With effect from the Academic Year 2024-25

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 (For the batch admitted in 2024-25) (R-24)

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.

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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 I	Graduates will be able to design efficient algorithms and develop solutions for real world problems.
PSO II	Graduates will possess knowledge in specialized areas of computer science and Engineering.
PSO III	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
M.TECH. – CSE : FIRST SEMESTER AY 2024 - 2025

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								
PI24PC110CS	Mathematical Foundations of Computer Science	3	-	-	3	60	40	3
PI24PC120CS	Advanced Data Structures	3	-	-	3	60	40	3
PI24PE1XXCS	Professional Elective - I	3	-	-	3	60	40	3
PI24PE1XXCS	Professional Elective - II	3	-	-	3	60	40	3
PI24AC140ME	Research Methodology and IPR	2	-	-	3	60	40	2
PI24AC110EH	Audit Course-I: English for Research Paper Writing	2	-	-	3	60	40	0
PRACTICALS								
PI24PC121CS	Advanced Data Structures Lab	-	-	4	-	-	50	2
PI24PE131CS	Advanced Databases Lab	-	-	4	-	-	50	2
	TOTAL	**16**	**-**	**8**	**-**	**360**	**340**	**18**
	GRAND TOTAL	**24**				**700**		

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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:**PI24PC110CS**
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.

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 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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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:**PI24PC120CS**
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.

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

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Department of Computer Science & Engineering

ADVANCED OPERATING SYSTEMS (PROFESSIONAL ELECTIVE-I)

SYLLABUS FOR M.TECH (CSE) – I SEMESTER

L:T:P (Hrs/week):3:0:0	SEE Marks Marks:60	Course Code:**PI24PE114CS**
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

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 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ADVANCED DATABASES
(PROFESSIONAL ELECTIVE-II)

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

L:T:P (Hrs./week): 3:0:0	SEE Marks Marks:60	Course Code:**PI24PE124CS**
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

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/

With effect from the Academic Year 2024-25

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 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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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: **PI24PC140ME**
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. Listvarious types of research and explain its significance in the relevant field. 2. review the relevant literature and summarize information for formulating the research problem. 3. generate, analyze and organize the data for the preparation of research report. 4. explain different types of intellectual property rights and its related laws. 5. discuss the patent administration system and patenting procedure.

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-II

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 2024-25

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:**PI24AC110EH**
Credits : -	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
This will enable the students should be able to: 1. Understand, how to improve your 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. write research papers 2. write citations as per the MLA style sheet and APA format 3. write concisely and clearly following the rules of simple grammar, diction and coherence.

UNIT-1

Planning and Preparation, Word Order, Breaking up long sentences. Structuring Paragraphs and Sentences, Being concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

UNIT-2

Clarifying Who Did What, Highlighting your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction

UNIT-3

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNIT-4

Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when 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

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.

Learning resources:

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

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VASAVI COLLEGE OF ENGINEERING (Autonomous)

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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: **PI24PC121CS**
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

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			

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VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

ADVANCED DATABASES LAB

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

L:T:P (Hrs./week): 3:0:0	SEE Marks Marks:0	Course Code: **PI24PE131CS**
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

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			

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION
M.TECH. – CSE : SECOND SEMESTER AY 2024 - 2025

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								
PI24PC210CS	Advanced Algorithms	3	-	-	3	60	40	3
PI24PC220CS	Data Mining	3	-	-	3	60	40	3
PI24PE2XXCS	Professional Elective -III	3	-	-	3	60	40	3
PI24OE2XXXX	Open Elective	3	-	-	3	60	40	3
PI24AC210EH	Audit course-II: Pedagogy Studies	2	-	-	3	60	40	0
PRACTICALS								
PI24PC211CS	Advanced Algorithms Lab	-	-	3	-	-	50	2
PI24PC221CS	Object Oriented Software Engineering Lab	-	-	3	-	-	50	2
PI24PW219CS	Mini Project with Seminar	-	-	2	-	-	50	2
TOTAL		**14**	**-**	**8**	**-**	**300**	**350**	**18**
GRAND TOTAL		**22**				**650**		

With effect from the Academic Year 2024-25

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: **PI24PC210CS**
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

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 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATA MINING

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

L:T:P(Hrs./week):3:0:0	SEE Marks Marks:60	Course Code: **PI24PC220CS**
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. Analyze various data mining tasks to find relevant patterns from large databases	1. Explain the steps in KDD , Identify various pre-processing techniques and Compute similarity among objects and differentiate relational & multidimensional data models 2. Build a classification model to classify unknown data objects based on different classification techniques 3. Illustrate the use of advanced classification models for prediction 4. Find associations and correlations among items by mining frequent patterns from transactional databases 5. Evaluate clusters formed based on various clustering techniques

UNIT-I

Introduction: Challenges, The Origins of Data Mining, Data Mining Tasks

Data: Types of Data, Data Quality, Data Preprocessing, Measures of Similarity and Dissimilarity, OLAP and Multidimensional Data Analysis.

UNIT-II

Classification: Preliminaries, General Approach to Solving a Classification Problem, Decision Tree Induction, Model Overfitting, Evaluating the Performance of a Classifier, Methods for Comparing Classifiers, Rule-Based Classifier.

UNIT-III

Classification: Nearest-Neighbor classifiers, Bayesian Classifiers, Artificial Neural Networks (ANN), Support Vector Machine (SVM), Ensemble Methods, Class Imbalance Problem, Multiclass Problem.

UNIT-IV

Association Analysis: Problem Definition, Frequent Itemset Generation, Rule Generation, Compact Representation of Frequent Itemsets, Alternative Methods for Generating Frequent Itemsets, FP-Growth Algorithm, Evaluation of Association Patterns, Effect of Skewed Support Distribution, Handling Categorical Attributes, Handling Continuous Attributes, Handling a Concept Hierarchy.

UNIT-V

Cluster Analysis: Overview, K-means, Agglomerative Hierarchical Clustering, DBSCAN, Cluster Evaluation, Clusters and Clustering Algorithms.

Learning Resources:

1. Pang-Ning Tan, Vipin Kumar,Michael Steinbach, "Introduction to Data Mining", (2017),Pearson Education
2. Jiawei Han & Micheline Kamber and Jain Pei ,Data Mining Concepts and Techniques , Third Edition(2011), India.
3. Margaret H Dunham, Data Mining Introductory and advanced topics , Pearson education
4. Arun K Pujari ,Data Mining Techniques, (2017) ,University Press
5. Sam Anahory , Dennis Murray ,Data Warehousing in the Real World, Pearson Education
6. Paulraj Ponnaiah, Data Warehousing Fundamentals, Wiley Student ed.
7. http://web.stanford.edu/class/cs345a/

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 2024-25

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: **PI24PE215CS**
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

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 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & 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: **PI24OE210CSE**
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.

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 2024-25

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

L:T:P(Hrs./week): 2:0:0	SEE Marks : 60	Course Code: **PI24AC210EH**
Credits : -	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to	**At the end of the course the students will be able to**
• Understand the essential pedagogical methods • Use technology to lead to enrichment of Teaching-Learning Methods • Conduct research on learning methods	• Design the Curriculum in accordance to the needs of the students, teacher beliefs, building on the pedagogical practices. • Implement Modern and Innovative Methods in the teaching-learning environment. • Utilize wide variety of techniques to conduct research and develop lesson plans, course plans for effective teaching.

Units	**Content**
1a.	**Introduction and Methodology :** ➢ Theories of learning, Curriculum, Teacher education. ➢ Conceptual framework, Research questions. ➢ Overview of methodology and Searching. ➢ Pedagogic theory and pedagogical approaches. ➢ Teachers' attitudes and beliefs and Pedagogic strategies.
b.	**Thematic overview:** ➢ Pedagogical practices that are being used by teachers. ➢ Curriculum, Teacher education. How can teacher education (curriculum and practicum) and the curriculum and guidance materials best support effective pedagogy.

2	**Research gaps and future directions** ➢ Research design- Lesson plans, Course plans ➢ Teacher education ➢ Curriculum and assessment

LEARNING RESOURCES:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2):245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

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 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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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:**PI24PC211CS**
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

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 2024-25

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

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : -	Course Code:**PI24PC221CS**
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

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 2024-25

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:**PI249PC219CS**
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

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	PI24PE110CS	Artificial Intelligence	PI24PE114CS	**Advanced Operating Systems**	PI24PE115CS	Mobile Computing
PE-II	PI24PE120CS	Parallel Algorithms	PI24PE124CS	**Advanced Databases**	PI24PE125CS	Software Quality & Testing
PE-III	PI24PE210CS	Natural Language Processing	PI24PE214CS	Parallel Computer Architecture	PI24PE215CS	**Object Oriented Software Engineering**

Semester	Actual credits
I Semester	18
II Semester	18
Total credits	**36**

Audit Courses and Open Electives		
S.No.	**Course Code**	**Course Title**
Audit Course – I		
1	PI24AC110EH	English for Research Paper Writing
2	PI24AC120XX	Value Education
3	PI24AC130XX	Stress Management by Yoga
4	PI24AC140XX	Sanskrit for Technical Knowledge
Audit Course –II		
1	PI24AC210EH	Pedagogy Studies
2	PI24AC220XX	Personality Development through Life Enlightenment Skills
3	PI24AC230XX	Constitution of India
4	PI24AC240XX	Disaster Management
Open Electives		
1	PI24OE310XX	Business Analytics
2	PI24OE320XX	Industrial Safety
3	PI24OE330XX	Operations Research
4	PI24OE340XX	Cost Management of Engineering Projects
5	PI24OE350XX	Composite Materials
6	PI24OE360XX	Waste to Energy