Research problem formulation.

Unit-I

Literature survey: Importance of literature survey, sources of information, Literature review: Need of Literature review, Plagiarism, research ethics, errors in research, Assessment of quality of journals.

Unit-III

Data collection & report preparation: Collection of primary data, secondary data, data organization, methods of data grouping, diagrammatic representation of data, graphic representation of data. Effective technical writing and how to write report, format of a research proposal, contents of a standard technical journal/conference paper, contents of dissertation.

Unit-IV

Introduction to Intellectual property law: Basics and types of intellectual property, international organizations, agencies and treaties.

Law of Trademarks: Purpose and functions of trademarks, types of Marks, acquisition of trade mark rights, protectable matter and trade mark registration process, Trade Mark Act.

Unit-V

Law of copyrights: Introduction, common law rights. Rights of reproduction, rights to display work publicly, other limitations of exclusive rights, copyright ownership issues, copy right registration and Berne convention.

Law of Patents: Administration of Indian patent system, Introduction, rights under patent law. Design patents, Plant patents. Patenting process. Patent ownership and transfer, new developments in IPR and international patent laws, Geographical Indications.

Learning Resources:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'.
2. C. R. Kothari-Research Methodology Methods and Techniques, Second revised edition, New Age International (P) limited Publishers, New Delhi.2013.
3. Ranjitkumar, Research methodology, A step-by-step Guide for Beginners, second Edition, Sage Publications India Pvt Ltd, New Delhi.2017.
4. PanneerSelvam, Research Methodology, Second Edition, PHI Learning Pvt Ltd, New Delhi.

5. Deborah E. Bouchoux -Intellectual Property, the law of trademarks, Copyrights, Patents and Trade Secrets. Fourth Edition, CENGAGE Learning India private Limited, New Delhi.2013.
6. P.Narayana, Intellectual property law, Third Edition, Eastern Law House, New 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 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

Audit Course – I: English for Research Paper Writing

SYLLABUS FOR M.TECH. (CSE) – I SEMESTER

L:T:P (Hrs./week):2:0:0	SEE Marks : 60	Course Code:**PI26AC110EH**
Credits : -	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE	COURSE OUTCOMES
This will enable the students should be able to: 1. Understand, how to improve writing skills and level of readability. 2 Learn about what to write in each section. 3 Understand the skills needed when writing a Title 4 Ensure the good quality of paper at very first-time submission	**On completion of the course, students will be able to** 1. Apply the principles of academic writing to create clear, concise, coherent, and well-structured paragraphs and documents. 2. Demonstrate ethical and effective research communication through paraphrasing, proper citation practices, and the presentation of research findings. 3. Organize and develop the major sections of a research paper, including literature review, methodology, results, discussion, and conclusions. 4. Construct impactful research paper components such as titles, abstracts, introductions, and literature reviews using appropriate academic conventions and writing strategies. 5. Prepare a complete research manuscript by effectively writing methods, results, discussions, and conclusions while ensuring quality and readiness for publication.

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

Unit 1: Foundations of Academic Writing
Planning and Preparation, Word Order, Breaking up long sentences. Structuring Paragraphs and Sentences, Being concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

Unit 2: Presenting Research Effectively
Clarifying Who Did What, Highlighting your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction

Unit 3: Structuring the Research Paper
Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

Unit 4: Crafting Impactful Research Components (Part I)
Key skills are needed when writing a Title, key skills are needed when writingan Abstract, key skillsare needed when writing an Introduction, skills neededwhen writing a Review of the Literature,useful phrases, how to ensure paper is as good as it could possibly be the first-time submission.

Unit 5: Crafting Impactful Research Components (Part II)
Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions.

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

ASSESSMENTS
- Online assignments
- Individual and Group

Learning Resources:
learn.talentsprint.com

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM Highman's book.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

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 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ADVANCED DATA STRUCTURES LAB

SYLLABUS FOR M.TECH. (CSE) – I SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks Marks:0	Course Code: **PI26PC121CS**
Credits:2	CIE Marks : 50	Duration of SEE: -----

Course Objectives	**Course Outcomes**
	At the end of the course, Students will be able to
1. Identify and apply various algorithm design strategies to solve engineering problems with efficient time and space utilization	1. Implement and use basic data structures like stack, queue, linked list to solve problems 2. Implement hashing techniques 3. Develop algorithm to do operations on special trees 4. Develop string pattern matching algorithms. 5. Implement range searching algorithms

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	2	1	3	3	1	3	2	1
CO2	2	1	3	3	1	3	2	1
CO3	3	2	3	3	1	3	3	2
CO4	3	2	3	3	2	3	3	2
CO5	3	2	3	3	2	3	3	3

List of Experiments:

1. Stack, queues and Linked list
2. Linear open addressing collision resolution Techniques
3. Chaining collision resolution Techniques
4. Double hashing
5. Skip list
6. Binary Search Tree (BST)

7. AVL Tree
8. B-trees
9. Brute-Force pattern matching algorithm
10. Boyer–Moore Pattern Matching Algorithm.
11. KMP Pattern Matching Algorithm with failure function.
12. Huffman Coding algorithm
13. One dimensional range searching algorithm
14. Two dimensional range searching algorithm
15. Priority search tree

Learning Resources:

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004.
2. Thomas H. Cormen, Leiserson .C.E, Rivest.R.L, Stein.C, Introduction to Algorithm , 2nd edition(2001), MIT press, USA.
3. M.T.Goodrich, R.Tomassia, Algorithm design – Foundations, Analysis, and Internet Algorithms, John Wiley, (2002).
4. Horowitz E. Sahani S, Fundamentals of computer Algorithms", Galgotia publications.
5. Aho, Hopcroft, Ulman, The Design and Analysis of Computer algorithms, Pearson Education, (2000).
6. Steven S.Skiena ,The algorithm design manual, Springer (1997).
7. Hari Mohan Pandy, "Design analysis and Algorithms", University Science Press,(2009).
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/index.htm.
9. http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=IntroToAlgorithms
10. http://nptel.ac.in/courses/106101060/
11. https://www.khanacademy.org/computing/computer-science/algorithms

No. of Internal Tests:	01	Max. Marks for Internal Test:	20
Marks for assessment of each experiment			30
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ADVANCED DATABASES LAB
(Professional Elective –I Lab)

SYLLABUS FOR M.TECH. (CSE) – I SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks Marks:0	Course Code: **PI26PE131CS**
Credits: 2	CIE Marks : 50	Duration of SEE: ---

Course Objectives	**Course Outcomes**
	At the end of the course, Students will be able to
1. Apply database management techniques to provide solution for a data intensive problem	1. Create and query the tables in object relational and object oriented databases 2. Create, query and process data in xml files 3. Implement sort and join operations on tables 4. Access remote data in distributed database system 5. Apply tuning methods to optimize the performance of a database

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	3	2				2	2	2
CO2	3	2				2	2	2
CO3	3	2				2	2	2
CO4	3	2				2	2	2
CO5	3	2				2	2	2

List of Experiments:

1. Creating tables and Inserting values for Retail Banking Database
2. Grouping Data, Sub Queries
3. Joins, Set operations
4. Aggregation operations.

5. Creating indexes on a table
6. Views, Clusters
7. Sequences, Object Types
8. Object views, Nested tables
9. Variable Arrays, Referencing Objects
10. Creating XML File for university database
11. Implementing External Sort-Merge algorithm
12. Implementing Nested-loop join algorithm
13. Implementing Block Nested-loop join algorithm
14. Accessing remote data

Learning Resources:

1. Ivan Bayross, SQL, PL/SQL, The Programming Language of Oracle, 4th Edition, PBP Publications.
2. AbrSilberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
3. http://nptel.ac.in/courses/106106093/

No. of Internal Tests:	01	Max. Marks for Internal Test:	20
Marks for assessment of each experiment			30
Duration of Internal Test: 2 Hours			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-26)
M.TECH. – CSE : SECOND SEMESTER AY 2026 - 27

M.TECH (CSE) II 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								
PI26PC210CS	Advanced Algorithms	3	-	-	3	60	40	3
PI26PC220CS	Artificial Intelligence and Machine Learning	3	-	-	3	60	40	3
PI26PE2XXCS	Professional Elective -III	3	-	-	3	60	40	3
PI26PE2XXCS	Open Elective	3	-	-	3	60	40	3
PI26AC210EH	Audit course-II: Pedagogy Studies	2	-	-	3	60	40	0
PRACTICALS								
PI26PC211CS	Advanced Algorithms Lab	-	-	3	-	-	50	2
PI26PC221CS	Professional Elective -III Lab	-	-	3	-	-	50	2
PI26PW219CS	Mini Project with Seminar	-	-	2	-	-	50	2
TOTAL		**14**	**-**	**8**	**-**	**300**	**350**	**18**
GRAND TOTAL		**22**				**650**		

With effect from the Academic Year 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ADVANCED ALGORITHMS

SYLLABUS FOR M.TECH. (CSE) – II SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks Marks:60	Course Code: **PI26PC210CS**
Credits: 3	CIE Marks : 40	Duration of SEE: 3 hours

Course Objectives	**Course Outcomes**
	At the end of the course, Students will be able to
1. introduce students to the advanced methods of designing and analyzing algorithms. 2. choose appropriate algorithms and use it for a specific problem. 3. understand different classes of problems concerning their computation difficulties.	1. Analyze the complexity/performance of sorting and graph algorithms 2. Apply greedy paradigm to solve problem on non linear data structure 3. Design and analyze network flow and matrix computation algorithms. 4. Design and analyze algorithms using dynamic programming approach and number theoretic algorithm to solve shortest path problem 5. Differentiate between NP-complete and NP-hard problems

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	2	2	3	3	1	3	2	1
CO2	2	1	3	3	1	3	2	1
CO3	2	2	3	3	1	3	3	2
CO4	2	2	3	3	1	3	3	3
CO5	3	2	3	2	1	2	3	2

UNIT-I

Sorting: Review of various sorting algorithms, topological sorting

Graph: BFS, DFS, shortest path in edge-weighted case (Dijkasra's), computation of strongly connected components, emphasis on correctness

proof of the algorithm and time/space analysis, example of amortized analysis.

UNIT-II

Introduction to greedy paradigm, algorithm to compute a maximum weight maximal independent set. Application of Minimum Spanning Tree. Graph Matching: Algorithm to compute maximum matching. Characterization of maximum matching by augmenting paths, Edmond's Blossom algorithm to compute augmenting path.

UNIT-III

Flow-Networks: Maxflow-mincut theorem, Ford-Fulkerson Method to compute maximum flow, Edmond-Karp maximum-flow algorithm.

Matrix Computations: Strassen's algorithm and introduction to divide and conquer paradigm, inverse of a triangular matrix, relation between the time complexities of basic matrix operations, LUP-decomposition.

UNIT-IV

Dynamic programming: Introduction to dynamic programming paradigm, examples of dynamic programming.

Modulo Representation of integers/polynomials: Chinese Remainder Theorem, Conversion between base-representation and modulo-representation. Extension to polynomials, Interpolation problem.

Fourier Transforms: Discrete Fourier Transform (DFT),Fast Fourier Transform (FFT) algorithm, Schonhage-Strassen Integer Multiplication algorithm.

UNIT- V

Linear Programming: Geometry of the feasibility region and Simplex algorithm.

NP-completeness: Proof of NP-hardness and NP-completeness. Approximation algorithms, Randomized Algorithms, Interior Point Method, Advanced Number Theoretic Algorithm

Learning Resources:

1. Thomas H. CORMEN, LEISERSON .C.E, RIVEST.R.L, STEIN.C, ”Introduction to Algorithm,2nd edition(2001), MIT press, USA.
2. Aho, Hopcroft, Ulman, The Design and Analysis of Computer algorithms,(2000) Pearson Education
3. "Algorithm Design" by Kleinberg and Tardos.
4. M.T.Goodrich, R.Tomassia, Algorithm design – Foundations, Analysis, and Internet Algorithms, John Wiley, (2002).

5. Horowitz E. Sahani S, Fundamentals of computer Algorithms, Galgotia publications.
6. Steven S.Skiena ,The algorithm design manual, Springer (1997).
7. Hari Mohan Pandy, Design analysis and Algorithms, University Science Press, (2009).
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/index.htm.
9. http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=IntroToAlgorithms
10. http://nptel.ac.in/courses/106101060/
11. https://www.khanacademy.org/computing/computer-science/algorithms

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 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

SYLLABUS FOR M.TECH. (CSE) – II SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks Marks:60	Course Code: **PI26PC220CS**
Credits: 3	CIE Marks : 40	Duration of SEE: 3 hours

COURSE OBJECTIVE	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Understand issues and techniques involved in the creation of intelligent systems	1. Choose appropriate state space searching techniques to maximize the performance 2. Develop an algorithm for playing games 3. Explain the basics machine learning. 4. Build a classification model to classify unknown data objects based on different classification and regression techniques 5. Evaluate clusters formed based on various clustering techniques and build ANN models

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	3
CO1	2	2	3	3	1	3	3	3
CO2	2	2	3	3	1	3	3	3
CO3	2	2	3	3	1	3	3	3
CO4	2	2	3	3	1	3	3	3
CO5	2	2	3	3	1	3	3	3

UNIT I:

Introduction: Intelligent Systems, Foundation of AI, Sub areas of AI, Applications.

Problem Solving – State – Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of problem, Exhaustive Searches, Heuristic Search Techniques, Iterative – Deepening A*.

UNIT II:

Problem Reduction & Game Playing: Game Playing, Bounded Look – Ahead Strategy and use of Evaluation Function, MINIMAX procedure, Alpha-Beta Pruning.

UNIT III:

Introduction to Machine Learning: Introduction, types of Human learning, types of learning, Problems not to be solved by Machine learning , applications of machine learning , Issues in machine learning,

Preparing to Model : Introduction, Machine Learning Activities, Basic Data types in machine learning , Exploring Structures of Data.

UNIT IV:

Basics of Feature Engineering: Introduction, feature transformation: feature Construction .

Supervised Learning – Classification: Introduction**,** Example of supervised learning, classification model, classification learning steps, common classification algorithms: KNN and Decision Tree, **Regression :** Introduction , Simple Linear regression.

UNIT V:

Unsupervised Learning – Introduction**,** Unsupervised vs supervised learning, Application of Unsupervised Learning , types of Clustering techniques, Partitioning methods, k-medoids.

Basics of Neural Networks: Introduction, types of activation functions, , early implementations of ANN, Architectures of Neural networks, , Learning process in ANN.

Learning Resources:

1. Saroj Kaushik, "Artificial Intelligence", Cengage Learning, 2011.
2. Russell, Norvig," Artificial Intelligence, A Modern Approach ", Pearson Education, Second Edition, 2004.
3. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, -Machine Learning, Pearson Education
4. Tom Mitchell, —Machine Learning‖, McGraw-Hill Science, First edition.
5. Christopher Bishop, —Pattern Recognition and Machine learning‖, Springer(2006).
6. http://www.nptel.ac.in/courses/106105077
7. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-spring-2005
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos

With effect from the Academic Year 2026-27

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 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OBJECT ORIENTED SOFTWARE ENGINEERING (PROFESSIONAL ELECTIVE-III)

SYLLABUS FOR M.TECH. (CSE) – II SEMESTER

L:T:P (Hrs./week):3:0:0	SEE Marks Marks:60	Course Code: **PI26PE215CS**
Credits: 3	CIE Marks : 40	Duration of SEE: 3 hours

Course Objectives	**Course Outcomes**
	At the end of the course, Students will be able to
1. construct an efficient information system using Object Oriented programming concepts	1. Define the software systems , discuss different problems in software system development and solve these problems using object oriented concepts 2. Differentiate different fact finding techniques to capture the requirements and apply different methods for requirement analysis 3. Analyze the different object oriented programming concepts and apply them in software system development 4. Apply different design patterns in software system development to solve real world problems 5. Explain different methods for database design and different reusable components for software system development

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	2		2			1		1
CO2	2	1	2			2		2
CO3	3	1	2		3	2		2
CO4	3	1	2		3	1		1
CO5	3	1	2			2		1

UNIT-I

Information System: Problems in Information System development, Project Life Cycles, Managing Information Systems Development, User Involvement and Methodological approaches, Basic Concepts and Origins of Object Orientation Modeling concepts.

UNIT-II

Requirement Capture: User requirements, Requirements capture and Modeling, Requirement Analysis, Use Case Realization, The Class Diagram, Assembling the Analysis Class Diagram Refining the Requirement Models, Component –based Development, Software Development patterns,

Object Interaction, Object Interaction and Collaboration, Interaction Sequence Diagram, Collaboration Diagram, Model Consistency

UNIT-III

Specifying Operations, The Role of Operation Specification, Contracts, Describing Operation Logic, Object Constraint Language, Creating an operation specification, Specifying Control, States and Events, Basic Notations, Further Notations, Preparing a state chart, Consistency Checking, Quality Guidelines, Design, Moving into Design , Logical and Physical design, System Design and Detail Design, Qualities and Objectives of Analysis and design, Measurable Objectives in Design, planning for Design , System Design, The Major elements of system design, Software Architecture , Concurrency, Processor Allocation, Data Management Issues, Development Standards, Design for Implementation

UNIT-IV

Object Design, Class Specification, Interfaces, Criteria for Good Design, Designing Associations, Integrity Constraints, Designing Operations, Normalization, Design patterns, Software Development Patterns, Documenting Patterns- Pattern Temples, How to use design patterns, Human Computer Interaction, The User Interface, Approaches to User Interface Design , Standards and Legal Requirements , Designing Boundary Classes, The Architecture if presentation layer, Prototyping User Interface, User Interface Design Patterns, Modeling the Interface using State charts

Testing concepts: Fault and Erroneous states and failures, Test Cases. Testing activities: Component Inspection, Usability Testing, Unit Testing, Integration Testing, system testing, Regression Testing, Model Based Testing.

UNIT-V

Data Management Design, Persistence, File Systems, Data Base Management Systems, Design RDBMS , Design ODMS, Distributed Data Bases, Designing Data Management Classes, Software Implementation, Component diagram and Deployment Diagram, Data Conversion, User Documentation and Training, Implementation Strategies, Review and Maintenance, Reusable Components, Planning a strategy for reuse, Commercial available Component ware, Managing Object Oriented Projects, Resource Allocation and Planning, Managing Iterations, Dynamic System Development Methods, Extreme Programming, Software Metrics, Process Patterns, Legacy Systems, System Development Methodologies, Method and Methodology, Participative Design Approaches, Issues in Choosing a Methodology, Hard versus Soft Methodologies.

Learning Resources:

1. Simon Benett, Steve Mc Robb & ray Farmer, Object Oriented System Analysis and Design using UML,2nd Edition (2002), McGraw Hill
2. Bernd Bruegge and Allen H. Dutoit, Object-Oriented Software Engineering: Using UML Patterns and Java, 2nd Edition(2006), Pearson Education Asia
3. Grady Booch, James Rumbaugh, Ivor Jacobson, The Unified Modeling Language-User Guide, 4th Edition(1999) ,Addison Wesley
4. Ivor Jacobson, Grady Booch, James Rumbaugh, The Unified Software Development Process, 4th Edition(1999), Addison Wesley, 1999
5. http://philip.greenspun.com/teaching/teaching-software-engineering

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 2026-27

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF COMPUTER SCIENCT & ENGINEERING

FUNDAMENTALS OF PYTHON PROGRAMMING
(OPEN ELECTIVE)
SYLLABUS FOR M.E./M.Tech. II – SEMESTER
(Common to all Branches)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **PI26OE210CS**
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 Acquire problem solving skills 2 Write programs using Python language	1. Develop Python programs with conditional statements and loops. 2. Write programs using functions, strings and lists. 3. Construct Python data structures programs using tuples, dictionaries and set. 4. Write programs using Files 5. Write programs using Class Concept .

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	1		1	1		1		2
CO2	1	1	1	1	2	1		2
CO3	1	1	1	1	2	2		2
CO4	1	1	1	1	2	2		2
CO5	1		1	1		1		2

UNIT-I:

Basics of Python Programming: Features of Python**,** variables and identifiers, operators and expressions.

Decision control Statements: Selection/Conditional branching statements, basic loop structures/iterative Statements, nested loops, break, continue, and pass Statements.

Functions and Modules: function definition, function call, more on defining functions, recursive functions, modules.

UNIT-II:

Data Structures: Strings: Introduction, built-in string methods and functions, slice operation, String Module. Regular Expressions.

Lists : Introduction, nested list, cloning lists, basic list operations, list methods. Functional programming-filter(),map(),reduce() function.

UNIT –III:

Tuples : Introduction, basic tuple operations, tuple assignment, tuples for returning multiple values, nested tuples, tuple methods and functions.

Set: Introduction, Set operations.

Dictionaries: Basic operations, sorting items, looping over dictionary, nested dictionaries, built-in dictionary functions.

UNIT-IV:

Files and Exceptions: reading and writing files, pickling, handling exceptions. Built-in and user-defined exceptions.

UNIT-V:

OOPS Concepts: Introduction, classes and object, class method and self argument, the_init_()method, class variables and object variables, public and private data members, Inheritance, Operator Overloading.

Learning Resources:

1. Reema Thareja ,"Python programming using problem solving approach ", Oxford university press.
2. Allen Downey," Think Python: How to Think Like a Computer Scientist", O'Reilly publications,2nd Edition.
3. Mark Lutz , "Learning Python", O'Reilly Publications.
4. Wesley.J.Chun, "Core Python Programming"", Prentice Hall, 2nd Edition.
5. http://www.python.org

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	5
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	5

Duration of Internal Test: 1 Hour 30 Minutes

With effect from the Academic Year 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

Audit Course – II : PEDAGOGY STUDIES

SYLLABUS FOR M.TECH. (CSE) – II SEMESTER

Common to all Branches

L:T:P(Hrs./week): 2:0:0	SEE Marks : 60	Course Code: **PI26AC210EH**
Credits : -	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to get students: 1. Understand and identify different behavioural styles and adapt training as necessary. 2. Identify the characteristics of an exceptional facilitator 3. Understand and identify different behavioural styles and adapt training as necessary. 4. Understand how to make lecture-based programs active. 5. Make effective trainer aids such as power points and learn to identify all the dependencies	**Upon the completion of this course the students will be expected to:** 1. Do a Learning Style inventory and understand theirs, and their students' learning style 2. Demonstrate successful understanding of key concepts during a practice presentation. 3. Do a need analysis and why it is a necessary step in any training program. 4. Develop strategies for different types of learners, handling hecklers, bullies, and other disruptive participants 5. Present information in a clear, concise, engaging manner.

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

From Fabulous to Fantastic -The Art and Science of Teaching the Digital Generation

Keeping information fresh and reinforcing new learning is a constant challenge for an instructor imparting knowledge to an adult. How do you choose activities that are fun but meaningful? How do you assess the level of knowledge already in the room? Is there a formula for creating a successful learning session?

This course is designed to nurture the process of learning, to facilitate sharing of field level experience and giving constructive feedback on training style and delivery. This Audit Course will teach participants how to determine the needs of an audience, improve classroom charisma, handle difficult participants, use activities effectively, and more.

Course Outline

Unit 1 - Astounding Adults: How they learn

Teaching adults calls for trustworthiness and neutrality while keeping the discussion focused. The first two sessions are about how adults learn how to help in retention and recall.

- How do adults learn
- Pedagogy and Andrago
- Malcolm Knowles theory of Andragogy
- Neuro Linguistic programming
- Kolb's learning styles
- Helping adults learn

Unit 2 - Classic Course/Class Design

This section's focus is on creating a classic course design that is tailor made for the trainee's learning style. This section also focuses on assessing the trainees' needs in class and customizes activities/direct discussions to address these needs. This section is delivered in two sessions.

- Six thinking hats and the classic course design
- Creating a beautiful body
- Opening
- Main body
- Grand finale

Unit 3 -Beating Murphy's Law

This section is designed to help trainers make effective trainer aids such as power points and learn to identify all the dependencies in advance and

have sufficient back up plans, in case there are technical issues. This section is spread over four sessions.

- Power Point
- The Rule of Three
- Anecdotes and Metaphors
- Beat Murphy's Law
- Awesome audiovisuals

Unit 4 - Dazzling Deliveries

Keeping trainees focused so they can get their desired results takes skill. Group dynamics and motivations can vary on many levels. Participants will learn how those factors affect facilitation. They will use tips shared in this session to practice re-engaging the audience through dialogue, feedback, and testing for consensus and understanding.

Training vs. facilitating vs. presenting

- Icebreakers
- Training Rainbow
- Teaching Style Tips
- Presenting and Demonstrating
- Teaching/Socratic Direction
- Facilitating discussion/brainstorming/increasing participation
- Process Monitoring

Unit 5 - Fruitful Feedback

This Unit finishes with an important but sometimes forgotten skill of how to give and receive feedback. During an activity called What Would You Say? Participants evaluate their presentations and also do a peer evaluation and create an action plan on the following areas.

- Relevance of Content
- Level of Content
- Rating of the Presenters
- Knowledge Transfer
- Most Useful Aspect of the Course
- Least Useful Aspect of the Course
- Action plan to go from Fabulous to Fantastic

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

Suggested Books

The break-up of marks for CIE:

Internal Tests (2); Quiz Tests (3) + Assignments (3)

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 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ADVANCED ALGORITHMS LAB

SYLLABUS FOR M.TECH. (CSE) – II SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : -	Course Code:**PI26PC211CS**
Credits: 2	CIE Marks : 50	Duration of SEE: -

Course Objectives	**Course Outcomes**
	At the end of the course, Students will be able to
1. Identify and apply various algorithm design strategies to solve engineering problems with efficient time and space utilization	1. Implement Sorting Algorithms 2. Apply divide-and-conquer, greedy design strategy, and dynamic programming approaches to solve problems 3. Implement network flow algorithms 4. Develop Fourier transform algorithm. 5. Implement encryption algorithms

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	1	2	3	3	1	3	2	1
CO2	2	2	3	3	1	3	2	2
CO3	2	2	3	3	1	3	3	2
CO4	2	2	3	3	1	3	3	3
CO5	2	2	3	3	1	3	3	3

List of Experiments:

1. Quick , Merge sort and topological Sort Algorithms.
2. Graph Traversal-DFS , BFS algorithms.
3. Single Source Shortest Path algorithms- Dijkstra's and Bellman-Ford.
4. Minimum Cost Spanning tree Algorithms- Prim's and Kruskal's.
5. Edmond's Blossom algorithm

6. Network Flow- Ford-Fulkerson Algorithm.
7. LUP Decomposition Algorithm
8. All-Pairs shortest paths Algorithm.
9. Matrix Chain Multiplication Algorithm.
10. Optimal Binary Search Tree (OBST) Algorithm.
11. Longest Common Subsequence (LCS) algorithm.
12. Discrete Fourier Transform algorithm
13. Fast Fourier Transform algorithm
14. Encryption algorithms-RSA and DES
15. Randomized Quick sort algorithm

Learning Resources:

1. Thomas H. Cormen, Leiserson .C.E, Rivest.R.L , Stein.C, Introduction to Algorithm ,2nd edition(2001), MIT press, USA.
2. M.T.Goodrich, R.Tomassia, Algorithm design – Foundations, Analysis, and Internet Algorithms, John Wiley, (2002).
3. Horowitz E. Sahani S, Fundamentals of computer Algorithms", Galgotia publications.
4. Aho, Hopcroft, Ulman, The Design and Analysis of Computer algorithms, Pearson Education, (2000).
5. Steven S.Skiena ,The algorithm design manual, Springer (1997).
6. Hari Mohan Pandy, " Design analysis and Algorithms", University Science Press,(2009).
7. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/index.htm.
8. http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=IntroToAlgorithms
9. http://nptel.ac.in/courses/106101060/
10. https://www.khanacademy.org/computing/computer-science/algorithms

No. of Internal Tests:	01	Max. Marks for Internal Test:	20
Marks for assessment of each experiment			30
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OBJECT ORIENTED SOFTWARE ENGINEERING LAB
(Professional Elective-III Lab)

SYLLABUS FOR M.TECH. (CSE) – II SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : -	Course Code:**PI26PC221CS**
Credits: 2	CIE Marks : 50	Duration of SEE: -

Course Objectives	**Course Outcomes**
	At the end of the course, Students will be able to
1. apply software engineering principles for analyzing, visualizing, specifying, constructing and documenting the artifacts of software intensive system	1. identify the functional and non-+functional requirements for a given s/w system 2. draw the structure chart for functional decomposition of the system 3. prepare project schedule using Gantt project and estimate the cost of the system using COCOMO-II 4. build design specifications for the s/w system using Rational Rose 5. prepare the test plan and use CVS tool to identify change management

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	2		2			1		1
CO2	2	1	2			2		2
CO3	3	1	2		3	2		2
CO4	3	1	2		3	1		1
CO5	3	1	2			2		1

Do the following for any five case studies.

1. Systems Software Requirement Specification (SRS)
2. ER Diagrams.

3. Functional module decomposition
4. Data flow diagrams at Level 0,1,2
5. project Schedule
6. product metrics
7. Cost estimation
8. Draw Use case diagram
9. Draw Class diagram
10. Draw Interaction diagrams
11. Draw Activity diagram
12. Draw Component diagram
13. Test plan
14. Configuration management
15. Risk Management

Learning Resources:

1. Simon Benett, Steve Mc Robb & ray Farmer, "Object Oriented System Analysis and Design using UML", McGraw Hill, 2002.
2. Bernd Bruegge and Allen H. Dutoit, "Object-Oriented Software Engineering: Using UML Patterns and Java", 2nd Edition, Pearson Education Asia.
3. Grady Booch, James Rumbaugh, Ivor Jacobson, "The Unified Modeling Language-User Guide", Addison Wesley, 1999.
4. Ivor Jacobson, Grady Booch, James Rumbaugh, "The Unified Software Development Process", Addison Wesley, 1999.

No. of Internal Tests:	01	Max. Marks for Internal Test:	20
Marks for assessment of each experiment			30
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2026-27

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MINI PROJECT WITH SEMINAR

SYLLABUS FOR M.TECH. (CSE) – II SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks: --	CourseCode:**PI26PW219CS**
Credits: 2	CIE Marks: 50	Duration of SEE: --

Course objectives	**Course outcomes**
	At the end of the course students will be able to
1. Develop an application in the relevant area of Computer Science 2. Learn contemporary technologies	1. Collect information through literature survey, analyze and present them 2. Understand the literature survey and identify the problem 3. Design a model to address the proposed problem 4. Develop and test the solution 5. Demonstrate the work done in the project through presentation and documentation 6. Adapt to contemporary technologies

CO-PO and CO-PSO mapping								
	PO					**PSO**		
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**
CO1	2	1					1	
CO2	2	1	1				2	
CO3	1			2		3		
CO4	2	1	1	2		3		
CO5	2	1		2	1		1	
CO6	1	1		1		3		1

The students are required to carry out mini projects in any areas such as Advanced operating systems, Advanced Databases, Artificial Intelligence,

Advanced algorithms, Data Mining, Distributed Computing Object Oriented software Engineering

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

SEMINAR

Oral presentation is an important aspect of engineering education. The objective of the seminar is to prepare the student for systematic independent study of state of the art topics in broad area of his/her specialization.

Seminar topics can be chosen by the students with the advice from the faculty members.

Students are to be exposed to following aspects of seminar presentation:

Literature survey
Organization of material
Preparation of OHP slides / PC presentation
Technical writing.

Each student is required to:

1. Submit one page of synopsis of the seminar talk two days before for display on notice board.
2. Give 20 minutes presentation through OHP, PC and slide project followed by 10 minutes discussion.
3. Submit a report on the seminar topic with a list of references and slides used within a week.

Seminars are to scheduled from the 3rd week to the last week of the semester and any change in schedule should be discouraged.

The sessional marks will be awarded to the students by at least 2 faculty members on the basis of an oral and a written presentation as well as their involvement in the discussion. Average of two presentations is considered for award of sessional marks for each student.

List of Professional Electives - Stream wise						
	AI and Data Engineering		**Systems & Networks**		**Applications**	
	Course Code	**Title**	**Course Code**	**Title**	**Course Code**	**Title**
PE-I	PI26PE110CS	Data Mining	PI26PE114CS	**Advanced Databases**	PI26PE115CS	Mobile Computing
PE-II	PI26PE120CS	Parallel Algorithms	PI26PE124CS	**Advanced Operating Systems**	PI26PE125CS	Software Quality & Testing
PE-III	PI26PE210CS	Natural Language Processing	PI26PE214CS	Parallel Computer Architecture	PI26PE215CS	**Object Oriented Software Engineering**

Semester	Actual credits
I Semester	18
II Semester	18
III Semester	16
IV Semester	16
Total credits	**68**

Audit courses and Open Electives		
S.No.	**Course Code**	**Course Title**
Audit Course – I		
1	PI26AC110EH	English for Research Paper Writing
2	PI26AC120XX	Value Education
3	PI26AC130XX	Stress Management by Yoga
4	PI26AC140XX	Sanskrit for Technical Knowledge
Audit Course –II		
1	PI26AC210EH	Pedagogy Studies
2	PI26AC220XX	Personality Development through Life Enlightenment Skills.
3	PI26AC230XX	Constitution of India
4	PI26AC240XX	Disaster Management
Open Electives		
1	PI26OE210CS	Fundamentals of Python Programming
2	PI26OE310XX	Business Analytics
3	PI26OE320XX	Industrial Safety
4	PI26OE330XX	Operations Research
5	PI26OE340XX	Cost Management of Engineering Projects
6	PI26OE350XX	Composite Materials
7	PI26OE360XX	Waste to Energy