RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Fifth Semester:-

S. N.	Subject	Teaching Scheme			Evaluation Scheme			Credits	Category
		L	T	P	CA	UE	Total		
1	Artificial Intelligence	3	1	-	30	70	100	4	PCC-CS
2	Artificial I Intelligence-Lab	-	-	2	25	25	50	1	PCC-CS
3	Design & Analysis of Algorithms	3	1	-	30	70	100	4	PCC-CS
4	Design & Analysis of Algorithms –Lab	-	-	2	25	25	50	1	PCC-CS
	Software Engineering & Project Management	3	-	-	30	70	100	3	PCC-CS
5	Elective-I	3	-	-	30	70	100	3	PEC-CS
6	Effective Technical Communication	2	-	-	15	35	50	2	HSMC
7	Profesional Skills Lab I			2	25	25	50	1	ESC
8	Yoga and Meditation (Audit Course)	2	-	-	50	-	-	Audit	MC
	Total	**16**	02	**06**			**600**	**19**	

Elective-I: 1. TCP/IP 2. Design Patterns 3. Data Warehousing and Mining

[Mrs. B. P. Dharaskar]

Dr. S. V. Sonekar
chairman

[Ms. Mona Nichandani]

Dr. M. V. Bramhe

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Artificial Intelligence** Subject Code: **BTECH_CSE-501T**

Load [Th+Tu]	Credits [Th+Tu]	College Assessment Marks	University Evaluation	Total Marks
[36 + 12]=48 Hrs	**3+1=4**	**30**	**70**	**100**

Aim: To understand the basic principles and concepts of Artificial Intelligence.

Prerequisite(s): Student should have basic knowledge of computers and mathematics.

Course Objectives:

1	To create appreciation and understanding the achievements of AI and the theory underlying those achievements
2	To create an understanding of the basic issues of knowledge representation

Course Outcomes:

At the end of this course students are able to:

CO1	Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
CO2	Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
CO3	To create an understanding of the basic issues of knowledge representation
CO4	Formulate and solve problems with uncertain information using Bayesian approaches.
CO5	Attain the capability to represent various real life problem domains using logic based techniques and

SYLLABUS:

UNIT-I

Introduction: What is AI? History & Applications, Artificial intelligence as representation & Search, Production system, Basics of problem solving: problem representation paradigms, defining problem as a state space representation, Characteristics.

UNIT-II

Search Techniques: Uninformed Search techniques, Informed Heuristic Based Search, Generate and test, Hill-climbing, Best-First Search, Problem Reduction, and Constraint Satisfaction.

UNIT-III

Knowledge representation: Knowledge representation Issues: First order logic, Predicate Logic, Structured Knowledge Representation: Backward Chaining, Backward Chaining, Resolution,Semantic Nets, Frames, and Scripts, Ontology.

UNIT-IV

Uncertainty: Handing uncertain knowledge, rational decisions, basics of probability, axioms of probability, Baye's Rule and conditional independence, Bayesian networks, Exact and Approximate inference in Bayesian Networks, Fuzzy Logic.

Intelligent Agents: Introduction to Intelligent Agents, Rational Agent, their structure, reflex, model-based, goal-based, and utility-based agents, behavior and environment in which a particular agent operates.

UNIT-V

Learning: What is learning?, Knowledge and learning, Learning in Problem Solving, Learning from example, learning probabilistic models

Expert Systems: Fundamental blocks, Knowledge Engineering, Knowledge Acquisition, Knowledge Based Systems, Basic understanding of Natural language

Text Books:

1. E.Rich and K. Knight, Artificial Intelligence, Tata McGraw Hill, 2008.
2. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 3rd edition, Pearson Education, 2015.
3. Artificial intelligence and soft computing for beginners by Anandita Das Bhattachargee, Shroff Publishers
4. Artificial Intelligence – A Practical Approach : Patterson , Tata McGraw Hill, 3rd Edition

Reference Books:

1. Introduction to Artificial Intelligence – Charniak (Pearson Education)

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Artificial Intelligence LAB 501P**

Subject Code: **BTECH_CSE-**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
2 Hrs/Week	**1**	**25**	**25**	**50**

Aim: This lab is aimed to provide students a complete insight of the implementation of different Artificial Intelligence algorithms.

Course Objectives:

1	To create appreciation and understanding the achievements of AI and the theory underlying those achievements
2	To create an understanding of the basic issues of knowledge representation

Course Outcomes:

Expected experiments to be performed (Not limited to):

Using the Python Libraries for Artificial Intelligence

1. **AIMA-Python**
2. **PyDatalog**
3. **Simple**
4. **Easy**

Write programs based on the following:

1. Graph search algorithms
2. Adversarial search
3. Knowledge representation
4. Logical inference
5. Probability theory
6. Bayesian networks
7. Markov models
8. Constraint satisfaction
9. Machine learning
10. Reinforcement learning
11. Neural networks
12. Natural language processing

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Design and Analysis of Algorithms** Subject Code: **BTECH_CSE-502T**

Load [Th+Tu]	Credits [Th+Tu]	College Assessment Marks	University Evaluation	Total Marks
[36 + 12]=48 Hrs	**3+1=4**	**30**	**70**	**100**

Course Objectives:

1	Analyze the asymptotic performance of algorithm
2	Apply important algorithmic design paradigms and methods of analysis
3	Solve simple to moderately difficult algorithmic problems arising in applications.
4	Able to demonstrate the hardness of simple NP-complete problems

Course Outcome:

At the end of this course students are able to:

CO1	Illustrate different approaches for analysis and design of efficient algorithms and Analyze performance of various algorithms using asymptotic notations.
CO2	Determine and Apply various divide & conquer strategies and greedy approaches for solving a given computational problem
CO3	Demonstrate and Solve various realtime problems using the concepts of dynamic programming
CO4	Make use of backtracking and graph traversal techniques for solving real-world problems
CO5	Recall and Classify the NP-hard and NP-complete problems

SYLLABUS:

UNIT-I

Definition of algorithms and brief explanation about the basic properties of algorithms Recurrence relations, solutions of recurrence relations using technique of characteristic equation, master theorem ,Asymptotic notations of analysis of algorithms, worst case, average case and best case analysis of insertion sort, selection sort and bubble sort, amortized analysis, application of amortized analysis, Biotonic sorting network.

UNIT-II

Divide and conquer strategies: Binary search, quick sort, merge sort, heap sort, Stressen's matrix multiplication algorithm, min-max algorithm.

Greedy Approach: Application to job sequencing with deadlines problem, knapsack problem, optimal merge pattern, Huffman code.

UNIT-III

Dynamic Programming: Basic Strategy, Multistage graph (forward and backward approach), Longest Common Subsequence, matrix chain multiplication, Optimal Binary Search Tree, 0/1 Knapsack problems, Travelling Salesman problem, single source shortest path using Bellman-Ford algorithm, all pair shortest path using Floyd- Warshall algorithm.

UNIT-IV

Basic Traversal and Search Techniques: Breadth first search and depth first search, connected components.

Backtracking: Basic strategy, N-Queen Problem and their Analysis (4 & 8-Queen), graph coloring, Hamiltonian cycles .

UNIT-V

NP-Hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP Hard and
NP-complete, Cook's theorem, decision and optimization problems, graph based problems on NP Principle.

Text Books:-

1. "Introduction to Algorithms", Thirs Edition, Prentice Hall of India by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein
2. The Design and Analysis of Computer Algorithms", Pearson education by Alfred V. Aho, John E. Hopcraft, Jeffrey D. Ullman.
3. "Fundamentals of Computer Algorithms", Second Edition, University Press By Horowitz, Sahani, Rajsekharam
4. Fundamentals of Algorithms", Prentice Hall by Brassard, Bratley
5. "Design and Analysis of Algorithms",Pearson Education, II nd Edition, Parag Dave, Himanshu Dave

Reference Books:

1. Computer Algorithms: Introduction to Design and analysis, 3rd Edition, By Sara Baase and Gelder Pearson Education.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Design and Analysis of Algorithms LAB** Subject Code: **BTECH_CSE-502P**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
2Hrs /Week (Practical)	1	25	25	50

Course Objectives:

1	To learn the importance of designing an algorithm in an effective way by considering space and time complexity
2	To learn graph search algorithms.
3	To study network flow and linear programming problems
4	To learn the dynamic programming design techniques.
5	To develop recursive backtracking algorithms.

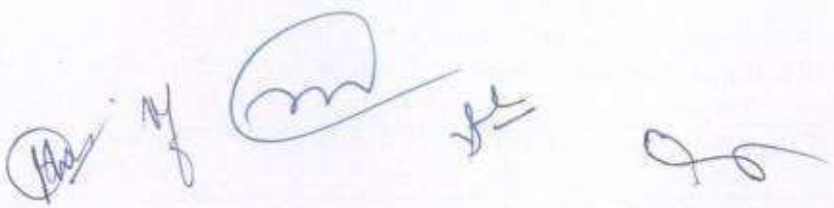
Course Outcome:

At the end of this course students will be able to:

CO1	Calculate the time complexity of algorithm.
CO2	Sort the given numbers using various sorting algorithms.
CO3	Develop programs for the problems using Divide and Conquer and greedy methods.
CO4	Develop programs for the problems using Dynamic programming.
CO5	Students will be able to write programs for the problems using Backtracking.

Expected experiments to be performed (Not limited to):

1. To find Time complexity of an algorithm.
2. To find Space complexity of an algorithm.
3. To find HCF and LCM of two numbers
4. Code and analyses to find median element in an array of integers.
5. Code and analyse to find majority element in an array of integers.
6. Code and analyse to sort an array of integers using merge sort
7. Code and analyse to sort an array of integers using quick sort
8. To implement maximum and minimum problem using divide and conquer strategy
9. To implement binary search using divide and conquer strategy
10. To implement program of Heap Sort.
11. WAP of minimum spanning tree using Kruskal algorithm.
12. WAP of minimum spanning tree using Prim's algorithm.
13. WAP to implement matrix chain multiplication
14. Code to find the shortest path in graph using Dijkstra's algorithm.
15. Code to find the shortest path using Bellman-Ford algorithm.
16. To implement LCS problem using Dynamic Programming.
17. To implement matrix chain multiplication problem using dynamic programming.
18. Code and analyze to find the minimum spanning tree in a weighted, undirected graph.
19. Code and analyze to find all occurrences of a pattern P in a given string S.
20. Code and analyze to do a depth-first search (DFS) on an undirected graph. Implementing an application of DFS such as:
    (i) to find the topological sort of a directed acyclic graph.
    (ii) to find a path from source to goal in a maze.
21. Code and analyze to do a breadth-first search (BFS) on an undirected graph. Implementing an application of BFS such as
    (i) to find connected components of an undirected graph.
    (ii) to check whether a given graph is bipartite.



RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Software Engineering and Project Management** Subject Code: **BTECH_CSE-503T**

Load	Lecture	Tutorial	Credits	College Assessment Marks	University Evaluation	Total Marks
36 Hrs	**3**	**-**	**3**	**30**	**70**	**100**

Course Objectives:

1	To understand general idea of software engineering
2	To develop skills to design various software process models
3	To develop skills required for software testing and various risk strategies

Course Outcomes:
At the end of this course students are able to:

CO1	Understand software engineering methods, practices, process models and application.
CO2	Analyse various software engineering life cycle models and apply methods for design and development of software projects.
CO3	Analyze and extract requirements for product and translate these into a documented design using different modeling techniques.
CO4	Understand and apply software testing methods and types, And to understand debugging concept with various testing methods.
CO5	Identify and apply the principles, processes and main knowledge areas for Software Projec Management

SYLLABUS:

UNIT-I

Basics: Introduction to Software Engineering, Software Myths, Software Engineering-A Layered Technology. Software Process Models: The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Agile Process Models

UNIT-II

Measures Metrics and Indicator, Metrics for process & projects: Software measurement, metrics for software quality.

System Engineering: Hierarchy, Business Process Engineering, Product Engineering, System Modeling, Requirements Engineering: Requirements Analysis, Analysis

Modeling Approaches, Data Modeling, Object-Oriented Analysis, Scenario-Based Modeling, Flow-Oriented Modeling, Class-based Modeling, Behavioral Model

UNIT-III

Design Engineering Concepts, Design Model, Pattern-Based Software Design,

Architectural Design, Mapping data flow into software architecture, Cohesion, Coupling, User interface analysis and Design.

UNIT-IV

Debugging, Software Testing Fundamentals, Black-Box Testing, White-Box Testing, Metrics for Source Code

Risk Management: Risk strategies, Software risks, Risk identification, Risk refinement, RMMM

UNIT-V

Quality Management: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Review, Software Reliability, Change Management: Software Configuration Management, SCM Repository, SCM Process, Reengineering: Software reengineering, Reverse Engineering, Restructuring, Forward Engineering

Text Books:

1. Software Engineering-A Practitioner's Approach (Sixth Edition) by Roger Pressman (TMH)
2. Software Engineering (Ninth Edition)-Ian Summerville (Pearson)
3. Software Engineering for students (4th Edition)- Douglas Bell(Pearson)

Reference Books:

1. Schaum's Outline of Theory and Problems of Software Engineering by David Gustafson (TMH)
2. Software Engineering (Third Edition) by K. K. Aggarwal and Yogesh Singh (New age International Publishers)
3. Software Engineering, Theory and Practice(4th Edition)- Pfleeger, Atlee(Pearson)

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Elective 1: TCP/IP** Subject Code: **BTECH_CSE-504.1T**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
36 Hrs.	3	30	70	100

Aim: The aim of the course is to provide students with an overview of the field of Internet technologies.

Prerequisite(s): Data Communication, Computer Networks

Course Objectives:

1	To, Create a comprehension of fundamental TCP / IP concepts, and how they function.
2	To, Build understanding of and functionality of TCP / IP protocol set.
3	To, Understand and evaluate various TCP / IP Interface protocols.
4	To, Introduce the student to basic definition of networking and train the students for advanced computer networking courses.

Course Outcomes:

At the end of this course Student are able to:

CO1	Enumerate the layers of the TCP/IP model.
CO2	Analyze the services of TCP/IP protocol and be able to deal with its layers. Also the concepts of IP addressing
CO3	Acquire the knowledge of routing protocols
CO4	Familiarize stuednts with the basic computer network protocols, and how they can be used to help develop and execute networks.
CO5	Generate the solution for basic issues of Internet Mechanism and its security.

SYLLABUS:

Unit I:

Networking Basics, TCP/IP Model, Router, Broadband router, Internet, NAP, ISPs, RFCs and Internet Standards.

Unit II:

IP addressig, Classful and Classless Internet address, CIDR-Subnetting and Supernetting, VLSM , IP Datagram,IP protocol. ARP, RARP, BOOTP, DHCP, VRRC vs HSRP.
IP Routing & Packet Forwarding, RIP, OSPF, EIGRP, ICMP, IGMP.

Unit III:

Protocol-Independent Multicast (PIM), Optical Time-Domain Reflectometer (OTDR).
TCP header, Services, Connection establishment and termination, Interactive data flow, Bulk data flow, Flow control and Retransmission, TCP Timers, Urgent Data processing, Congestion control, Extension headers.

Unit IV:

Switching technology, MPLS fundamentals, signaling protocols, **Carrier Ethernet**, LDP, IP traffic engineering, ECMP, SBR, Routing extensions for traffic engineering, Traffic engineering limitations and future developments.

Unit V:

IP security protocol, IPv6 addresses, Packet format, Multicast, Anycast, ICMPv6, Interoperation between IPv4 and IPv6-QoS, Auto configuration, Stateless address auto configuration (SLAAC), ACL.

Text books:

- TCP/IP Network Administration, Craig Haut, 3rd Edition, Shroff Publications, 2002.
- Internetworking with TCP/IP - Principles, Protocols, and Architecture, Douglas E. Comer, 5th edition Volume-1, Prentice Hall, 2006.
- The Internet and its Protocols- A Comparative approach, Adrian Farrel, Morgan Kaufmann, 2004
- TCP/IP Illustrated - The Protocols, W. Richard Stevens, Volume-1, Pearson Education, 2003.
- TCP/IP Protocol Suite, Behrouz A. Forouzan, 3rd Edition, Tata McGraw Hill, 2006.

Reference books:

- IPv6 Theory, Protocol and Practice, 2nd Edition By, Morgan Kaufmann, 2003.
- Internetworking TCP/IP, Comer D.E and Stevens D.L, Volume 1, 4th Edition, Prentice Hall.
- CCNA Cisco Certified Network Associate Study Guide, 7th Edition by Todd Lammle.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Elective 1: Design Patterns** Subject Code: **BTECH_CSE-504.2T**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
36 Hrs.(Theory)	**3**	**30**	**70**	**100**

Aim: A design pattern offers a general comprehensive framework to particular challenges in software design to speed up the production process by offering a well-tested, validated development/design model.

Prerequisite(s): Intermediate knowledge of Object Oriented programming.

Course Objectives:

1	Understand the concept of Design patterns and its importance.
2	Be capable of applying knowledge to create an architecture for given application.
3	Apply the suitable design patterns to refine the basic design for given context.
4	Get perspectives that help render own design pattern more flexible, versatile, reusable and understandable.

Course Outcomes:

At the end of this course Student are able to:

CO1	Understand common design patterns in the context of incremental/iterative development.
CO2	Exploit well-known Creational design patterns.
CO3	Distinguish between different types of structural design patterns..
CO4	Remember the appropriate design patterns, purpose and methods and use of Behavioural Design Pattern to solve object oriented design problems.
CO5	Demonstrate an understanding of Behavioural and other useful design patterns.

SYLLABUS:

Unit I:

Introduction to Design Patterns: Software design principles, Object oriented design principles, Overview of design pattern, benefits of design patterns, Description of design patterns, Catalog and organization of catalog, design patterns to solve design problems, selection of design pattern, Use of design patterns.

Unit II:

Creational Patterns: Abstract Factory, Builder, Factory Method, prototype, Singleton, Creational Patterns.

Unit III:

Structural Pattern: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy, Discussion of Structural Patterns.

Unit IV:

Behavioral Patterns Part I: Chain of Responsibility, Command, Interpreter, Iterator Mediator, Memento, Observer, Discussion of Behavioral Patterns.

Unit V:

Behavioral Patterns Part III: State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns. Expectations from Design Patterns.

Other useful Design Patterns: Model View Controller, Data Access Object and Transfer Object Design Pattern.

Text books:

1. Head First Design Patterns, by Eric Freeman and Elisabeth Freeman, Oreilly Media.
2. Design Patterns Elements of Reusable Object Oriented Software, by Erich Gamma, Addison-Wesley.
3. Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, by Craig Larman, 3rd Edition, Pearson.

Reference books:

1. Pattern-Oriented Software Architecture: A System of Pattern by Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal, John Wiley & Sons, 1996.
2. Design Patterns Explained: A New Perspective on Object Oriented Design by Alan Shalloway and James Trott, 2nd edition, Addison-Wesley.
3. Introduction to design Patterns in C++ with Qt by Alan Ezust, Paul Ezust, Prentice Hall, 2011.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Elective 1: Data Warehousing and Mining** Subject Code: **BTECH_CSE-504.3T**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
36 Hrs.(Theory)	**3**	**30**	**70**	**100**

Aim: To understand the overall architecture of a data warehouse and methods for data gathering and data pre-processing. The different data mining models and techniques will be discussed in this course.

Prerequisite(s): Intermediate knowledge of Object Oriented programming.

Course Objectives:

1	To understand the basic concepts of Data Warehouse and Data Mining techniques.
2	Capable to create a data warehouse and to process raw data .
3	Able to apply basic classification, clustering on a set of data.
4	Able to identify frequent data items and to apply association rule on a set of data.
5	To learn recent trends of data mining such as web mining.

Course Outcomes:

At the end of this course Student are able to:

CO1	To understand the basic concepts of Data Warehouse and Data Mining techniques.
CO2	Capable to create a data warehouse and to process raw data .
CO3	Able to apply basic classification, clustering on a set of data.
CO4	Able to identify frequent data items and to apply association rule on a set of data.
CO5	To learn recent trends of data mining such as web mining.

SYLLABUS:

UNIT I

Introduction: Characteristics, Operational database systems and data warehouse (OLTP & OLAP), Multidimensional data models, Data warehouse architecture, OLAP Operations, Design and construction of data warehouses.

UNIT II

Fundamentals of data mining:Data mining functionalities, Classification of data mining systems, Data mining task primitives, Major issues and challenges in data mining, Data preprocessing- need for processing, data cleaning, integration, transformation, data reduction, data mining application areas.

UNIT III

Classification: Introduction, Decision tree, Building decision tree- tree induction algorithm, Split algorithm based on information theory, Split algorithm based on gini index, Decision tree rules, Naive based methods.

Clustering: Cluster analysis, Desired features, Types of data in cluster analysis, Computing distance. Categorizations of major clustering methods – Partitioning methods (K-means, EM), Hierarchical methods (agglomerative, divisive).

UNIT IV

Mining frequent patterns and Association Rules: Market basket analysis, Frequent item sets and association rules, Apriori algorithm, FP growth algorithm, Improving efficiency of Apriori and FP growth algorithms.

UNIT V

Web Data Mining: Introduction, Graph properties of web, Web content mining, Web structure mining, Web usage mining, Text mining, Visual web data mining, Temporal and Spatial data mining.

TEXT BOOKS:

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.
2. A. K. Pujari, "Data Mining Techniques", Second Edition, University press, 2013.
3. Jason Bell, "Machine Learning for Big Data: Hands-on for Developers and Technical Professionals, Wiley India Publications, 2013.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Professional Skills Lab I** Subject Code: **BTECH_CSE-505P**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
2 Hrs/Week	**1**	**25**	**25**	**50**

Aim: The aim of this lab is to develop an ability to design and implement static and dynamic websites.

Prerequisite(s): Internet Programming ,Fundamental of Computing and Programming

Course Objectives:

1	To understand the basic concepts of Web designing
2	Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
3	Have a Good grounding of Web Application Terminologies, Internet Tools, E–Commerce and other web services.

Course Outcomes:

At the end of this course Student are able to:

CO1	List various tags in HTML , DHTML and use these, apply Cascaded style sheet to create web page.
CO2	Understand and evaluate web application architecture, technologies and frameworks
CO3	Apply the knowledge of web technology in developing web applications
CO4	Develop an interactive web applications using ASP.NET.
CO5	Evaluate different solutions in field of web application development

Expected experiments to be performed (Not limited to):

- **Client Side Scripting / Coding -**
  1. HTML (HyperText Markup Language)
  2. CSS (Cascading Style Sheets)
  3. JavaScript
  4. Ajax (Asynchronous JavaScript and XML)
  5. jQuery (JavaScript Framework Library - commonly used in Ajax development)
  6. MooTools (JavaScript Framework Library - commonly used in Ajax development)
  7. Dojo Toolkit (JavaScript Framework Library - commonly used in Ajax development)

- **Server Side Scripting / Coding -**
  1. PHP (very common Server Side Scripting language - Linux / Unix based Open Source - free redistribution, usually combines with MySQL database)
  2. Zend Framework (PHP's Object Oriented Web Application Framework)
  3. ASP (Microsoft Web Server (IIS) Scripting language)
  4. ASP.NET (Microsoft's Web Application Framework - successor of ASP)
  5. ColdFusion (Adobe's Web Application Framework)
  6. Ruby on Rails (Ruby programming's Web Application Framework - free redistribution)
  7. Perl (general purpose high-level programming language and Server Side Scripting Language - free redistribution - lost its popularity to PHP)
  8. Python (general purpose high-level programming language and Server Side Scripting language - free redistribution)

- **Use of Program Libraries and Web Application Frameworks**

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR

FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE

SEMESTER: V (C.B.C.S.)

BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Effective Technical Communication** Subject Code: **BTECH_CSE-506T**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
2 Hrs/Week	**2**	**15**	**35**	**50**

Course Objective: At the end of the semester, students will have enough confidence to face competitive examinations (IELTES/ TOEFL/CAT/ MAT/ XAT/SNAP/GMAT/GATE etc.) to pursue masters degree. They will also acquire language skills required to write their Reviews/Projects/Reports. They will be able to organize their thoughts in English and hence face job interviews more confidently.

Course Outcomes: After completing the course, students will

1. Acquire knowledge of structure of language.
2. Be able to face competitive exams and the interview process and can become employable.
3. Develop business writing skills.
4. Become familiar with technology enabled communication and can develop technical and scientific writing skills.

Unit 1. Functional Grammar:
Common errors, Transformation of Sentences- Change the Voice, Change the Narration, Simple, Compound Complex sentences, Use of Phrases, Idioms & Proverbs.

Unit II. English for Competitive Exams & Interview Techniques:
Word building, **English** words /phrases derived from otherlanguages, Prefixes and Suffixes, Synonyms/Antonyms, Technical Jargons, Verbal Analogies, Give one word for, Types & Techniques of Interview.

Unit III. Formal Correspondence
Business Letters, (Enquiry, Quotation, Order, Complaint), Job applications and ResumeWriting, e-mail etiquette, Writing Memorandum, Circulars, notices, Analytical comprehension

Unit IV. Technical & Scientific Writing:
Features of Technical Writing, Technical Report writing (Accident, Feasibility, Trouble, Progress), Writing Scientific Projects, Writing Manuals,Writing Project Proposals, Writing Research papers.

Reference Books:

1. Effective technical Communication by Barun K. Mitra, Oxford University Press,
2. *Technical Communication-Principles and Practice* by Meenakshi Raman & Sharma, Oxford UniversityPress, 2011,
3. *Functional English for Technical Students* by Dr. Pratibha Mahato and Dr. Dora Thompson, Himalaya Publishing House
4. *How to Prepare a Research Proposal*: Guidelines for Funding and Dissertations in the Social andBehavioral Sciences by Krathwohl & R David

5. *Technical Writing- Process and Product* by Sharon J. Gerson & Steven M. Gerson, 3rd edition, Pearson Education Asia, 2000
6. *Developing Communication* skills by Krishna Mohan & Meera Banerjee

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Audit Course:** Yoga & Meditation Subject Code: **BTECH_CSE-507T**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
2 Hrs/Week	-	**50 (Grade)**	-	**Grade**

Aim:

The purpose of this course is to learn the specific skills and/or the techniques of the activity. By actively participating in an activity class, the student may gain health benefits such as improved body composition, increased flexibility, increased muscular endurance and increased muscular strength. Participating in activity classes leads to a healthier lifestyle.

Course Objectives:

1. Learn the rules, fundamentals, skills & strategies of yoga.
2. Teach various asanas (postures) using hatha yoga & the Iyengar method.
3. Learn breathing techniques.
4. Improve strength, flexibility and the sense of well-being.
5. Increase relaxation of body and soul.

Instructional Methodology:

This class is an activity and participation course; the specific task/exercise(s) for students to complete will be demonstrated. Students will then complete the task/exercise(s) to the best of their ability.

Curriculum:

1. Two: Basic yoga asanas, breathing techniques and relaxation exercises.
2. Continuation of learning asanas, breathing techniques, and relaxation exercises.
3. Instructions for final yoga routine will be distributed to students.
4. Continuation of learning more advanced asanas, breathing techniques, relaxation exercises and meditation.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech.) DEGREE COURSE
SEMESTER: V (C.B.C.S.)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: **Audit Course:** Yoga & Meditation Subject Code: **BTECH_CSE-507T**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
2 Hrs/Week	-	**50 (Grade)**	-	**Grade**

Aim:

The purpose of this course is to learn the specific skills and/or the techniques of the activity. By actively participating in an activity class, the student may gain health benefits such as improved body composition, increased flexibility, increased muscular endurance and increased muscular strength. Participating in activity classes leads to a healthier lifestyle.

Course Objectives:

1. Learn the rules, fundamentals, skills & strategies of yoga.
2. Teach various asanas (postures) using hatha yoga & the Iyengar method.
3. Learn breathing techniques.
4. Improve strength, flexibility and the sense of well-being.
5. Increase relaxation of body and soul.

Instructional Methodology:

This class is an activity and participation course; the specific task/exercise(s) for students to complete will be demonstrated. Students will then complete the task/exercise(s) to the best of their ability.

Curriculum:

1. Two: Basic yoga asanas, breathing techniques and relaxation exercises.
2. Continuation of learning asanas, breathing techniques, and relaxation exercises.
3. Instructions for final yoga routine will be distributed to students.
4. Continuation of learning more advanced asanas, breathing techniques, relaxation exercises and meditation.