USHARAMA

COLLEGE OF ENGINEERING AND TECHNOLOGY

**(AUTONOMOUS)**

(Approved by A.I.C.T.E & Permanently Affiliated to JNTU, Kakinada)
Accredited by NAAC with "A" Grade
on NH 16, Telaprolu, Krishna Dist – 521109

# M.Tech
# Computer Science and Engineering
# Course Structure & Syllabus

**(Applicable for the batches admitted from the Academic Year 2019-20)**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

## M.Tech: I Semester

| S.No | Course Category | Course Code | Course Title | L | T | P | Contact Hrs/Wk | Credits |
|---|---|---|---|---|---|---|---|---|
| 1 | PCC | UR19PCMCS101 | Advanced Data Structures And Algorithm Analysis | 3 | 0 | 0 | 3 | 3 |
| 2 | PCC | UR19PCMCS102 | Mathematical Foundations of Computer Science | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR19PCMCS103 | IoT Applications and Communication Protocols | 3 | 0 | 0 | 3 | 3 |
| 4 | PCC | UR19PCMCS104 | Distributed Databases | 3 | 0 | 0 | 3 | 3 |
| 5 | PCC | UR19PCMCS105 | Advanced Operating Systems | 3 | 0 | 0 | 3 | 3 |
| 6 | PCC | UR19PCMCS106 | Data Ware Housing And Data Mining | 3 | 0 | 0 | 3 | 3 |
| 7 | PCC | UR19PCMCSL101 | CSE LAB-1 | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PROJ | UR19PROJMCS101 | Seminar – I | 0 | 2 | 0 | 2 | 2 |
| 9 | AD | | **Audit Course – I*** | 0 | 0 | 0 | 0 | 0 |
| | | UR19ADMCS101 | English for Research Paper Writing | | | | | |
| | | UR19ADMCS102 | Value Education | | | | | |
| **Total** | | | | 18 | 2 | 3 | 23 | 21.5 |
| ***Internal Evaluation – Self Learning Course** | | | | | | | | |

## M.Tech : II Semester

| S.No | Course Category | Course Code | Course Title | L | T | P | Contact Hrs/Wk | Credits |
|---|---|---|---|---|---|---|---|---|
| 1 | PCC | UR19PCMCS201 | Cyber Security | 3 | 0 | 0 | 3 | 3 |
| 2 | PCC | UR19PCMCS202 | Big Data Analytics | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR19PCMCS203 | Advanced Unix Programming | 3 | 0 | 0 | 3 | 3 |
| 4 | PCC | UR19PCMCS204 | Semantic Web & Social Networks | 3 | 0 | 0 | 3 | 3 |
| 5 | PEC | | **Program Elective – I** | 3 | 0 | 0 | 3 | 3 |
| | | UR19PEMCS201 | Software Engineering | | | | | |
| | | UR19PEMCS202 | Artificial Intelligence | | | | | |
| | | UR19PEMCS203 | Scripting Languages | | | | | |
| | | UR19PEMCS204 | Machine Learning | | | | | |
| 6 | PEC | | **Program Elective – II** | 3 | 0 | 0 | 3 | 0 |
| | | UR19PEMCS205 | Image Processing | | | | | |
| | | UR19PEMCS206 | parallel Algorithm | | | | | |
| | | UR19MCSPE207 | Cloud Computing | | | | | |
| | | UR19PEMCS208 | Natural Language Processing | | | | | |
| 7 | PCC | UR19PCMCSL201 | CSE LAB-II | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PROJ | UR19PROJMCS201 | Seminar – II | 0 | 2 | 0 | 2 | 2 |
| | | | **Audit Course – II*** | 0 | 0 | 0 | 0 | 0 |
| 9 | AD | UR19ADMCS201 | Disaster Management | | | | | |
| | | UR19ADMCS202 | Pedagogy Studies | | | | | |
| **Total** | | | | **18** | **2** | **3** | **23** | **21.5** |
| ***Internal Evaluation – Self Learning Course** | | | | | | | | |

## M.Tech III Semester

| S.No | Course Category | Course Code | Course Title | L | T | P | Contact Hrs./wk. | Credits |
|---|---|---|---|---|---|---|---|---|
| 1 | PROJ | UR19PROJMCS301 | Project Work Phase-I | 0 | 0 | 20 | 20 | 10 |
| **Total** | | | | **0** | **0** | **20** | **20** | **10** |

## M.Tech IV Semester

| S.No | Course Category | Course Code | Course Title | L | T | P | Contact Hrs./wk. | Credits |
|---|---|---|---|---|---|---|---|---|
| 1 | PROJ | UR19PROJMCS401 | Project Work Phase-II | 0 | 0 | 30 | 30 | 15 |
| **Total** | | | | **0** | **0** | **30** | **30** | **15** |

**Total Credits = 21.5 + 21.5 + 10 + 15 = 68**

**M.Tech. I Semester** **COURSE CODE: UR19PCMCS101**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

## ADVANCED DATA STRUCTURES AND ALGORITHM ANALYSIS

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. Understand the role of key preprocessing algorithms in hashed data structures.
2. Distinguishes various graph algorithms and techniques for finding minimum path.
3. Generalize the binomial heap and binary heap using special tree structures by combining each other.
4. Understand the mapping of real-world problems to algorithmic solutions.

**UNIT- I:**
Introduction to Data Structures, Singly Linked Lists, Doubly Linked Lists, Circular Lists-Algorithms. Stacks and Queues: Algorithm Implementation using Linked Lists.

**UNIT-II:**
Searching-Linear and Binary Search Methods. Sorting-Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort. Trees- Binary trees, Properties, Representation and Traversals (DFT, BFT), Expression Trees(Infix,prefix,postfix).Graphs-Basic Concepts , Storage Structures and Traversals.

**UNIT- III:**
Dictionaries, ADT, The List ADT, Stack ADT, Queue ADT, Hash Table Representation, Hash Functions, Collision Resolution-Separate Chaining, Open Addressing-Linear Probing, Double Hashing.

**UNIT- IV:**
Priority queues- Definition, ADT, Realizing a Priority Queue Using Heaps, Definition, Insertion, Deletion .Search Trees- Binary Search Trees, Definition, ADT, Implementation, Operations-Searching, Insertion, Deletion.

**UNIT –V:**
Search Trees- AVL Trees, Definition, Height of AVL Tree, Operations, Insertion, Deletion and Searching. Search Trees- Introduction to Red-Black and Splay Trees, B-Trees, Height of B-Tree, Insertion, Deletion and Searching, Comparison of Search Trees.

**TEXT BOOKS:**

1. Data Structures: A Pseudocode Approach, 2/e, Richard F.Gilberg, Behrouz A. Forouzon, Cengage.
2. Data Structures, Algorithms and Applications in java, 2/e, Sartaj Sahni, University Press.

**REFERENCE BOOKS:**

1. Data Structures And Algorithm Analysis, 2/e, Mark Allen Weiss, Pearson.
2. Data Structures And Algorithms, 3/e, Adam Drozdek, Cengage.
3. C and Data Structures: A Snap Shot Oriented Treatise Using Live Engineering Examples, N.B.Venkateswarulu, E.V.Prasad, S Chand & Co,2009.

**Course Outcomes:**

At the end of the course, the student will be able to

1. Implementation of hash tables, including collision avoidance and resolution schemes.
2. Analyze how to balance a binary search tree using rotation methods and color changing methods
3. Solve problems using graph algorithms, including single-source and all-pairs shortest paths, and minimum spanning tree algorithms.
4. Generates new searching algorithms for websites to match the specified string, numeric or both in an application.
5. Reconstructs such applications that take the advantage of a trie's ability to quickly search for, insert, and delete entries into the dictionary.
6. Ability to compare various search trees and find solutions for IT related problems

**M.Tech. I Semester** **COURSE CODE: UR19PCMCS102** **L T P C**
**3 0 0 3**

## MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
2. To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

**UNIT- I:**

**Mathematical Logic:** Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus, Rules of inference, Consistency of premises and indirect method of proof, Automatic Theorem Proving Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus

**UNIT- II :**

**Set theory & Relations:** Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram. Functions: composition of functions, Inverse Function, Recursive Functions, Lattice and its Properties, Pigeon hole Principles and its application. Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and Monoids, groups, sub groups, Definitions, Examples, homomorphism, Isomorphism and related problems.

**UNIT- III:**

**Elementary Combinatorics:** Basis of counting, Enumeration of Combinations & Permutations, Enumerating of Combinations & Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion – Exclusion.

**UNIT- IV:**

**Recurrence Relations:** Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, The method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

**UNIT- V:**

**Graph Theory:** Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, Planar Graphs, Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

**TEXT BOOKS:**

1. Discrete Mathematical Structures with Applications to computer science J.P Tremblery, R.Manohar, TMH
2. Discrete Mathematical for computer Scientists & Mathematicians " J.L. Molt, A.Kandel T.P.Baker, PHI

**REFERENCE BOOKS:**

1. Elements of Discrete Mathematics, C L Liu, D P Mohanpatra, TMH
2. Discrete Mathematics, Schaum's Outlines, Lipschutz, Lipson TMH.
3. Discrete Mathematical Structures, Kolman, Busby, Ross, 6th ed., PHI, 2009

**Course Outcomes:**

At the end of the course, the student will be able to

1. Student will be able to demonstrate skills in solving mathematical problems
2. Student will be able to comprehend mathematical principles and logic
3. Student will be able to demonstrate knowledge of mathematical modeling and proficiency in using mathematical software.
4. Student will be able to manipulate and analyze data numerically and/or graphically using appropriate Software
5. Student will be able to communicate effectively mathematical ideas/results verbally or in Writing
6. Students will be able to Apply graph theory for real time problems like network routing problem.

**M.Tech. I Semester** **COURSE CODE: UR19PCMCS103**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

## IOT APPLICATIONS AND COMMUNICATION PROTOCOLS

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. Basic introduction of all the elements of IoT-Mechanical, Electronics/sensor platform Wireless and wireline protocols, Mobile to Electronics integration, Mobile to enterprise integration
2. Open source/commercial electronics platform for IoT-Raspberry Pi, Arduino ArmMbedLPC
3. Open source /commercial enterprise cloud platform for IoT-Ayla, iO Bridge, Libellium , Axeda, Cisco fog cloud

**UNIT I:**

Basic function and architecture of a sensor — sensor body, sensor mechanism, sensor calibration, sensor maintenance, cost and pricing structure, legacy and modern sensor network. Development of sensor electronics — IoT vs legacy, and open source vs traditional PCB design style Development of sensor communication protocols, Protocols: Modbus, relay, Zigbee, Zwave, X10,Bluetooth, ANT, etc. Business driver for sensor deployment — FDA/EPA regulation, fraud/tempering detection, supervision, quality control and process management Different kind of calibration Techniques: manual, automation, infield, primary and secondary calibration — and their implication in IoT Powering options for sensors: battery, solar, Witricity, Mobile and PoE

**UNIT II:**

Zigbee and Zwave — advantage of low power mesh networking. Long distance Zigbee. Introduction to different Zigbee chips. Bluetooth/BLE: Low power vs high power, speed of detection, class of BLE. Introduction of Bluetooth vendors & their review. Wireless protocols such as Piconet and packet structure for BLE and Zigbee Other long distance RF communication link. LOS vs NLOS links, Capacity and throughput calculation Application issues in wireless protocols:power consumption, reliability, PER, QoS, LOS

**UNIT III:**

PCB vs FPGA vs ASIC design , Prototyping electronics vs Production electronics , QA certificate for IoT- CE/CSA/UL/IEC/RoHS/IP65 ,Basic introduction of multi-layer PCB design and its workflow

Electronics reliability-basic concept of FIT and early mortality rate Environmental and reliability testing-basic concepts Basic Open source platforms: Arduino, Raspberry Pi, Beaglebone

**UNIT IV:**

Introduction to Mobile app platform for IoT: Protocol stack of Mobile app for IoT, Mobile to server integration, iBeacon in IoS, Window Azure, Linkafy Mobile platform for IoT, Axeda, Xively

**UNIT V:**

Database implementation for IoT : Cloud based IoT platforms, SQL vs NoSQL, Open sourced vs. Licensed Database, Available M2M cloud platform, AxedaXively, Omega NovoTech, Ayla Libellium, CISCO M2M platform, AT &T M2M platform, Google M2M platform. Recent trends in home automation, IOT-locks, Energy optimization in home

**TEXT BOOK:**

1. Internet of Things for Architects: Architecting IoT solutions by implementing sensors, communication infrastructure, edge computing, analytics, and security Kindle Edition, PERRRY LEY.

**REFERENCE BOOK:**

1. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things: Key Applications and Protocols, Wiley-Blackwell.

**Course Outcomes:**

At the end of the course, the student will be able to

1. Summarize on the term 'internet of things' in different contexts.
2. Analyze various protocols for IoT.
3. Design a PoC of an IoT system using Rasperry Pi/Arduino
4. Determine the Market perspective of IoT.
5. Apply data analytics and use cloud offerings related to IoT.
6. Analyze applications of IoT in real time scenario

**M.Tech. I Semester** **COURSE CODE: UR19PCMCS104**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

# DISTRIBUTED DATABASES

**Internal Marks: 30**
**External Marks: 70**

**Course Objective:**

1. The objective of course is to provide insight to distributed database, normalization techniques integrity rules. It also includes parallel database systems along with object oriented models.

**UNIT I:**
**Introduction:** Distributed Data processing, Distributed database system (DDBMS), Promises of DDBMSs, Complicating factors and Problem areas in DDBMSs, Overview Of Relational DBMS Relational Database concepts, Normalization, Integrity rules, Relational Data Languages, Relational DBMS.

**UNIT II:**
**Distributed DBMS Architecture:** DBMS Standardization, Architectural models for Distributed DBMS, Distributed DBMS Architecture. Distributed Database Design: Alternative design Strategies, Distribution design issues, Fragmentation, Allocation. Semantic Data Control: View Management, Data security, Semantic Integrity Control.

**UNIT III:**
**Overview of Query Processing:** Query processing problem, Objectives of Query Processing, Complexity of Relational Algebra operations, characterization of Query processors, Layers of Query Processing. Introduction to Transaction Management: Definition of Transaction, Properties of transaction, types of transaction. Distributed Concurrency Control: Serializability theory, Taxonomy of concurrency control mechanisms, locking bases concurrency control algorithms.

**UNIT IV:**
**Parallel Database Systems:** Database servers, Parallel architecture, Parallel DBMS techniques, Parallel execution problems, Parallel execution for hierarchical architecture.

**UNIT V:**
**Distributed Object Database Management systems:** Fundamental Object concepts and Object models, Object distribution design. Architectural issues, Object management, Distributed object storage, Object query processing. Transaction management. Database Interoperability: Database Integration, Query processing.

**TEXT BOOK :**

1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw-Hill

**REFERENCE BOOKS:**

1. Principles of Distributed Database Systems, Second Edition, M. Tamer Ozsu Patrick Valduriez
2. Distributed Databases principles and systems, Stefano Ceri, Giuseppe Pelagatti, Tata McGraw Hill.

**Course Outcomes:**

At the end of the course, the student will be able to

1. Understand what is Distributed DBMS & Understand various architectures of DDBMS
2. Apply various fragmentation techniques given a problem
3. Understand and calculate the cost of enforcing semantic integrity controlHow optimization techniques are applies to Distributed Database.
4. Learn and understand various Query Optimization Algorithms
5. Understand Transaction Management & Compare various approaches to concurrency control in Distributed database
6. Understand various algorithms and techniques for deadlock and recovery in Distributed database.

**M.Tech. I Semester** **COURSE CODE: UR19PCMCS105** **L T P C**
**3 0 0 3**

## ADVANCED OPERATING SYSTEMS

**Internal Marks: 30**
**External Marks: 70**

**COURSE OBJECTIVES:**

1. The objective of the course is to provide introduction to operating system design and concept of process, process lifecycle and scheduling approaches.
2. They will learn deadlock process.
3. Students can able to understanding distributed shared memory

**UNIT - I:**
Architectures of Distributed Systems - System Architecture types - issues in distributed operating systems - communication networks - communication primitives. Theoretical Foundations – inherent limitations of a distributed system - lamp ports logical clocks - vector clocks - casual ordering of messages - global state - cuts of a distributed computation - termination detection. Distributed Mutual Exclusion - introduction - the classification of mutual exclusion and associated algorithms – a comparative performance analysis.

**UNIT - II:**
Distributed Deadlock Detection -Introduction - deadlock handling strategies in distributed systems - issues in deadlock detection and resolution - control organizations for distributed deadlock detection - centralized and distributed deadlock detection algorithms -hierarchical deadlock detection algorithms. Agreement protocols - introduction-the system model, a classification of agreement problems, solutions to the Byzantine agreement problem, applications of agreement algorithms. Distributed resource management: introduction-architecture - mechanism for building distributed file systems - design issues - log structured file systems.

**UNIT - III:**
Distributed shared memory-Architecture- algorithms for implementing DSM - memory coherence and protocols - design issues. Distributed Scheduling - introduction - issues in load distributing - components of a load distributing algorithm - stability - load distributing algorithm – performance comparison - selecting a suitable load sharing algorithm - requirements for load distributing –task migration and associated issues. Failure Recovery and Fault tolerance: introduction- basic concepts - classification of failures - backward and forward error recovery, backward error recovery- recovery in concurrent systems - consistent set of check points - synchronous and asynchronous check pointing and recovery - check pointing for distributed database systems- recovery in replicated distributed databases.

**UNIT - IV:**

Protection and security -preliminaries, the access matrix model and its implementations.-safety in matrix model- advanced models of protection. Data security - cryptography: Model of cryptography, conventional cryptography- modern cryptography, private key cryptography, data encryption standard public key cryptography - multiple encryption - authentication in distributed systems.

**UNIT - V:**

Multiprocessor operating systems - basic multiprocessor system architectures - inter connection networks for multiprocessor systems - caching - hypercube architecture. Multiprocessor Operating System - structures of multiprocessor operating system, operating system design issues- threads- process synchronization and scheduling. Database Operating systems :Introduction- requirements of a database operating system Concurrency control : theoretical aspects - introduction, database systems – a concurrency control model of database systems- the problem of concurrency control – serializability theory- distributed database systems, concurrency control algorithms - introduction, basic synchronization primitives, lock based algorithms-timestamp based algorithms, optimistic algorithms - concurrency control algorithms, data replication.

**TEXT BOOK:**

1. Mukesh Singhal, Niranjan G.Shivaratri, "Advanced concepts in operating systems: Distributed, Database and multiprocessor operating systems", TMH, 2001

**REFERENCE BOOKS:**

1. Andrew S.Tanenbaum, "Modern operating system", PHI, 2003
2. Pradeep K.Sinha, "Distributed operating system-Concepts and design", PHI, 2003.
3. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2003

**COURSE OUTCOMES**

At the end of the course, the student will be able to

1. To understand the characteristics of OS for Multiprocessor and Multicomputer.
2. Understanding advanced concepts in operating systems.
3. Learning principles of Distributed and multiprocessor operating systems
4. Knowledge about advanced concepts in OS
5. Ability to develop OS for distributed systems
6. Ability to develop modules for mobile devices

**M.Tech. I Semester COURSE CODE: UR19PCMCS106** **L T P C**
**3 0 0 3**

## DATA WAREHOUSING AND DATA MINING

**Internal Marks: 30**
**External Marks: 70**

### COURSE OBJECTIVES

1. Application of data mining in web mining, pattern matching and cluster analysis is included to aware students of broad data mining areas.
2. They can able to learn OLAP tools.
3. They will learn about Data Preprocessing Techniques
4. They will understand the real time examples using Mining Techniques

**UNIT I:**
Data warehousing Components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

**UNIT II:**
Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet.

**UNIT III:**
Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns- Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.

**UNIT IV :**
Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction – Basic Concepts – Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

**UNIT V :**
Cluster Analysis – Types of Data – Categorization of Major Clustering Methods – K-means– Partitioning Methods – Hierarchical Methods – Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data – Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

**TEXT BOOKS:**

1. Alex Berson and Stephen J.Smith, “Data Warehousing, Data Mining and OLAP”, Tata McGraw – Hill Edition, Thirteenth Reprint 2008.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Third Edition, Elsevier, 2012. AULibrary.com

**REFERENCE BOOKS:**

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Aja, “Insight into Data Mining Theory and Practice”, Eastern Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “Introduction to Data Mining with Case Studies”, Eastern Economy Edition, Prentice Hall of India, 2006.

**COURSE OUTCOMES**

At the end of the course, the student will be able to

1. Study of different sequential pattern algorithms
2. Study the technique to extract patterns from time series data and it application in real world.
3. Can extend the Graph mining algorithms to Web mining
4. Apply data mining techniques Assosiation nad F-P Growth.
5. Apply data mining techniques and methods to large data sets.
6. Usage of data mining tools to Compare and contrast the various classifiers.

**M.Tech. I Semester** **COURSE CODE: UR19PCMCSL101** **L T P C**
**0 0 3 1.5**

## CSE LAB - I

**Internal Marks: 20**
**External Marks: 30**

**COURSE OBJECTIVES:**

1. To develop skills to design and analyze simple linear and nonlinear data structures
2. It introduces searching and sorting algorithms
3. It provides an understanding of data structures such as stacks and queues.
4. To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
5. To Gain knowledge in practical applications of data structures
6. To understand the design aspects of operating system.
7. To study the process management concepts & Techniques.
8. To study the memory management concepts.
9. To study the storage management concepts.

**PART – A (DATA STRUCTURES)**

**LIST OF EXPERIMENTS:**

1. To implement Stacks& Queues using Arrays & Linked Lists
2. To implement Stack ADT, Queue ADT using arrays & Linked Lists
3. To implement Dequeue using Double Linked List & Arrays
4. To perform various Recursive & Non-recursive operations on Binary Search Tree
5. To implement BFS & DFS for a graph
6. To implement Merge & Heap sort of given elements
7. To perform various operations on AVL trees
8. To implement Krushkal's algorithm to generate a min-cost spanning tree
9. To implement Prim's algorithm to generate min-cost spanning tree
10. To implement functions of Dictionary using Hashing

**PART – B (OPERATING SYSTEMS)**
**LIST OF EXPERIMENTS:**

1. Program to implement FCFS(First Come First Serve)scheduling Algorithms
2. Program to implement SJF(Shortest Job First)Scheduling Algorithm
3. Program to implement Priority Scheduling algorithm
4. Program to implement Round Robin Scheduling algorithm
5. Program to implement FIFO(First in First Out) Page Replacement Algorithm
6. Program to implement LRU(least recently used)Page Replacement Algorithm

7. Program to implement LFU(Least frequently used)Page Replacement Algorithm
8. Write a program to implement how Disk Scheduling is done in operating system
9. Draw the appropriate C.P.U performance graphs for SJF Scheduling Algorithm Operating system programs:
10. Program to implement FCFS(First Come First Serve)scheduling Algorithms
11. Program to implement SJF(Shortest Job First)Scheduling Algorithm
12. Program to implement Priority Scheduling algorithm
13. Program to implement Round Robin Scheduling algorithm
14. Program to implement FIFO(First in First Out) Page Replacement Algorithm
15. Program to implement LRU(least recently used)Page Replacement Algorithm
16. Program to implement LFU(Least frequently used) Page Replacement Algorithm
17. Write a program to implement how Disk Scheduling is done in operating system
18. Draw the appropriate C.P.U performance graphs for SJF Scheduling Algorithm

**Note**: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

**Requirements**:
**Software Requirements:**
Turbo C++
**Hardware Requirements:**
Processors: Intel(R) Pentium(R) CPU G2010 @ 2.80GHz

Operating systems: Windows 7

**COURSE OUTCOMES:**
After completion of course, students will be able to

1. Implement various operations of stack, queue and linked list data types.
2. Be able to design and analyze the time and space efficiency of the data structure.
3. sample linear and nonlinear data structures
4. Build 'C' program for process and file system management using system calls
5. Choose the best CPU scheduling algorithm for a given problem instance
6. Identify the performance of various page replacement algorithms

**M.Tech. I Semester** **COURSE CODE: UR19PROJMCS101** **L T P C**
**0 2 0 2**

## SEMINAR – I

**Internal Marks: 50**
**External Marks: 0**

The students are required to search / gather the material / information on a specific topic, comprehend it, submit report and present in the class.

**Course Outcomes:**

The Students will be able to

1. Understand of contemporary / emerging technology for various processes and systems.

2. Share knowledge effectively in oral and written form and formulate documents.

**M.Tech. I Semester COURSE CODE: UR19ADMCS101** **L T P C**
**0 0 0 0**

## ENGLISH FOR RESEARCH PAPER WRITING

**Internal Marks: 100**
**External Marks: 0**

**Course objectives:**

1. Understand that 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 Ensure the good quality of paper at very first-time submission

**UNIT-I**

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

**UNIT –II**

Clarifying Who Did What, High lighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction. Review of the Literature, Methods, Results, Discussion, Conclusions.

**UNIT – III**

The Final Check 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

**UNIT-IV**

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,

**UNIT-V**

Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

**TEXT BOOKS**


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'sbook .
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

**WEB RESOURCES:**

1.https://writing.colostate.edu/textbooks/informedwriter/chapter10.pdf
2.https://link.springer.com/content/pdf/bfm%3A978-1-4419-7922-3%2F1.pdf

**Course Outcomes:**

At the end of the course, the student will be able to:

1. Understand that how to improve writing skills and level of readability
2. Learn about what to write in each section
3. Understand key skills are needed when writing a Title, when writing an Abstract.
4. Understand skills when writing a Title Ensure the good quality of paper at very first-time submission.
5. Identifies how to prepare a research paper: First Rough Draft
6. how to do Editing and Organizing a research paper: final drafting.

**M.Tech. I Semester COURSE CODE: UR19ADMCS102** **L T P C**
**0 0 0 0**

## VALUE EDUCATION

**Internal Marks: 100**
**External Marks: 0**

**Course Objectives:**

1. Understand value of education and self- development
2. Imbibe good values in students
3. Let the should know about the importance of character

**UNIT I**

Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non- moral valuation. Standards and principles. Value judgments

**UNIT II**

Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism. Love for nature, Discipline

**UNIT III**

Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labor.

**UNIT IV**

Universal brotherhood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature

**UNIT V**

Character and Competence –Holy books vs. Blind faith. Self-management and Good health. Science of reincarnation. Equality, Nonviolence, Humility, Role of Women. All religions and same message. Mind your Mind, Self-control. Honesty, studying effectively

.

**TEXT BOOK**

1 Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi

**REFERENCE BOOK**

1. Dr. N. Venkataiah, “Value Education”, A.P.H. Publishing Corporation, New Delhi 2007.

**Course Outcomes:**

At the end of the course, the student will be able to

1. Knowledge of self-development.
2. Learn the importance of Human values.
3. Developing the overall personality.
4. Association and Cooperation, doing best for saving nature.
5. Knowledge about the character and competence
6. Identify how to do self presentation and representation of him in society.

**M.Tech. II Semester** **COURSE CODE: UR19PCMCS201**

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# CYBER SECURITY

**Internal Marks: 30**
**External Marks: 70**

## Course Objectives:

1. The Cyber security Course will provide the students with foundational Cyber Security principles, Security architecture, risk management, attacks, incidents, and emerging IT and IS technologies.

2. Students will gain insight into the importance of Cyber Security and the integral role of Cyber Security professionals.

## UNIT I

Introduction to Cybercrime: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security ,Who are Cybercriminals? , Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens

## UNIT II

Cyber offenses: How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing

## UNIT III

Cybercrime Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

**UNIT IV**

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft(IDTheft)

**UNIT V**

Cybercrimes and Cyber security: Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies.

**TEXT BOOKS**

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, SunitBelapure, Wiley.

2. Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, Cengage Learning.

**REFERENCE BOOK**

1. Information Security, Mark Rhodes, Ousley, MGH.

**Course Outcomes:**

At the end of the course, the student will be able to

1. Understand Cyber Security architecture principles
2. Identifying System and application security threats and vulnerabilities
3. Identifying different classes of attacks
4. Cyber Security incidents to apply appropriate response
5. Describing risk management processes and practices
6. Evaluation of decision making outcomes of cyber security scenarios

**M.Tech II Semester** **COURSE CODE: UR19PCMCS202**

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## BIG DATA ANALYTICS

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. Understand big data for business intelligence. Learn business case studies for big data analytics.
2. Understand nosql big data management. Perform map-reduce analytics using Hadoop and related tool

**UNIT I**

**Data structures in Java:** Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

**UNIT II**

**Working with Big Data:** Google File System, Hadoop Distributed File System (HDFS) – Buildingblocks of Hadoop (Namenode, Datanode, Secondary Namenode, Job Tracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

**UNIT III**

**Writing MapReduce Programs:** A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner

**UNIT IV**

**Hadoop I/O:** The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable, Object Writable and Generic Writable, Writable collections, Implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparators

**UNIT V**

**Pig:** Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin.Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing

Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data

**TEXT BOOKS:**

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC

2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly

3. Hadoop in Action by Chuck Lam, MANNING Publ.

4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman

B.Melnyk,Bruce Brown, Rafael Coss

**REFERENCE BOOKS:**

1. Hadoop in Practice by Alex Holmes, MANNING Publ.

2. Hadoop MapReduce Cookbook, Srinath Perera, Thilina Gunarathne

**Course Outcomes:**

At the end of the course, student will be able to

1. Understand the programming requirements viz., generic types and methods to perform data Analysis.
2. Understand the existing technologies and the need of distributed files systems to analyze the big data
3. To understand and analyze Map-Reduce programming model for better optimization.
4. Collect, manage, store, query, and analyze big data; and identify the need of interfaces to perform I/O operations in Hadoop.
5. Identify the need based tools, viz., Pig and Hive and to handle.
6. Formulate an effective strategy to implement a successful Data analytics project

**M.Tech II Semester** **COURSE CODE: UR19PCMCS203** **L T P C**
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## ADVANCED UNIX PROGRAMMING

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. To understand the fundamental design of the unix operating system
2. To become fluent with the systems calls provided in the unix environment
3. To be able to design and build an application/service over the unix operating system

**UNIT I**

**Introduction to Unix:** Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix Some Basic Commands-Command Substitution-Giving Multiple Commands.

**UNIT II**

**The File system**: The Basics of Files-What's in a File-Directories and File Names-Permissions-I Nodes The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

**UNIT III**

**Using the Shell:** Command Line Structure-Met characters-Creating New Commands-Command

**Arguments and Parameters:** Program Output as Arguments-Shell Variables- -More on I/O Redirection Looping in Shell Programs.

**UNIT IV**

**Filters-**The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

**UNIT V**

**Shell Programming-**Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command Debugging Scripts-The Script Command-The Eval Command-The Exec Command. The Process-The Meaning-Parent and Child Processes-Types of Processes-More about Foreground and Background processes-Internal and External Commands-Process Creation-The Trap Command-The Stty Command , The Kill Command-Job Control.

**TEXT BOOKS:**

1. The UNIX programming Environment by Brain W. Kernighan & Rob Pike, Pearson.
2. Introduction to UNIX Shell Programming by M.G.Venkateshmurthy, Pearson.

**REFERENCE BOOK:**

1. Unix and shell programming by B.M. Harwani, OXFORD university press.

**Course Outcomes:**

At the end of the course, the student will be able to

1. Ability to understand and reason out the working of Unix Systems
2. To be able to build an application/service over a UNIX system.
3. Develops the skills necessary for system programming including file system programming, process and signal management.
4. Improves the basic skills required to write network programs using Sockets.
5. Understand the inter process communication.
6. To understand and make effective use of Linux utilities and shell scripting language (bash) to solve problem.

**M.Tech II Semester** **COURSE CODE: UR19PCMCS204**

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## SEMANTIC WEB AND SOCIAL NETWORKS

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

The objectives are : - to understand semantic web - to understand the role of ontology and inference engines in semantic web.

**UNIT I:**

**Web Intelligence:** Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

**UNIT II:**

**Knowledge Representation for the Semantic Web:** Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

**UNIT III:**

**Ontology Engineering:** Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

**UNIT IV:**

**Semantic Web Applications, Services and Technology:** Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

**UNIT V:**

**Social Network Analysis and semantic web:** What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

**TEXT BOOKS:**

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley inter science, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

**REFERENCE BOOKS:**

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J. Davies, R. Studer, P. Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T. Segaran, C.Evans, J. Taylor, O'Reilly, SPD

**Course Outcomes:**

At the end of the course, student will be able to

1. Demonstrate knowledge and be able to explain the three different "named" generations of the web.
2. Demonstrate the ability to articipate materially in projects that develop programs relating to Web applications and the analysis of Web data.
3. Be able to understand and analyze key Web applications including search engines and social networking sites.
4. Be able to analyze and explain how technical changes affect the social aspects of Web-based computing.
5. Be able to develop "linked data" applications using Semantic Web technologies.
6. Understand the usage and risks in the social networks and Electronic Discussion networks, blogs.

**M.Tech II Semester** **COURSE CODE: UR19PEMCS201** **L T P C**
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## SOFTWARE ENGINEERING
## (PE-I)

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. To understand the software life cycle models.
2. To understand the software requirements and SRS document.
3. To understand the importance of modeling and modeling languages.
4. To design and develop correct and robust software products.
5. To understand the quality control and how to ensure good quality software.
6. To understand the planning and estimation of software projects.
7. To understand the implementation issues, validation and verification procedures.
8. To understand the maintenance of software

**UNIT I:**

**Software and Software Engineering:** The Nature of Software, The Unique Nature of Web Apps, Software Engineering, Software Process, Software Engineering Practice, Software Myths. Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

**UNIT II:**

**Requirements Analysis And Specification**: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification. Software Design: Overview of the Design Process, How to Characterise of a Design?, Cohesion an d Coupling, Layered Arrangement of Modules, Approaches to Software Design

**UNIT III:**

**Function-Oriented Software Design:** Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, over view of Object Oriented design. User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

**UNIT IV:**

**Coding And Testing:** Coding, Code Review, Software Documentation, Testing, Unit Testing, BlackBox Testing, White-Box Testing, Debugging,Program Analysis Tool,

Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing

**UNIT V:**

**Software Reliability And Quality Management:** Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model. Computer Aided Software Engineering: Case and its Scope, Case Environment, Case Support in Software Life Cycle, Other Characteristics of Case Tools, Towards Second Generation CASE Tool, Architecture of a Case Environment

**TEXT BOOKS:**


1. Software Engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition McGraw Hill International Edition.

2. Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.

3. Software Engineering, Ian Sommerville, Ninth edition, Pearson education


**REFERENCE BOOKS:**


1. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
2. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.


**COURSE OUTCOMES**:

At the end of the course, the student will be able to

1. Define and develop a software project from requirement gathering to implementation.

2. Obtain knowledge about principles and practices of software engineering.

3. Focus on the fundamentals of modeling a software project.
4. Obtain knowledge about estimation and maintenance of software Systems
5. Describe the software quality management.
6. Obtrain the knowledge of Software Quality Management System

**M.Tech II Semester** **COURSE CODE: UR19PEMCS202**

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# ARTIFICIAL INTELLIGENCE
## (PE-I)

**Internal Marks: 30**
**External Marks: 70**

**COURSE OBJECTIVES:**

1. To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.
2. To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs.
3. To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning

**UNIT-I:**

**Introduction to artificial intelligence:** Introduction ,history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of ai languages, current trends in AI

**UNIT-II:**

**Problem solving:** state-space search and control strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative-deepening a*, constraint satisfaction Problem reduction and game playing: Introduction, problem reduction, game playing, alpha-beta pruning, two-player perfect information games

**UNIT-III:**

**Logic concepts:** Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic

**UNIT-IV:**

**Knowledge representation:** Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames advanced knowledge representation techniques: Introduction, conceptual dependency theory, script structure, cyc theory, case grammars, semantic web.

**UNIT-V:**

**Expert system and applications:** Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools

**TEXT BOOKS:**

1. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning,
2. Artificial intelligence, A modern Approach , 2nd ed, Stuart Russel, Peter Norvig, PEA
3. Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3rd ed, TMH
4. Introduction to Artificial Intelligence, Patterson, PHI

**REFERNCE BOOKS:**

1. Atificial intelligence, structures and Strategies for Complex problem solving, -George F Lugar, 5 th ed, PEA
2. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer
3. Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier

**COURSE OUTCOMES**:

At the end of the course, the student will be able to

1. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
2. Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
3. Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
4. Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.
5. Focus on semantic networks for knowledge representation
6. Can build the rule based rexpert system.

**M.Tech II Semester** **COURSE CODE: UR19PEMCS203** **L T P C**
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## SCRIPTING LANGUAGES
**(PE-I)**

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. To be able to introduce core programming basics and program design with functions using Python programming language.
2. To understand the high-performance programs designed to strengthen the practical expertise
3. Understand the concepts of scripting languages for developing web based projects.
4. Illustrates object oriented concepts like PHP, PYTHON, PERL.
5. Create database connections using PHP and build the website for the world.
6. Demonstrate IP address for connecting the web servers.
7. Analyze the internet ware application, security issues and frame works for application.

**UNIT - I**
Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

**UNIT - II**
Advanced perl Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

**UNIT- III**
PHP Basics PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

**UNIT - IV**
Advanced PHP Programming PHP and Web Forms, Files, PHP Authentication and Methodologies - Hard Coded, File Based, Database Based, IP Based, Login

Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the M crypt package, Building Web sites for the World.

**UNIT -V**

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk. Python Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling. Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

**TEXT BOOKS:**

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dream tech)

**REFERENCE BOOKS:**

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1, I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.

**COURSE OUTCOMES**:

At the end of the course, the student will be able to

1. Ability to understand the differences between scripting languages
2. Ability to apply your knowledge of the weaknesses of scripting languages to select implementation.
3. Create PHP authentication Methodology for security issues.
4. Ability to survey many of the modern and way cool language features that show up frequently in scripting languages.
5. Identify PHP encryption functions and Mcrypt Package.
6. Identify the python language and its applications.

**M.Tech II Semester** **COURSE CODE: UR19PEMCS204**

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# MACHINE LEARNING
## (PE-I)

**Internal Marks: 30**
**External Marks: 70**

**Course Objective:**

1. The objectives of the course "Machine Learning and Data Mining" is to introduce students to state-of-the-art methods and modern programming tools for data analysis.

**UNIT -I: The ingredients of machine learning, Tasks:** the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. Binary classification and related tasks: Classification, Scoring and ranking, Class probability estimation

**UNIT- II: Beyond binary classification:** Handling more than two classes, Regression, Unsupervised and descriptive learning. Concept learning: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts

**UNIT- III: Tree models:** Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. Rule models: Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning

**UNIT -IV: Linear models:** The least-squares method, The perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods. Distance Based Models: Introduction, Neighbours and exemplars, Nearest Neighbours classification, Distance Based Clustering, Hierarchical Clustering.

**UNIT- V: Probabilistic models:** The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimising conditional likelihood Probabilistic models with hidden variables. Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting

**TEXT BOOKS:**

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

**REFERENCE BOOKS:**

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben- David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

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

1. Understand complexity of Machine Learning algorithms and their limitations;
2. Understand modern notions in data analysis oriented computing;
3. Be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;
4. Be capable of performing distributed computations;
5. Be capable of performing experiments in Machine Learning using real-world data.
6. Understand the probabilistic models.

**M.Tech II Semester** **COURSE CODE: UR19PEMCS205**

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# IMAGE PROCESSING
## (PE-II)

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. To study the image fundamentals and mathematical transforms necessary for image processing.
2. To study the image enhancement techniques
3. To study image restoration procedures.
4. To study the image compression procedures.

**UNIT I:**
**Introduction:** Applications of Computer Graphics and Image Processing, Fundamentals on Pixel concepts, effect of Aliasing and Jaggles, Advantages of high resolution systems DDA line algorithms: Bresenhams line and circle derivations and algorithms

**UNIT II:**
**2-D Transformations:** Translations, Scaling, rotation, reflection and shear transformations, Homogeneous coordinates, Composite Transformations- Reflection about an arbitrary line; Windowing and clipping, viewing transformations, Cohen-Sutherland clipping algorithm

**UNIT III:**
**Digital Image Properties:** Metric and topological properties of Digital Images, Histogram, entropy, Visual Perception, Image Quality, Color perceived by humans, Color Spaces, Palette Images, color Constancy Color Images: Pixel brightness transformations, Local Preprocessing, image smoothing, Edge detectors, Robert Operators, Laplace, Prewitt, Sobel, Fri-chen, Canny Edge detection

**UNIT IV:**
**Mathematical Morphology:** Basic Mathematical Concepts, Binary dilation and Erosion, Opening and closing, Gray Scale dilation and erosion, Skeleton, Thinning , Thickening Ultimate erosion, Geodesic transformations, Morphology and reconstruction, Morphological Segmentation

**UNIT V:**

**SEGMENTATION:** Threshold detection methods, Optimal Thresholding, Edge based SegmentationEdge image thresholding, Edge relaxation, Border tracing, Hough Transforms, Region based segmentation: Region Mergingm Region Splitting, Splitting and Merging, Watershed Segmentation. Image Data Compression: Image data Properties, Discrete Image Transformations in data compression, Discrete Cosine and Wavelet Transforms, Types of DWT and merits; Predicative Compression methods, Hierarchical and Progressive Compression methods, Comparison of Compression methods, JPEG- MPEG Image Compression methods.

**TEXT BOOKS:**

1. Computer Graphics C Version, Donald Hearn, M Paulli Baker , Pearson ( Unit I and Unit II)
2. Image Processing, Analysis and Machine Vision, Millan Sonka, Vaclov Halvoc, Roger Boyle, Cengage Learning, 3ed, ( Unit III, Unit IV, Unit V and Unit VI)

**REFERENCE BOOKS:**

1. Computer & Machine Vision, Theory , Algorithms , Practicles, E R Davies, Elsevier, 4ed
2. Digital Image Processing with MATLAB and LABVIEW, Vipul Singh, Elsevier

**COURSE OUTCOMES**:

At the end of the course, the student will be able to

1. Describe basic image related concepts.
2. Explain various image enhancement and restoration techniques.
3. Describe colour image processing, image compression, image segmentation and representation
4. Describe wavelet transforms.
5. Define the segmentation.
6. Distinguish the Discrete Image Transformations in data compression.

**M.Tech II Semester** **COURSE CODE: UR19PEMCS206**

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# PARALLEL ALGORITHMS
## (PE-II)

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. The aim of the course is to introduce principles and design techniques of parallel algorithms and data structures for various parallel architectures.
2. Students can apply these knowledge when they develop algorithms and implement them in parallel computers. Theoretical aspect as well as empirical development of algorithms will be emphasized.
3. This course is aimed at graduate students who are interested in the algorithmic aspect of parallel computation but may be also taken by students interested in theory of computation, VLSI and computer architectures.

**UNIT I:**
**Introduction:** Computational demand in various application areas, advent of parallel processing, terminology pipelining, Data parallelism and control parallelism-Amdahl's law.

**UNIT II:**
**Scheduling:** Organizational features of Processor Arrays, Multi processors and multi-computers. Mapping and scheduling aspects of algorithms. Mapping into meshes and hyper cubes-Load balancing-List scheduling algorithm Coffman-graham scheduling algorithm for parallel processors.

**UNIT III:**
**Algorithms:** Elementary Parallel algorithms on SIMD and MIMD machines, Analysis of these algorithms. Matrix Multiplication algorithms on SIMD and MIMD models. Fast Fourier Transform algorithms. Implementation on Hyper cube architectures. Solving linear file -system of
equations, parallelizing aspects of sequential methods back substitution and Tri diagonal.

**UNIT IV:**
**Sorting:** Parallel sorting methods, Odd-even transposition Sorting on processor arrays, Biotonic ,merge sort on shuffle - exchange ID , Array processor,2D-Mesh processor and Hypercube Processor Array. Parallel Quick-sort on Multi processors. Hyper Quick sort on hypercube multi computers. Parallel search operations. Ellis algorithm and Manber and ladner's Algorithms for dictionary operations.

**UNIT V:**

**Searching:** Parallel algorithms for Graph searching, All Pairs shortest paths and inimum cost spanning tree. Parallelization aspects of combinatorial search algorithms with Focus on Branch and Bound Methods and Alpha-beta Search methods.

**TEXT BOOK:**

1. Parallel computing th e o r y and practice, Michel J.Quinn

**REFERENCE BOOK:**

1. Programming Parallel Algorithms, Guy E. Blelloch, Communications of the ACM

**COURSE OUTCOMES**:

At the end of the course, the student will be able to

1. Familiar with the wide applicability of graph theory and tree algorithms as an abstraction for the analysis of many practical problems,
2. Familiar with the efficient parallel algorithms related to many areas of computer science: expression computation, sorting, graph-theoretic problems, computational geometry, algorithmics of texts etc
3. Familiar with the basic issues of implementing parallel algorithms.
4. Distinguish the sorting algorithms
5. Define the Parallel search operations.
6. Focus on Parallel algorithms for Graph searching.

**M.Tech. II Semester** **COURSE CODE: UR19MCSPE207** **L T P C**
**3 0 0 3**

# CLOUD COMPUTING
## (PE-II)

**Internal Marks: 30**
**External Marks: 70**

**Course Objective:**

1. The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet cloud concepts capabilities across the various cloud service models.

**UNIT I**

**Introduction:** Network centric computing, Network centric content, peer-to –peer systems, cloud computing delivery models and services, Ethical issues, Vulnerabilities, Major challenges for cloud computing, Parallel and Distributed Systems: introduction, architecture, distributed systems, communication protocols, logical clocks, message delivery rules, concurrency, model concurrency with Petri Nets.

**UNIT II**

**Cloud Infrastructure:** At Amazon, The Google Perspective, Microsoft Windows Azure, Open Source Software Platforms, Cloud storage diversity, Inter cloud, energy use and ecological impact, responsibility sharing, user experience, Software licensing Cloud Computing: Applications and Paradigms: Challenges for cloud, existing cloud applications and new opportunities, architectural styles, workflows, The Zookeeper, The Map Reduce Program model, HPC on cloud, biological research

**UNIT III**

**Cloud Resource virtualization:** Virtualization, layering and virtualization, virtual machine monitors, virtual machines, virtualization- full and para, performance and security isolation, hardware support for virtualization, Case Study: Xen, vBlades Cloud Resource Management and Scheduling: Policies and Mechanisms, Applications of control theory to task scheduling, Stability of a two-level resource allocation architecture, feed back control based on dynamic thresholds, coordination, resource bundling, scheduling algorithms, fair queuing, start time fair queuing, cloud scheduling subject to deadlines, Scheduling Map Reduce applications, Resource management and dynamic application scaling.

**UNIT IV**

**Storage Systems:** Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system., Apache Hadoop, Big Table, Megastore ( text book 1), Amazon Simple Storage Service(S3), Cloud Security: Cloud security risks, security – atop concern for cloud users, privacy and privacy impact assessment, trust, OS security, Virtual machine security, Security risks

**UNIT V**

**Cloud Application Development:** Amazon Web Services: EC2 – instances, connecting clients, security rules, launching, usage of S3 in Java, Installing Simple Notification Service on Ubuntu 10.04, Installing Hadoop on Eclipse, Cloud based simulation of a Distributed trust algorithm, Cloud service for adaptive data streaming ,Google: Google App Engine, Google Web Toolkit Micro Soft: Azure Services Platform, Windows live, Exchange Online, Share Point Services, Microsoft, Dynamics CRM

**TEXT BOOKS:**

1. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier

2. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte,

Robert Elsenpeter, TMH.

**REFERENCE BOOK:**

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammarai selvi, TMH.

**Course Outcomes:**

At the end of the course, the student will be able to

1. Understanding the key dimensions of the challenge of Cloud Computing.
2. Create the economics, financial, and technological implications for selecting cloud computing for own organization.
3. Analyze the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.
4. Evaluate the storage, privacy, and security issues in cloud.
5. Create own organizations needs for capacity building and training in cloud computing-related IT areas.
6. install various hadoop tools.

**M.Tech . III Semester** **COURSE CODE: UR19PEMCS208** **L T P C**
**3 0 0 3**

# NATURAL LANGUAGE PROCESSING

## (PE-II)

**Internal Marks: 30**
**External Marks: 70**

**Course Objectives:**

1. This course introduces the fundamental concepts and techniques of natural language processing (NLP).
2. Students will gain an in-depth understanding of the computational properties of natural languages and the commonly used algorithms for processing linguistic information.
3. The course examines NLP models and algorithms using both the traditional symbolic and the more recent statistical approaches.

**UNIT I**

**Introduction:** NLP tasks in syntax, semantics, and pragmatics. Applications such as information extraction, question answering, and machine translation. The problem of ambiguity. The role of machine learning. Brief history of the field.

**UNIT II**

**N-gram Language Models:** The role of language models, Simple Ngram models.Estimating parameters and smoothing. Evaluating language models. Part of Speech Tagging and Sequence Labeling : Lexical syntax. Hidden Markov Models. Maximum Entropy Models. Conditional Random Fields

**UNIT III**

**Syntactic parsing:** Grammar formalisms and tree banks. Efficient parsing for context-free grammars (CFGs). Statistical parsing and probabilistic CFGs (PCFGs). Lexicalized PCFGs.

**UNIT IV**

**Semantic Analysis:** Lexical semantics and word-sense disambiguation. Compositional semantics. Semantic Role Labeling and Semantic Parsing.

**UNIT V**

**Information Extraction (IE) and Machine Translation (MT)**: Named entity recognition and relation extraction. IE using sequence labeling. Basic issues in MT.

Statistical translation, word alignment, phrasebased translation, and synchronous grammars. Dialogues: Turns and utterances, grounding, dialogue acts and structures Natural Language Generation: Introduction to language generation, architecture, discourse planning (text schemata, rhetorical relations).

**TEXT BOOK:**

1. D. Jurafsky & J. H. Martin – "Speech and Language Processing – An introduction to Languageprocessing, Computational Linguistics, and Speech Recognition", Pearson Education.

**REFERENCE BOOKS**


1. Allen, James. 1995. – "Natural Language Understanding". Benjamin/ Cummings, 2ed.
2. Bharathi, A., Vineet Chaitanya and Rajeev Sangal. 1995. Natural Language Processing- "A Pananian Perspective". Prentice Hll India, Eastern Economy Edition.

3. Eugene Cherniak: "Statistical Language Learning", MIT Press, 1993.

4. Manning, Christopher and Heinrich Schutze. 1999. "Foundations of

Statistical Natural Language Processing". MIT Press.


**Course Outcomes:**

At the end of the course, the student will be able to

1. Understand approaches to syntax and semantics in NLP.

2. Understand approaches to discourse, generation, dialogue and

summarization within NLP.

3. Understand the concepts grammer formalisms and syntactic parsing.

4. Understand the concepts of semantic analysis.

5. Analyze information extraction and machine translation.

6. Describe Information Extraction (IE) and Machine Translation (MT)

**M.Tech II Semester** **COURSE CODE: UR19PCMCSL201** **L T P C**
**0 0 3 1.5**

## CSE LAB-II

**Internal Marks: 20**
**External Marks: 30**

### COURSE OBJECTIVES:

1. To familiarize students with the Linux environment
2. To learn the fundamentals of shell scripting/programming
3. To familiarize students with basic Unix administration

### LIST OF EXPERIMENTS:

1. a) Study of Unix/Linux general purpose utility command list
man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time,
kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.
b) Study of vi editor.
c) Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.
d) Study of Unix/Linux file system (tree structure).
e) Study of .bashrc, /etc/bashrc and Environment variables.

2. Write a C program that makes a copy of a file using standard I/O, and system calls.
3. Write a C program to emulate the UNIX ls –l command.
4. Write a C program that illustrates how to execute two commands concurrently with a command pipe.
Ex: - ls –l | sort
5. Write a C program that illustrates two processes communicating using shared memory
6. Write a C program to simulate producer and consumer problem usingsemaphores
7. Write C program to create a thread using pthreads library and let it run its function.
8. Write a C program to illustrate concurrent execution of threads using pthreads library. Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, Traceroute, whoisetc. Usage of elementary socket system calls (socket (), bind(), listen(), accept(),connect(),send(),recv(),sendto(),recvfrom()).
9. Implementation of Connection oriented concurrent service (TCP).
10. Implementation of Connectionless Iterative time service (UDP).
11. Implementation of Select system call.
12. Implementation of gesockopt (), setsockopt () system calls.
13. Implementation of getpeername () system call.
14. 14.Implementation of remote command execution using socket system calls

**Note**: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

**Requirements**:

**Software Requirements:**

Turbo c, Putty

**Hardware Requirements:**

Processors: Intel(R) Pentium(R) CPU G2010 @ 2.80GHz
Operating systems: Windows 7

**COURSE OUTCOMES:**

At the end of the course, the student will be able to

1. To use UNIX utilities and perform basic shell control of the utilities
2. To use the UNIX file system and file access control.
3. To use of an operating system to develop software
4. Work confidently in Unix/Linux environment
5. Write shell scripts to automate various tasks
6. Master the basics of Linux administration

**M.Tech. II Semester** **COURSE CODE: UR19PROJMCS201** **L T P C**
**0 0 0 2**

## SEMINAR – II

**Internal Marks: 50**
**External Marks: 0**

The students are required to search / gather the material / information on a specific topic, comprehend it, submit report and present in the class.

**Course Outcomes:**

The Students will be able to

1. Understand of contemporary / emerging technology for various processes and systems.

2. Share knowledge effectively in oral and written form and formulate documents.

**M.Tech. II Semester** **COURSE CODE: UR19ADMCS201** **L T P C**
**0 0 0 0**

## DISASTER MANAGEMENT

**Internal Marks: 100**
**External Marks: 0**

**Course Objectives:**

1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
3. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict Situations.
4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.

**UNIT I**

**Introduction Disaster**: Definition, Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude

**UNIT II**

**Repercussions of Disasters and Hazards**: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.

**UNIT III**

**Disaster Prone Areas in India Study Of Seismic Zones**; Areas Prone To Floods and Droughts, Landslides and Avalanches; Areas Prone To Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

**UNIT IV**

**Disaster Preparedness And Management Preparedness**: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing,

Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

**UNIT V**

**Risk Assessment Disaster Risk**: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival. Disaster Mitigation Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs Of Disaster Mitigation in India.

**TEXT BOOKS**


1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'New Royal book Company.
2. Sahni, PardeepEt.Al. (Eds.)," Disaster Mitigation Experiences and Reflections", Prentice Hall Of India, New Delhi.
3. Goel S. L., Disaster Administration and Management Test and Case Studies", Deep &Deep Publication Pvt. Ltd., New Delhi.


**Course Outcomes:**

At the end of the course, the student will be able to

1. understand key concepts in disaster risk reduction and humanitarian response.
2. Gain the knowledge Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis

3. understand Disaster Prone Areas in India Study of Seismic Zones.

4. understand the application Of Remote Sensing, Data from Meteorological.

5. learn about Structural Mitigation and Non-Structural Mitigation

6. know what interventions the Government is doing in the field of Disaster

Management

**M.Tech. II Semester** **COURSE CODE: UR19ADMCS202** **L T P C**
**0 0 0 0**

# PEDAGOGY STUDIES

**Internal Marks: 100**
**External Marks: 0**

**Course Objectives:**

1. Review existing evidence on the review topic to inform programmed design and policy making undertaken by the DfID, other agencies and researchers.
2. Identify critical evidence gaps to guide the development.

**UNIT I**

**Introduction and Methodology:** aims and rationale, Policy background, Conceptual framework and terminology Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching

**UNIT II**

**Thematic overview:** Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.

**UNIT III**

**Evidence on the effectiveness of pedagogical practices, Methodology for the in depth stage:** quality assessment of included studies.How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength anexd nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

**UNIT IV**

**Professional development:** alignment with classroom practices and follow-up support Peer Support from the head teacher and the community. Curriculum and assessment Barriers to learning: limited resources and large class sizes

**UNIT V**

**Research gaps and future directions:** Research design-Contests Pedagogy-Teacher education-Curriculum and assessment- Dissemination and research impact.

**TEXT BOOKS**


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 1. London: DFID.


**Course Outcomes:**

Students will be able to understand:

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
3. How can teacher education (curriculum and practicum) and the school curriculum and guidance
4. Practice the personality development.
5. Examine the . Teachers' attitudes and beliefs and Pedagogic strategies
6. Identrify the Dissemination and research impact

**PROJECT WORK PHASE – I AND PHASE – II**

| Phase | M.Tech Semester | Course code | L | T | P | C | Marks |
|---|---|---|---|---|---|---|---|
| I | III | UR19PROJMCS301 | 0 | 0 | 20 | 10 | External 100 |
| II | IV | UR19PROJMCS401 | 0 | 0 | 30 | 15 | |

**Syllabus Contents:**

The project topic should be selected / chosen to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study. The project should have the following

1. Relevance to social needs of society
2. Relevance to value addition to existing facilities in the institute
3. Relevance to industry need
4. Problems of national importance
5. Research and development in various domain

The student should complete the following:

1. Literature survey Problem Definition
2. Motivation for study and Objectives
3. Preliminary design / feasibility / modular approaches
4. Implementation and Verification
5. Report and presentation

The project phase II is based on a report prepared by the students on project topic allotted to them. It may be based on:

1. Experimental verification / Proof of concept.
2. Development of various software projects
3. The viva-voce examination will be based on the above report and work.

**Guidelines for Project Phase – I and II at M. Tech. (CSE):**

1. As per the AICTE directives, the project is a yearlong activity, to be carried out and evaluated in two phases i.e. Phase – I: July to December and Phase – II: January to June.
2. The project may be carried out preferably in-house i.e. department's laboratories and centers OR in industry allotted through department's T & P coordinator.

3. After multiple interactions with guide and based on comprehensive literature survey, the student shall identify the domain and define project objectives. The referred literature should preferably include in CSA/IET/Springer/Science Direct journals in the areas of Computing and Processing (Hardware and Software). In case of Industry sponsored projects, the relevant application notes, white papers, product catalogues should be referred and reported.
4. Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and phase wise work distribution, and submit the proposal within a month from the date of registration.

5. Phase – I deliverables: A document report comprising of summary of literature survey, detailed objectives, project specifications, paper and/or computer aided design, proof of concept/functionality, part results, A record of continuous progress.

6. Phase – I evaluation: A committee comprising of guides of respective specialization shall assess the progress/performance of the student based on report, presentation and Q &A. In case of unsatisfactory performance, committee may recommend repeating the Phase-I work.

7. During phase – II, student is expected to exert on design, development and testing of the proposed work as per the schedule. Accomplished results/contributions/innovations should be published in terms of research papers in reputed journals and reviewed focused conferences OR IP/Patents.

8. Phase – II deliverables: A project report as per the specified format, developed system in the form of hardware and/or software, a record of continuous progress.

9. Phase – II evaluation: Guide along with appointed external examiner shall assess the progress/performance of the student based on report, presentation and Q &A. In case of unsatisfactory performance, committee may recommend for extension or repeating the work.

**Course Outcomes:**

At the end of the course, the student will be able to

1. Synthesize knowledge and skills previously gained.
2. Apply an in-depth study and execution of new technical problem.
3. Select from different methodologies, methods.
4. Form analysis to produce a suitable research design, and justify their design.
5. Present the findings of their technical solution in a written report.
6. Present the work in International/ National conference or reputed