

**COURSE STRUCTURE
AND
DETAILED SYLLABUS
for
M.Tech course
in
COMPUTER SCIENCE
(CS)**

(Applicable for the batches admitted from 2017-2018)



Department of Computer Science and Engineering (CSE)

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

(An Autonomous Institution approved by UGC and affiliated to JNTUH)

(Accredited by NAAC with 'A' Grade, Accredited by NBA of AICTE, Recipient of WBA under TEQIP I & II)

Yamnampet, Ghatkesar, Malkajiri(Medchal)-501 301

Department of Computer Science and Engineering
M. Tech. (Computer Science)
Course Structure and Syllabus
Academic Regulations: 2017-2018

I Year	COURSE STRUCTURE	I Semester
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S. No.	Subject Code	Subject Name	L	T	P	C	Marks	
							CIE	SEE
1	1N101	Data Structures and Algorithms	3	1	-	3	25	75
2	6P103	Database System Concepts	3	1	-	3	25	75
3	1N102	Distributed Systems	3	1	-	3	25	75
4	1N103	Advanced Java Programming	3	1	-	3	25	75
5		PROFESSIONAL ELECTIVE I	3	1	-	3	25	75
6		PROFESSIONAL ELECTIVE II	3	1	-	3	25	75
7	6P116	Data Structures through Java lab	-	-	4	2	25	75
8	6P115	Research Methodology	2	-		2	25	75
9	1N170	Literature Review and Seminar-I	-	-	3	1	100	-
10	1N171	Comprehensive Viva – Voce –I	-	-	-	1	100	-
		Total	20	6	7	24	400	600

PROFESSIONAL ELECTIVE I		PROFESSIONAL ELECTIVE II	
Subject Code	Subject Name	Subject Code	Subject Name
6P101	Advanced Computer Architecture	1N106	Parallel and Distributed Algorithms
6P108	Software Process and Project Management	6P113	Software metrics and Quality Assurance
6P105	Artificial Intelligence	6P111	Cloud Computing
1N104	Network Security	1N106	Linux Programming
6P106	Semantic Web and Social Networking	1N105	Distributed Computing

I Year	COURSE STRUCTURE				II Semester			
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S. No.	Subject Code	Subject Name	L	T	P	C	Marks	
							CIE	SEE
1	1N201	Network Programming	3	1	-	3	25	75
2	6P208	Information Retrieval Systems	3	1	-	3	25	75
3	1N202	Internet Technologies and Services	3	1	-	3	25	75
4	6P210	Mobile Computing	3	1	-	3	25	75
5		PROFESSIONAL ELECTIVE III	3	1	-	3	25	75
6		OPEN ELECTIVE	3	1	-	3	25	75
7	1N270	Internet Technologies and Services Lab	-	-	4	2	25	75
8	1N271	Literature Review and Seminar-II	-	-	3	1	100	-
9	1N272	Project Seminar – I (Abstract)	-	-	3	2	100	-
10	1N273	Comprehensive Viva – Voce-II	-	-	-	1	100	-
		Total	18	6	10	24	475	525

PROFESSIONAL ELECTIVE III		OPEN ELECTIVE	
Subject Code	Subject Name	Subject Code	Subject Name
1N203	Data Mining	6ZC13	Entrepreneurship and Innovation
6P207	Machine Learning	6WC30	Operations Research
6P209	Big Data Analytics	6ZC03	Banking Operations, Insurance and Risk Management
6P211	Internet of Things	6QC33	Intellectual Property Rights
1N204	Cyber Security & Cyber Laws	6QC47	Bioinformatics
6P205	Software Architecture and Design Patterns	6T217	Embedded Systems

II Year	COURSE STRUCTURE				I Semester			
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S. No.	Subject Code	Subject Name	L	T	P	C	Marks	
							CIE	SEE
1	1N370	Project Work Review- I	-	-	-	12	100	-
		Total Credits	-	-	-	12	100	-

II Year	COURSE STRUCTURE	II Semester
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S. No.	Subject Code	Subject Name	L	T	P	C	Marks	
							CIE	SEE
1	1N471	Project Work Review-II	-	-	-	12	100	-
2	1N472	Project Evaluation (Viva-voice)	-	-	-	24	-	200
		Total	-	-	-	36	100	200

L - Lectures; T = Tutorial; P = Practical; C=Credit

CIE: Continuous Internal Evaluation

SEE: Semester End Exam

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

**Syllabus for M. Tech I Year I Semester
Computer Science
DATA STRUCTURES AND ALGORITHMS**

Code: 1N101

L	T	P	C
3	1	-	3

Course Objectives:

Understand various fundamental design, analysis, and implementation of basic data structures. Basic concepts in the specification and analysis of programs. Principles for good program design, especially the uses of data abstraction. Significance of algorithms in programming and various aspects of algorithm development.

Course Outcomes: After completion of this course, student will be able to

1. Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.
2. Analyze and apply to solve the complex problems using advanced data structures (Stacks, queues, Heaps)
3. Demonstrate the various searching methods on ordered and unordered data and analyze their performance.
4. Ability to implement various sorting algorithms depending upon the requirement and comparison of various sorting methods in terms of their performance.
5. Design, implement, test, and debug programs using a variety of non-linear data structure binary and general tree structures, graphs.
6. Understand the advanced data structures related to handling data (Binary Search trees, AVL trees, Red-Black Trees, B trees)

UNIT I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples.

Data structures-Linear and non linear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two dimensional arrays, Sparse matrices and their representation.

UNIT II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap, java.util package-ArrayList, Linked List, Vector classes, Stacks and Queues in java.util, Iterators in java.util.

UNIT III

Searching-Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hashing in java.util-HashMap, HashSet, Hashtable.

UNIT IV

Sorting -Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT V

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non recursive traversals, Java code for traversals, Threaded binary trees. Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-dfs and bfs, Java code for graph traversals, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT VI

Search trees- Binary search tree-Binary search tree ADT, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees - Definition and examples only, B-Trees-definition, insertion and searching operations, Tries(examples only),Comparison of Search trees.

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TEXT BOOKS:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage Learning.
3. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition, Addison-Wesley (Pearson Education).

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th editon, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M.T.Goodrich, R.Tomassia, 3rd edition, Wiley India Edition.
5. Data structures and the Java Collection Frame work,W.J.Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
8. Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.
9. Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.
10. Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay and G.A.Cheston, Java edition, Pearson Education.

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

**Syllabus for M. Tech I Year I Semester
Computer Science
Database System Concepts**

Code: 6P103

L	T	P	C
3	1	-	3

Course Objectives:

To understand the basic concepts and the applications of database systems. Master the basics of SQL and construct queries using SQL. The relational database design principles. Familiar with the basic issues of transaction processing and concurrency control, with database storage structures and access techniques.

Course out come : After undergoing the course, Students should be able to understand

1. Explain the basic concepts and the applications of database systems.
2. Utilize the knowledge of basics of SQL and construct queries using SQL. Use commercial relational database system (Oracle) by writing Queries using SQL. Apply relational database theory, and be able to write relational algebra expressions for queries.
3. Explain & use design principles for logical design of databases, including the E-R method and normalization approach. Apply normalization for the development of application software's
4. Demonstrate the basics of query evaluation and apply query optimization techniques. Explain basic issues of transaction processing and concurrency control.
5. Compare the basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.
6. Distributed databases management system concepts and Implementation outcome.

UNIT I

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL, DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, ER diagrams,.

UNIT II

Relational Model: Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views –Altering Tables and Views, Relational Algebra, Basic SQL Queries, Nested Queries, Complex Integrity Constraints in SQL, Triggers

UNIT III

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less- join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT IV

Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking –Transaction Support in SQL.

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques – Concurrency Control without Locking.

Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery

UNIT V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing

Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM)

B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear Hashing.

UNIT VI

Distributed databases: Introduction to distributed databases, Distributed DBMS architectures, Storing data in a distributed DBMS, Distributed catalog management, Distributed query processing Updating distributed data, Distributed transactions, Distributed concurrency control, Distributed recovery.

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.
3. Fundamentals of Database Systems 5th edition. Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2008.

REFERENCE BOOKS:

1. Introduction to Database Systems, C.J.Date,Pearson Education.
2. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
3. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
4. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
5. Database-Principles, Programming, andPerformance, P.O'Neil&E.O'Neil, 2nd ed., ELSEVIER
6. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, TMH.
10. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez , Pearson Education, 2nd Edition.
11. Distributed Database Systems, Chhanda Ray, Pearson.
12. Distributed Database Management Systems, S.K.Rahimi and F.S.Haug, Wiley.

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓		✓	

Syllabus for M. Tech. I Year I semester
Computer Science
DISTRIBUTED SYSTEMS

L T P C
3 1 - 3

Code : 1N102

Course Objectives:

To understand the need for distributed systems and their applications, the concepts of Inter process Communication, remote procedure, distributed mutual exclusion and Flat and Nested Distributed Transaction.

Course Outcome: After completion of this course, student will be able to

1. Understand Distributed Systems and Its Implementation Through different model.
2. To understand the concept of Distributed Objects and Communication mechanisms between them.
3. Understand the concept of Distributed File Systems with Case Study.
4. Understand the Importance Of Coordination and Agreement, Transaction and Concurrency Control.
5. To know about the Distributed Transactions , Challenges and Recovery Procedures.
6. Understand Security Algorithms and techniques, Its Design and Implementation Issues through Case Studies.

UNIT I

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models-Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication.

UNIT II

Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC,Events and notifications, Case study-Java RMI Operating System Support-Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture,

UNIT III

Distributed File Systems-Introduction, File Service architecture, case study- SUN network file systems. Name Services-Introduction, Name Services and the Domain Name System,

Case study of the Global Name Service, Case study of the X.500 Directory Service. Peer to Peer Systems–Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore, Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.

UNIT IV

Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems. Transactions and Concurrency control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

UNIT V

Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT VI

Security-Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 Wi-Fi. Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, Other consistency models, CORBA case study-Introduction, CORBA RMI, CORBA Services

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman& Hall/CRC, Taylor & Francis Group, 2010..

REFERENCES:

1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press.
2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, TMH.
4. Reliable Distributed Systems, K.P.Birman, Springer.
5. Distributed Systems–Principles and Paradigms, A.S.Tanenbaum & M.V.Steen, Pearson Edn.
6. Distributed Operating Systems and Algorithm Analysis, R.Chow, T.Johnson, Pearson.
7. Distributed Operating Systems, A.S.Tanenbaum, Pearson education.
8. Distributed Computing, Principles, Algorithms and Systems, Ajay D.Kshemakalyani and Mukesh Singhal, Cambridge, rp 2010.

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M. Tech. I Year I semester
Computer Science
Advanced Java Programming

L T P C
3 1 - 3

Code : 1N103

Course Objectives:

Students will learn how to write, compile and execute Java programs, develop applications using Java's object-oriented features, develop applications using Java class libraries, develop platform-independent GUIs, read and write data using Java streams, develop network applications.

Course Outcome: After completion of this course, student will be able to

1. Identify classes, objects, members of a class and relationships among them needed for a specific problem.
2. Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifies, automatic documentation through comments, error exception handling)
3. Develop programs using the Java Collection API as well as the Java standard class library.
4. Write Java programs to implement error handling techniques using exception handling and multithreading.
5. Understand the Collections Framework and to develop the programs on Java Collections Framework. Understand the connection of database through JDBC and SQL operations
6. Understand the concepts of network programming and how to write network programs.

UNIT I

History of Java, Java buzzwords, data types, variables, simple java program, scope and life time of variables, operators, expressions, control statements, type conversion and costing, arrays,, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, recursion, string handling, StringTokenizer.

Objective: On the completion of the unit, a student should be able to: i) Write ,compile and execute simple java programs ii) Understand the syntax of classes and objects creation in java iii) Explain the differences between classes and objects iv) differentiate methods and constructors v) Understand constructor and method overloading vi) Understand how to handle strings in java

UNIT II

Inheritance –Definition, single inheritance, benefits of inheritance, Member access rules, super class, polymorphism- method overriding, Dynamic method dispatch, using final with inheritance, abstract classes, Base class object.

Interfaces: definition, variables and methods in interfaces, differences between classes and interfaces, usage of implements and extends keyword, an application using interfaces, uses of interfaces.

Applications using interface Objective:

On the completion of the unit, a student should be able to: i) Explain the benefits of inheritance ii) Understand how to access members of super class from subclass iii) Differentiate static and dynamic polymorphism iv) Understand the usage of final keyword in inheritance v) Understand the use of abstract class vi) Understand how to implement multiple inheritance in java vii) Explain the difference between classes and interfaces.

UNIT III

Packages: Definition, types of packages, Creating and importing a user defined package.

Exposure on java.io package,Streams and Serializable interface .

Exposure on java.util package , Internationalization , Localization and Wrapper Classes.

Generics: Auto boxing & Unboxing in java

On the completion of the unit, a student should be able to: i) Understand uses of packages ii) Able to create user defined packages in java

UNIT IV

Exception handling -exception definition, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Multi-Threading:-Thread definition, types of multitasking, uses of multitasking, thread life cycle, creating threads using Thread class and Runnable interface, synchronizing threads, daemon thread.

Applications of multithreading.

Objective: On the completion of the unit, a student should be able to: i) Understand benefits of exception handling ii) Handle built-in and user defined exceptions iii) Understand the uses of multi-threading iv) Create multi-threaded programs using either Thread class or Runnable interface v) Know how to synchronize threads

UNIT V

Introduction to Collections: What Is a Collections Framework? Interfaces Collection, Set, List, Queue, Dequeue and Map Implementations and Algorithms. Traversing Collections and Iterators. Collection Interface Array Operations. Connecting to database through JDBC and executing SQL operations.

On the completion of the unit, a student should be able to: i) Understand the core collection interfaces are the foundation of the Java Collections Framework. ii) Able to develop the programs on Java Collections Framework. iii)) Able to develop the programs on Java database connectivity.

UNIT VI

Networking – Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, sending file from server to client.

Applications: One to one Chat application Deployment options: Creating a JAR File, Running an executable JAR, Working with Manifest Files: The Basics

Objective:

On the completion of the unit, a student should be able to: i) Understand the concepts of networking ii) Understand socket programming iii) Write client-server applications iv) Able to create and execute jars.

TEXT BOOKS:

1. Java; the complete reference, 6th edition, Herbert Schildt, TMH.
2. Introduction to Java programming 6th edition, Y. Daniel Liang, Pearson education.

REFERENCES:

1. Core Java 2, Vol 1, Fundamentals, Cay. S. Horstmann and Gary Cornell, seventh Edition, Pearson Education.
2. Core Java 2, Vol 2, Advanced Features, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

**Syllabus for M. Tech I Year I Semester
Computer Science
ADVANCED COMPUTER ARCHITECTURE
(PROFESSIONAL ELECTIVE –I)**

Code: 6P101

L	T	P	C
3	1	-	3

Course Objectives :

Understand various classes of computers, new trends and developments in computer architecture. Understanding of instruction set architectures, addressing techniques, the various techniques to enhance a processors ability to exploit Instruction-level parallelism (ILP), and its challenges and the several advanced techniques to achieve cache performance.

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

1. Know the various classes of computers, new trends and developments in computer architecture.
2. Understand the instruction cycle, instruction set architectures, addressing modes.
3. Understand the various techniques to enhance a processors ability to exploit Instruction-level parallelism (ILP), and its challenges.
4. Understand exploiting ILP using dynamic scheduling, Hardware speculation and VLIW approach to exploits parallelism.
5. Understand the various methods to achieve memory consistency. Understand the several advanced techniques to achieve cache performance. Understand virtual memory and virtual machines.
6. Understand the performance of multi-core processors using SPEC benchmarks, thread level parallelism.
7. Understand RAID errors and failures, I/O subsystem designing concepts.

UNIT - I

Fundamentals of Computer design- Technology trends- cost- Instruction set principles and examples- classifying instruction set- memory addressing- type and size of operands- addressing modes -operations in the instruction set- instructions for control flow- encoding an instruction set.-the role of compiler.

UNIT - II

Instruction level parallelism (ILP)- overcoming data hazards- reducing branch costs –high performance instruction delivery- hardware based speculation- limitation of ILP

UNIT - III

ILP software approach- compiler techniques- static branch protection - VLIW approach - H.W support for more ILP at compile time- H.W verses S.W Solutions

UNIT - IV

Memory hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM.

UNIT - V

Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading.

UNIT - VI

Storage systems- Types – Buses - RAID- errors and failures- bench marking a storage device- designing a I/O system. Interconnection network media – practical issues in interconnecting networks.

TEXT BOOKS

1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier)

REFERENCES

1. “Computer Architecture and parallel Processing” Kai Hwang and A.Briggs International Edition McGraw-Hill.
2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.
3. Parallel Computer Architecture, A Hardware / Software Approach, David E. Culler, Jaswinder Pal singh with Anoop Gupta, Elsevier

PO1	PO2	PO3	PO4	PO5	PO6
✓			✓		✓

Syllabus for M. Tech I Year I Semester
Computer Science
SOFTWARE PROCESS AND PROJECT MANAGEMENT
(PROFESSIONAL ELECTIVE –I)

Code:6P108

L	T	P	C
3	1	-	3

Course Objectives: At the end of the course, the student shall be able to:

1. To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
2. To compare and differentiate organization structures and project structures.
3. To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

Course Outcome: After completion of this course, student will be able to

1. Software process maturity and independently carries out research on principles of software process.
2. Software economics; reduce software product size, improvement in software process, improving team effectiveness.
3. Life-Cycle Phases and artifacts of the Process
4. Describe Workflows and Checkpoints of process Software process workflows and process planning.
5. Understanding the Project Organizations and Project Control and process instrumentation
6. Understanding of CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

UNIT I

Software Process Maturity : Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process. **Process Reference Models** Capability Maturity Model (CMM), CMMi, PCMM, PSP, TSP.

UNIT II

Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

UNIT III

Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures.

UNIT IV

Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments. **Process Planning** Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT V

Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation. The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT VI

CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:

1. Managing the Software Process, Watts S. Humphrey, Pearson Education.
2. Software Project Management, Walker Royce, Pearson Education.

REFERENCE BOOKS:

1. Effective Project Management: Traditional, Agile, Extreme, Robert Wysocki, Sixth edition, Wiley India, rp2011.
2. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
3. Process Improvement essentials, James R. Persse, O'Reilly, 2006
4. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
5. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
6. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
7. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon 2ed, Wiley India, 2004.

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M. Tech I Year II Semester
Computer Science
Artificial Intelligence

(PROFESSIONAL ELECTIVE –I)

Code: 6P105

L	T	P	C
3	1	-	3

Course Objectives:

To design a suitable agent that takes rational decisions while solving problems for a given application and also incorporate features of autonomy and conflict resolution.

Course Outcome: After completion of this course, student will be able to

1. Identify different types of agents and their relationships with the environment.
2. Demonstrate the application of agents handling applications dealing with conflict resolution
3. Represent knowledge in logical level and also be able to convert it to a form suitable for implementation.
4. Derive inferences applying rules of First Order Logic
5. Formulate an approach for applications involving complete and incomplete Planning
6. Choose the appropriate learning strategy needed for solving a given problem.

UNIT-I

AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic and Rules.

UNIT-II

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Back propagation Network. Associative Memory Networks. Traing Algorithms for pattern association, BAM and Hopfield Networks.

UNIT-III

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks- Introduction to various networks.

UNIT-IV

Introduction to Classical Sets (crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations. Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

UNIT-V

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision Making.

UNIT-VI

Fuzzy Logic Control Systems, Genetic Algorithm- Introduction and basic operators and terminology. Applications: Optimization of TSP, Internet Search Technique.

TEXT BOOKS:

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva,, Pearson Edition, 2004.

REFERENCE BOOKS:

1. Artificial Intelligence and SoftComputing- Behavioural and Cognitive Modeling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.Systems”, Thomson India Edition, 2nd Ed., 2007.

REFERENCES:

1. Vijay. K. Garg, “Wireless Communication and Networking”, Morgan Kaufmann Publishers, 2007.
2. Kaveth Pahlavan, Prashant Krishnamurthy, "Principles of Wireless Networks",Pearson Education Asia, 2002.
3. Gary. S. Rogers & John Edwards, “An Introduction to Wireless Technology”, PearsoEducation, 2007.
4. Clint Smith, P.E. & Daniel Collins, “3G Wireless Networks”, Tata McGraw Hill, 2nd Ed

PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M. Tech I Year I Semester
 Computer Science
NETWORK SECURITY
(PROFESSIONAL ELECTIVE –I)

Code: 1N104

L	T	P	C
3	1	-	3

Course Objectives:

Understand various cryptographic algorithms, Authentication techniques, Email security Network layer security issues, SET, Firewalls, intruder detection, virus related threats.

Course Outcome: After completion of this course, student will be able to

1. List the basic categories of security attacks, services, understand the model of network security, different techniques and operations involved in encryption and decryption.
2. Implement different symmetric and asymmetric encryption algorithm, key distribution and cryptanalysis.
3. Understand the requirements of authentication and implement different authentication technique and its applications.
4. Understand the Email security, IP security and its associated protocols and headers
5. Describe the Secure Socket Layer, distinguish between SSL and TLS, Firewall design principles
6. Understand SET, intrusion techniques and virus related threats.

UNIT I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security.

Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT II

Symmetric key Ciphers: Block Cipher principles & Algorithms(DES, AES,Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution

Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman,ECC), Key Distribution

UNIT III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions,

Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm

Authentication Applications: Kerberos, X.509 Authentication Service, Public – Key Infrastructure, Biometric Authentication

UNIT IV

E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP Security architecture,

Authentication Header, Encapsulating security payload, combining security associations, key management

UNIT V

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Firewalls:, Countermeasures, Firewall design principles, Types of firewalls

UNIT VI

Secure Electronic transaction, Intruders, Intrusion detection, password Management, Virus and related threats

TEXT BOOKS:

1. Cryptography and Network Security : William Stallings, Pearson Education,5th Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 2nd Edition.
3. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

REFERENCES BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2nd Edition
3. Information Security, Principles and Practice : Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning.
6. Principles of Information security by Michael E Whitman and Herbert J.Mattord.

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Syllabus for M. Tech. I Year I semester
Computer Science
SEMANTIC WEB AND SOCIAL NETWORKS
(PROFESSIONAL ELECTIVE-I)

Code: 6P106

L	T	P	C
3	1	-	3

Course objectives:

Understand the newer technologies used in the World Wide Web and their significance over the conventional technologies. Appriase the usage of RDF, OWL and UML/ XML Schema in the semantic web development. Learn and understand the ontology concepts and tools used to develop them in web applications.

Course Outcome: After completion of this course, student will be able to

1. Describe role of Web , its need and Intelligence.
2. Explain Machine Intelligence Ontology, Inference engines, Software Agents, Berners-Lee www and Semantic Road Map.
3. Describe Knowledge Representation for the Semantic Web with Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML and XML Schema.
4. Apply Ontology Engineering using Ontology Development Tools/ Methods, Ontology Libraries, Ontology Mapping, Logic and Inference Engines.
5. Explain Semantic Web Applications, Services and Technology.
6. Apply Social Network Analysis, Semantic web networks analysis and describe Building of Semantic Web Applications with social network features.

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

Unit II

Machine Intelligence: Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

Unit III

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 IV

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 V

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 VI

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 interscience, 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,Rudi Studer,Paul Warren,JohnWiley&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 A Semantic Web Primer, G. Antoniou and V. Harmelen, PHI.

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Syllabus for M. Tech I Year I semester
Computer Science
PARALLEL AND DISTRIBUTED ALGORITHMS
(PROFESSIONAL ELECTIVE –II)

Code: 1N106

L	T	P	C
3	1	-	3

Course objective : To learn parallel and distributed algorithms development techniques, pipelining, Distributed shared memory systems and Shared memory multiprocessor.

Course Outcome : After completion of this course, student will be able to

1. To learn parallel and distributed algorithms development techniques for shared memory and message passing models.
2. Understand the main classes of parallel algorithms.
3. To study the complexity and correctness models for parallel algorithms.
4. Understand distributed shared memory programming primitive.
5. Understand shared memory multiprocessor architecture.

UNIT-I

Basic Techniques, Parallel Computers for increase Computation speed, Parallel & Cluster Computing

UNIT-II

Message Passing Technique- Evaluating Parallel programs and debugging, Portioning and Divide and Conquer strategies examples

UNIT-III

Pipelining- Techniques computing platform, pipeline programs examples

UNIT-IV

Synchronous Computations, load balancing, distributed termination examples, programming with shared memory

UNIT-V

Shared memory multiprocessor constructs for specifying parallel sharing data parallel programming languages and constructs, open MP

UNIT-VI

Distributed shared memory systems and programming achieving constant memory distributed shared memory programming primitives, algorithms – sorting and numerical algorithms.

TEXT BOOK:

1. Parallel Programming, Barry Wilkinson, Michael Allen, Pearson Education, 2nd Edition.

REFERENCE BOOK:

1. Introduction to Parallel algorithms by Jaja from Pearson, 1992

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Syllabus for M. Tech I Year I semester
Computer Science and Engineering
SOFTWARE METRICS AND QUALITY ASSURANCE
(PROFESSIONAL ELECTIVE –II)

Code: 6P113

L	T	P	C
3	1	-	3

Course Objectives:

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

- Understand quality management processes
- Distinguish between the various activities of quality assurance, quality planning and quality control.
- Understand the importance of standards in the quality management process and their impact on the final product.
-

Course Outcome: After completion of this course, student will be able to

1. Software Fundamentals of measurement, Scope of software metrics, Measurement theory, Software measurement validation software metrics data collection, Analysis methods.
2. Software Measurement of internet product attributes, size and structure, external product attributes measurement of quality, Software quality metrics.
3. Explain Rayleigh Model, Problem Tracking Report (PTR) Model, Reliability Growth Model and Orthogonal Classification.
4. Describe SQA basics, Software quality in business context, planning for software quality assurance, Product quality and process quality, Software process models.
5. Understanding the Models for Quality Assurance, ISO-9000 – Series CMM, CMMI, Test Maturity Models, SPICE.
6. Software Process PSP and TSP , OO Methodology, Clean-room software engineering.

UNIT I: INTRODUCTION TO SOFTWARE METRICS

Fundamentals of measurement, Scope of software metrics, Measurement theory, Software measurement validation software metrics data collection, Analysis methods.

UNIT II PRODUCT AND QUALITY METRICS

Measurement of internet product attributes, size and structure, external product attributes, measurement of quality, Software quality metrics, product quality-process quality, metrics for software maintenance.

UNIT III MANAGEMENT METRICS

Quality Management Models - Rayleigh Model, Problem Tracking Report (PTR) Model, Reliability Growth Model, Model Evaluation, Orthogonal Classification.

UNIT IV FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE

SQA basics, Software quality in business context, planning for software quality assurance , Product quality and process quality, Software process models, Total Quality Management, QC Tools and Modern Tools.

UNIT V QUALITY ASSURANCE MODELS

Models for Quality Assurance, ISO-9000 – Series CMM, CMMI, Test Maturity Models, SPICE, Malcolm ,Baldrige Model- P-CMM.

UNIT VI SOFTWARE QUALITY ASSURANCE TRENDS

Software Process PSP and TSP , OO Methodology, Clean-room software engineering, Defect injection and prevention -Internal Auditing and Assessments-Inspections & Walkthroughs

TEXTBOOKS:

1. Norman E-Fentor and Share Lawrence Pflieger.” Software Metrics”. International Thomson Computer Press, 1997.
2. Stephen H.Kan,”Metric and Models in software Quality Engineering”, Addison QWesley

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Syllabus for M. Tech I Year I Semester
Computer Science
CLOUD COMPUTING
(PROFESSIONAL ELECTIVE –II)

Code: 6P111

L	T	P	C
3	1	-	3

Course Objectives:

Understand various distributed computing architectures. Comprehend Cloud computing features, services and security challenges along with the standards useful for the development of cloud based applications.

Course Outcomes: After undergoing the course, Students should be able to understand

- 1 Explain Distributed, Parallel, Vector, multi processing and grid Computing Architectures. Describe Virtualization and usage of Virtual machine.
- 2 Define basic terms of Cloud and cloud computing along with benefits/ challenges and explain differences between Grid Computing and Cloud Computing.
- 3 Describe and use concepts of IaaS, PaaS and SaaS. Explain cloud development process and role of cloud data center using SOA.
- 4 Apply and explain Privacy in the Cloud along with the cloud security challenges.
- 5 Explain Common Standards and role of open cloud consortium for application developers and apply standards for messaging.
- 6 Explain Mobile internet devices along with virtualization , Map Reduce and HDFS.

UNIT - I

Introductory Concepts & overview: Distributed Systems - Parallel Computing Architectures: Vector Processing, Symmetric Multi Processing and Massively parallel processing systems - Grid Computing - Service Oriented Architecture Overview - Virtualization.

UNIT - II

Overview of Cloud Computing : Meaning of the terms Cloud and cloud computing - cloud based service offerings - Grid Computing Vs Cloud Computing - Benefits of Cloud Model - limitations - legal issues - key characteristics of cloud computing - challenges for the cloud - the evolution of cloud computing.

UNIT - III

Web services delivered from the cloud: Infrastructure as a service - platform as a service - software as a service. Building Cloud networks: Evolution from the MSP model to cloud computing and software as a service - the cloud data center - SOA as step toward cloud computing - basic approach to a data center based SOA.

UNIT - IV

Federation Presence, Identity & Privacy in the Cloud: Federation in the cloud - presence in the cloud - privacy in the cloud - Privacy and its relation to cloud based information system. security in the cloud: cloud security challenges - software as a service security.

UNIT - V

Common Standards in cloud computing: the open cloud consortium - the distributed management task force - standards for application developers -standards for messaging - standards for security.

UNIT - VI

Mobile internet devices and the cloud: smartphone - mobile operating systems for smartphones - mobile platform virtualization - Collaboration Applications for mobile platforms - future trends.

Casestudies: Map Reduce, HDFS.

TEXT BOOKS:

1. Cloud Computing Implementation, Management and Security by John W. Rittinghouse, James F. Ransome, CRC Press, Taylor & Francis group, 2010.
2. Cloud Computing a practical approach by Anthony T. Velte, Toby J. velte Robert Elsenpeter, Tata McGrawHill edition, 2010.

REFERENCES:

1. Cloud Application Architectures by George Reese, Oreilly publishers.
2. Cloud Computing and SOA convergence in your enterprise, David S. Linthicum, Addison- Wesley.
3. George Coulouris, JeanDollimore and Tim Kindberg. Distributed Systems:Concepts and Design (Edition 3).Addison-Wesley2001

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Syllabus for M. Tech. I Year II semester
Computer Science
LINUX PROGRAMMING
(Professional Elective- II)

Code:1N106

L	T	P/D	C
3	1	-	3

Course Objectives: Understand various Linux commands, file structure and file locking / unlocking primitives, Understand concepts of process management and client server communication and to Learn Inter Process Communication concepts.

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

1. Know the fundamentals of scripting and command on linux commands.
2. Describe File structure of Unix and related system calls to interact with files and directories.
3. Demonstrate operating system fundamentals of sharing, locking and deadlock.
4. Handle the process and signals related to operating system.
5. Interact, communicate with multiple processes. They will be in position to write client server programs for communication.
6. Describe the core concepts of operating system semaphore mutex and shared memory.
7. Understand the use of Message Queues, FIFOs.

Unit 1: (Chapter 1 and 2)

An Introduction to UNIX, Linux, and GNU, What Is UNIX?, What Is Linux?, The GNU Project and the Free Software Foundation, Linux Distributions, Programming Linux, Linux Programs, Text Editors, The C Compiler, Shell Programming: Why Program with a Shell?, A Bit of Philosophy, What Is a Shell? Pipes and Redirection: Redirecting Output, Redirecting Input, Pipes. The Shell as a Programming Language: Interactive Programs, Creating a Script, Making a Script Executable, Shell Syntax: Variables, Conditions, Control Structures, Functions, Commands, Command Execution, Here Documents, Debugging Scripts

Unit 2: (Chapter 3)

Working with Files: Linux File Structure, Directories, Files and Devices, System Calls and Device Drivers, Library Functions, Low-Level File Access: write, read, open, Initial Permissions, Other System Calls for Managing Files, The Standard I/O Library: fopen, fread, fwrite, fclose, fflush, fseek, fgetc, getc, and getchar, fputc, putc, and putchar, fgets and gets,

Formatted Input and Output: printf, fprintf, and sprintf, scanf, fscanf, and sscanf, Other Stream Functions, Stream Errors, Streams and File Descriptors, File and Directory Maintenance, chmod, chown, unlink, link, and symlink, mkdir and rmdir, chdir and getcwd.

Scanning Directories: opendir, readdir, telldir, seekdir, closedir, Errors, strerror, perror

The /proc File System, fcntl.

Unit 3:

Environment Variables (Chapter 4 given topics only): getenv and putenv, The environ Variable, Data Management (Chapter 7): Managing Memory, Simple Memory Allocation, Allocating Lots of Memory, Abusing Memory, The Null Pointer, Freeing Memory, Other Memory Allocation Functions, File Locking, Creating Lock Files, Locking Regions, Use of read and write with Locking, Competing Locks, Other Lock Commands, Deadlocks, Databases, The dbm Database, The dbm Routines, dbm Access Functions, Additional dbm Functions

Development Tools (Chapter 9 given topics only): The make Command and Makefiles

Unit 4:

Processes and Signals(Chapter 11):

What Is a Process?, Process Structure, The Process Table, Viewing Processes, System Processes, Process Scheduling, Starting New Processes, Waiting for a Process, Zombie Processes, Input and Output Redirection, Threads

Signals: Sending Signals, Signal Sets,

POSIX Threads (Chapter 12): What Is a Thread?, Advantages and Drawbacks of Threads, A First Threads Program, Simultaneous Execution, Synchronization, Synchronization with Semaphores, Synchronization with Mutexes, Thread Attributes, Canceling a Thread, Threads in Abundance.

Unit 5:

Inter-Process Communication (Chapter 13): Pipes: What Is a Pipe?, Process Pipes, Sending Output to popen, Passing More Data, How popen Is Implemented, The Pipe Call, Parent and Child, Processes, Reading Closed Pipes, Pipes Used as Standard Input and Output. Named Pipes: FIFOs, Accessing a FIFO, Advanced Topic: Client/Server Using FIFOs

Case Study: Client Interface Functions, The Server Interface, server.c, The Pipe

Unit 6:

Semaphores, Shared Memory, and Message Queues (Chapter 14): Semaphores: Semaphore Definition, A Theoretical Example, Linux Semaphore Facilities, Using Semaphores, Shared Memory: shmget, shmat, shmdt, shmctl

Message Queues: msgget, msgsnd, msgrcv, msgctl

IPC Status Commands: Displaying Semaphore Status, Displaying Shared Memory Status, Displaying Message Queue Status

TEXT BOOK:

1. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.

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Syllabus for M. Tech. I Year II semester
Computer Science
DISTRIBUTED COMPUTING
(PROFESSIONAL ELECTIVE –II)

Code:1N105

L	T	P/D	C
3	1	-	3

Course Objectives

To understand Foundation of cooperative distributed systems engineering, Supporting technologies with a special attention to agent-oriented paradigm, Service-oriented computing and grid computing and The implementation component includes a term-project.

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

1. To learn the strengths and weaknesses of Distributed computing.
2. To understand Cluster Architecture, parallel programming models and Applications of Clusters.
3. To understand Grid computing road map and architecture.
4. Open Grid Service Architecture and Commercial Data Center.
5. Online Media and Entertainment. OGSA platform Components.
6. Globus GT 3 Toolkit – Architecture and Programming Model.

UNIT I:**Introduction**

The different forms of computing, The strengths and weaknesses of Distributed computing, Operating system concepts relevant to distributed computing, the architecture of distributed applications. Paradigms for Distributed Applications, choosing a Paradigm for an application (trade-offs).

UNIT II**Cluster Computing**

Parallel computing overview, cluster computing – Introduction, Cluster Architecture, parallel programming models and Paradigms, Applications of Clusters.

UNIT III**Grid Computing**

Introduction, Grid Computing Anatomy – Architecture, Architecture and relationship to other Distributed Technologies, Grid computing road map. Merging the Grid services Architecture with the Web Services Architecture.

UNIT IV

Open Grid Service Architecture – Introduction, Architecture and Goal, Sample Use cases: Commercial Data Center, National Fusion Collaboratory

UNIT V

Online Media and Entertainment. OGSA platform Components, Open Grid Services Infrastructure.

UNIT VI

Globus GT 3 Toolkit – Architecture, Programming Model, A sample implementation, High Level services, OGSI.NET Middleware Solutions.

TEXT BOOKS:

1. Grid Computing, Joshy Joseph & Craig Fellenstein, Pearson education, 2004
2. Distributed Computing, Principles and Applications, M.L.Liu, Pearson Education, 2004
3. High Performance Cluster Computing, Rajkumar Buyya, Pearson education.

REFERENCE BOOKS:

1. Grid Computing – Making the global infrastructure a reality, Fran Berman, Geoffrey C Fox, Anthony J G Hey, Wiley India, 2010.
2. A Networking Approach to Grid Computing, D.Minoli, Wiley & sons, 2006.
3. Grid Computing: A Practical Guide to Technology and Applications, A.Abbas, Firewall Media, 2008.

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Syllabus for M. Tech. I Year I semester

Computer Science

ADVANCED DATA STRUCTURES and ALGORITHMS using JAVA LAB

Code: IN170

L	T	P	C
-	-	4	2

Objective:

The fundamental design, analysis, and implementation of basic data structures. Basic concepts in the specification and analysis of programs. Principles for good program design, especially the uses of data abstraction.

Course Outcomes: After completion of this course, student will be able to

1. Be able to design and analyze the time and space efficiency of the data structure.
2. Be capable to identify the appropriate data structure for given problem and understand the operations of heaps and their applications.
3. Organize the data in the computer memory using hash functions.
4. Ability to implement and summarize various sorting techniques.
5. Implement traversal techniques on basic non-linear data structures like binary trees and graphs.
6. Explain non linear data structures binary search trees, B trees, and pattern matching KMP algorithm.

Sample Problems on Data structures:

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods: a) Linear search b) Binary search
2. Write Java programs to implement the following using arrays and linked lists a) List ADT
3. Write Java programs to implement the following using an array. a) Stack ADT b) Queue ADT
4. Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).
5. Write a Java program to implement circular queue ADT using an array.
6. Write a Java program that uses both a stack and a queue to test whether the given string is a palindrome or not.
7. Write Java programs to implement the following using a singly linked list. a) Stack ADT b) Queue ADT
8. Write Java programs to implement the deque (double ended queue) ADT using a) Array b) Singly linked list c) Doubly linked list.
9. Write a Java program to implement priority queue ADT.

10. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in
 - a) Preorder b) Inorder c) Postorder.
11. Write a Java program to perform the following operations:
 - a) Construct a binary search tree of elements.
 - b) Search for a key element in the above binary search tree.
 - c) Delete an element from the above binary search tree.
12. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
13. Write a Java program to implement Dijkstra's algorithm for Single source shortest path problem.
14. Write Java programs for the implementation of bfs and dfs for a given graph.
15. Write Java programs for implementing the following sorting methods:
 - a) Bubble sort d) Merge sort g) Binary tree sort
 - b) Insertion sort e) Heap sort
 - c) Quick sort f) Radix sort
16. Write a Java program to perform the following operations:
 - a) Insertion into a B-tree b) Searching in a B-tree
17. Write a Java program that implements Kruskal's algorithm to generate minimum cost spanning tree.
18. Write a Java program that implements KMP algorithm for pattern matching.

REFERENCE BOOKS:

1. Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning.
 2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum's Outlines, TMH.
 3. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.
 4. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.
 5. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.
 6. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education.
 7. Data Structures and java collections frame work, W.J.Collins, Mc Graw Hill.
 8. Java: the complete reference, 7th editon, Herbert Schildt, TMH.
 9. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java: How to Program P.J.Deitel and H.M.Deitel , 8th edition, PHI.
 10. Java Programming, D.S.Malik,Cengage Learning.
 11. A Practical Guide to Data Structures and Algorithms using Java, S.Goldman & K.Goldman, Chapman & Hall/CRC, Taylor & Francis Group.
- (Note: Use packages like `java.io`, `java.util`, etc)

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**Syllabus for M. Tech I Year I Semester
Computer Science
Research Methodology**

L	T	P/D	C
2	1		2

Code: 6P115

Course Objectives

Understand some basic concepts of research and its methodologies, Identify appropriate research topics, Select and define appropriate research problem and parameters, prepare a project proposal (to undertake a project), Organize and conduct research (advanced project) in a more appropriate manner, Write a research report and thesis

Course Outcomes: At the end of this course, the students should be able to:

1. Study the concepts of Research, Characteristics and Prerequisites of research, Research needs in Engineering, Education, Science and Management.
2. Study the concepts of conducting a literature search, Evaluating, Organizing, and synthesizing the literature.
3. Identifying and describing the research, finding the research Problem, Sources of research problem
4. Perform Quantitative / Qualitative Research Design, basic principles of research design.
5. Familiar with concept of formatting a research proposal.
6. Familiar with writing Research report

UNIT-I

1. Research Methodology: An Introduction

Meaning of Research, Objectives of Research Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method. Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India,

UNIT-II

2. Defining the Research Problem

What is a Research Problem?, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration, Conclusion .

UNIT-III

3. Research Design

Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Developing a Research Plan, Conclusion.

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UNIT-IV

4. Sampling Design

Census and Sample Survey, Implications of a Sample Design, Steps in Sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs, How to Select a Random Sample, Random Sample from an Infinite Universe, Complex Random Sampling Designs, Conclusion.

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UNIT-V

5. Methods of Data Collection

Collection of Primary Data, Observation Method, Interview Method, Collection of Data through Questionnaires, Collection of Data through Schedules, Difference between Questionnaires and Schedules, Some Other Methods of Data Collection, Collection of Secondary Data.

UNIT-VI

6. Concept of Hypothesis and Testing

What is a Hypothesis? Basic Concepts Concerning Testing of Hypotheses, Procedure for Hypothesis Testing, Flow Diagram for Hypothesis Testing, Measuring the Power of a Hypothesis Test, Tests of Hypotheses. Important Parametric Tests, Hypothesis Testing of Correlation Coefficients, Limitations of the Tests of Hypotheses, Chi-square as a Test for Comparing Variance, Chi-square as a Non-parametric Test, Conditions for the Application of χ^2 Test, Steps Involved in Applying Chi-square Test.

Text Books

1. C.R. Kothari, Research Methodology Methods and Techniques, 2/e, Vishwa Prakashan, 2006
2. Donald H.McBurney, Research Methods, 5th Edition, Thomson Learning, ISBN:81-315-0047-0,2006

Reference Books

1. Donald R. Cooper, Pamela S. Schindler, Business Research Methods, 8/e, Tata McGraw-Hill Co. Ltd., 2006.
2. Fuzzy Logic with Engg Applications, Timothy J.Ross, Wiley Publications, 2nd Ed[d]
3. Simulated Annealing: Theory and Applications (Mathematics and Its Applications, by P.J. van Laarhoven &E.H. Aarts[e]
4. Genetic Algorithms in Search, Optimization, and Machine Learning by David E. Goldberg

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓		✓		

Syllabus for M. Tech I Year I Semester

Computer Science

Literature Review and Seminar-I

Code: IN171

L	T	P	C
-	-	3	1

Max. Marks: 100

After studying this course, the students will be able to

1. Identify a research topic
2. Collect literature
3. Present seminar
4. Discuss the queries

There shall be three seminar presentations during I year I semester and I year II Semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the Department in a report form and shall make an oral presentation before the Departmental Committee, which shall consist of the Head of the Department, a senior Faculty Member and the Supervisor and will jointly evaluate the report and presentation. For each Seminar there will be only internal evaluation of 25 marks. A candidate has to secure a minimum of 50% to be declared successful.

In the First semester the report must be in the form of the review paper with a format used by IEEE / ASME etc. In the Second semester Technical Seminar in the form of Independent Review Paper must be of high quality fit for publication in a reputed conference / journal.

The evaluation format for seminar is as follows:

- Day to day evaluation by the Supervisor : 20 marks
- Final Report : 20 marks
- Presentation : 60 marks (20 Abstract seminar +40 Final Presentation)

The presentation includes content (5) + Participation (5) + Presentation (10) for a total of 20 marks and double for 40 marks for final presentation.

A Student has to concentrate on the following sections while writing technical paper or presenting seminar.

Contents

- Identification of specific topic
- Analysis
- Organization of modules
- Naming Conventions
- Writing style
- Figures
- Feedback
- Miscellaneous

REFERENCES:

Teach Technical Writing in Two Hours per Week by Norman Ramsey

For Technical Seminar the student must learn few tips from sample seminars and correcting himself, which is continues learning process

REFERENCE LINKS:

- I. <http://www.cs.dartmouth.edu/~scot/givingTalks/sld001.htm>
- II. <http://www.cse.psu.edu/~yuanxie/advice.htm>
- III. <http://www.eng.unt.edu/ian/guides/postscript/speaker.pdf>

NOTE: A student can use any references for this process, but must be shared in classroom.

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓				

Syllabus for M. Tech I Year I Semester
Computer Science
Comprehensive Viva-Voce-I

Code: IN172

L	T	P	C
-	-	3	2

Max. Marks: 100

There shall be a Comprehensive Viva-Voce Examination. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects, he/she studied during the M. Tech course of study, The Comprehensive Viva-Voce is valued for 100 marks. There are 50 marks to be evaluated by the internal committee and 50 marks for the end semester evaluation by a committee constituted with internal members and external evaluator. A candidate has to secure a minimum of 50% of total marks subject to securing a minimum of 40% mark in external examination to be declared successful.

PO1	PO2	PO3	PO4	PO5	PO6
		✓	✓		

Syllabus for M. Tech I Year II Semester

Computer Science

NETWORK PROGRAMMING

Code: 1N201

L	T	P	C
3	1	-	3

Course Objective:

Understanding of Linux utilities, file handling, signals, Inter Process Communication and various methods to communicate with each other across a Computer Network.

Course Outcomes: At the end of this course, the students should be able to:

1. Understand File handling utilities, Security by file permissions, Process utilities
2. Learn file I/O in C using system calls, kernel support for files, file status information-stat family.
3. Learn Process concept, Kernel support for process, process attributes, process control.
4. Understand Interprocess Communication, Pipes, using FIFOs(Named pipes), message queues, semaphores and shared memory.
5. Understand Socket system calls for Connection Oriented –Communication.
6. Concepts of Network Programming in Java-Network basics.

UNIT – I

Linux Utilities- File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking utilities, Filters, Text processing utilities and Backup utilities.

Bourne again shell(bash) - Introduction, pipes and redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples.

UNIT - II

Review of C programming concepts-arrays, strings (library functions), pointers, function pointers, structures, unions, libraries in C.

Files- File Concept, File types File System Structure, Inodes, File Attributes, file I/O in C using system calls, kernel support for files, file status information-stat family, file and record locking-lockf and fcntl functions, file permissions- chmod, fchmod, file ownership-chown, lchown , fchown, linksoft links and hard links – symlink, link, unlink.

UNIT - III

File and Directory management – Directory contents, Scanning Directories- Directory file APIs.

Process- Process concept, Kernel support for process, process attributes, process control – process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process.

UNIT - IV

Signals- Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions. Interprocess Communication - Introduction to IPC mechanisms, Pipes- creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions, Introduction to message queues, semaphores and shared memory.

Message Queues- Kernel support for messages, UNIX system V APIs for messages, client/server example.

Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores.

UNIT – V

Shared Memory- Kernel support for shared memory, UNIX system V APIs for shared memory, client/server example.

Network IPC - Introduction to Unix Sockets, IPC over a network, Client-Server model Address formats(Unix domain and Internet domain), Socket system calls for Connection Oriented -

Communication, Socket system calls for Connectionless-Communication, Example-Client/Server Programs- Single Server-Client connection, Multiple simultaneous clients, Socket options – setsockopt, getsockopt, fcntl.

UNIT-VI

Network Programming in Java-Network basics, TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI)-Basic RMI Process, Implementation details-Client-Server Application.

TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHI.(Units II,III,IV)
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.(Unit I)
3. An Introduction to Network Programming with Java, Jan Graba, Springer, rp 2010.(Unit V)
4. Unix Network Programming ,W.R. Stevens, PHI.(Units II,III,IV)
5. Java Network Programming,3rd edition, E.R. Harold, SPD, O'Reilly.(Unit V)

REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Edn.
3. UNIX for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Edn.
4. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition.
5. Unix Network Programming The Sockets Networking API, Vol.-I,W.R.Stevens, Bill Fenner, A.M.Rudoff, Pearson Education.
6. Unix Internals, U.Vahalia, Pearson Education.
7. Unix shell Programming, S.G.Kochan and P.Wood, 3rd edition, Pearson Education.
8. C Programming Language, Kernighan and Ritchie, PHI

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

**Syllabus for M. Tech I Year II semester
Computer Science
INFORMATION RETRIEVAL SYSTEMS**

Code: 6P208

L	T	P	C
3	1	-	3

Course Objectives:

On completion of this course you should have gained a good understanding of the foundation concepts of information retrieval techniques and be able to apply these concepts into practice. Specifically, the student should be able to:

Course Outcomes: The students must able to understand

1. To use different information retrieval techniques in various application areas
2. To apply IR principles to locate relevant information large collections of data
3. To analyze performance of retrieval systems when dealing with unmanaged data sources
4. To implement retrieval systems for web search tasks.
5. To implement Flat clustering, Hierarchical clustering, Matrix decompositions and latent semantic index

UNIT I

Boolean retrieval. The term vocabulary and postings lists. Dictionaries and tolerant retrieval. Index construction. Index compression.

UNIT II

Scoring, term weighting and the vector space model. Computing scores in a complete search system. Evaluation in information retrieval. Relevance feedback and query expansion.

UNIT III

XML retrieval. Probabilistic information retrieval. Language models for information retrieval. Text classification.

UNIT IV

Vector space classification. Support vector machines and machine learning on documents

UNIT V

Flat clustering, Hierarchical clustering, Matrix decompositions and latent semantic indexing.

UNIT VI

Web search basics, Web crawling and indexes, Link analysis.

TEXT BOOKS:

1. Introduction to Information Retrieval , Christopher D. Manning and Prabhakar
2. Raghavan and Hinrich Schütze, Cambridge University Press, 2008.

REFERENCE BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrieval, Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics, David A Grossman and Ophir Frieder, 2nd Edition, Springer, 2004.
4. Information Retrieval Data Structures and Algorithms, William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
5. Information Storage & Retrieval, Robert Korfhage , John Wiley & Sons.

PO1	PO2	PO3	PO4	PO5	PO6
		✓	✓		

Syllabus for M. Tech I Year II Semester

Computer Science

INTERNET TECHNOLOGIES AND SERVICES

Code:1N202

L	T	P	C
3	1	-	3

Course Objective:

The student should understand multi-tier architecture, server side components and HTML5, CSS3, Javascript, Ajax, JQuery and JSON, Database: MySQL and Framework: Struts with validation framework.

Course Outcomes: The students must able to understand

1. Knowledge of programming with java using multi-tier architecture.
2. Learn HTML5, CSS3, Javascript, Ajax, JQuery and JSON.
3. Concepts of Server Side: Java Servlets, and JSP.
4. MySQL with Hibernate and Connection Pooling.
5. Framework: Struts with validation framework, Internationalization (I18N).
6. SOA: Service Oriented Architecture.

UNIT I

Client Side Technologies: Overview of HTML - Common tags, XHTML, capabilities of HTML5, Cascading Style sheets, CSS3 enhancements, linking to HTML Pages, Classes in CSS

Introduction to JavaScripts, variables, arrays, methods and string manipulation, BOM/DOM (Browser/Document Object Model), accessing elements by ID, Objects in JavaScript
Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events Simplifying scripting with JQuery, JASON for Information exchange

UNIT II:

Client Side Technologies: Overview of HTML - Common tags, XHTML, capabilities of HTML5 Cascading Style sheets, CSS3 enhancements, linking to HTML Pages, Classes in CSS

Introduction to JavaScripts, variables, arrays, methods and string manipulation, BOM/DOM (Browser/Document Object Model), accessing elements by ID, Objects in JavaScript, Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events Simplifying scripting with JQuery, JASON for Information exchange.

UNIT III

Introduction to Java Servlets: Introduction to Servlets: Lifecycle of a Servlet, Reading request and initialization parameters, Writing output to response, MIME types in response, Session Tracking: Using Cookies and Sessions Steps involved in Deploying an application Database Access with JDBC and Connection Pooling Introduction to XML, XML Parsing with DOM and SAX Parsers in Java Ajax - Ajax programming with JSP/Servlets, creating XML Http Object for various browsers, Sending request, Processing response data and displaying it.

Introduction to Hibernate

UNIT IV

Introduction to JSP: JSP Application Development: Types of JSP Constructs (Directives, Declarations, Expressions, Code Snippets), Generating Dynamic Content, Exception Handling, Implicit JSP Objects, Conditional Processing, Sharing Data Between JSP pages, Sharing Session and Application Data, Using user defined classes with jsp:useBean tag, Accessing a Database from a JSP

UNIT V

Introduction to Struts Framework: Introduction to MVC architecture, Anatomy of a simple struts2 application, struts configuration file, Presentation layer with JSP, JSP bean, html and logic tag libraries, Struts Controller class, Using form data in Actions, Page Forwarding, validation frame work, Internationalization

UNIT VI

Service Oriented Architecture and Web Services Overview of Service Oriented Architecture – SOA concepts, Key Service Characteristics, Technical Benefits of a SOA Introduction to Web Services– The definition of web services, basic operational model of web services, basic steps of implementing web services.

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models, Describing Web Services –Web Services life cycle, anatomy of WSDL

Introduction to Axis– Installing axis web service framework, deploying a java web service on axis. Web Services Interoperability – Creating java and .Net client applications for an Axis Web Service (Note: The Reference Platform for the course will be open source products Apache Tomcat Application Server, MySQL database, Hibernate and Axis)

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech .2. The complete Reference Java 7th Edition , Herbert Schildt., TMH.
3. Java Server Pages,Hans Bergsten, SPD, O'Reilly.
4. Professional Jakarta Struts - James Goodwill, Richard Hightower, Wrox Publishers.
5. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp –2008.
6. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition –2009

7. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009

REFERENCE BOOKS:

1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE
3. TECHNOLOGIES , Marty Hall and Larry Brown Pearson
4. Internet and World Wide Web – How to program , Dietel and Nieto PHI/Pearson.
5. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly.
6. Professional Java Server Programming,S.Allamaraju & othersApress(dreamtech).
7. Java Server Programming ,Ivan Bayross and others,The X Team,SPD
8. Web Warrior Guide to Web Programmimg-Bai/Ekedaw-Cengage Learning.
9. Beginning Web Programming-Jon Duckett ,WROX.

PO1	PO2	PO3	PO4	PO5	PO6
✓				✓	

Syllabus for M. Tech I Year II Semester
Computer Science
MOBILE COMPUTING

Code: 6P210

L	T	P	C
3	1	-	3

Course Objective : Learn concepts of mobile communication and various media access control methods. Understand IP mobile primitives and concepts of network and transport layer with regard to mobile communication. Understand WAP protocols, Bluetooth and The Necessary Tools for Android.

Course Outcomes

1. Identify vast application areas for mobile / wireless communication / computing. They also understand the working principle of GSM technology.
2. Discuss various media access control methods that are meant for wireless communication along with SDMA, FDMA, TDMA and CDMA.
3. Identify IP mobile primitives in Network layer in the wireless communication and recognize suitable solutions for the same.
4. Explain the issues in the Transport layer in wireless communication and identifying suitable solutions for the same
5. Discuss MANETs with examples and explain hoarding, client sever computing along with the data delivery mechanisms.
6. Discuss protocols and tools such as WAP, Blue Tooth and explain emerging mobile operating systems.

UNIT - I

Introduction to Mobile Communications and Computing: Mobile Computing (MC): Introduction to MC, novel applications, limitations, introduction to mobile architecture - UMTS, GSM.

Architecture GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT - II

(Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT - III

Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT - IV

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT - V

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing algorithms.

Database: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, data delivery mechanisms

UNIT - VI

Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management), introduction to mobile operating systems- Android, Java OS (J2ME).

TEXT BOOKS

1. Jochen Schiller, "Mobile Communications", *Addison-Wesley*. (Chapters 1, 2, 3, 4, 7, 8 and 9). Second edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", *Wiley*, 2002, ISBN 0471419028. (Chapters 6, 11, 15, 17, 18, 19, 26 and 27)

REFERENCES

1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October 2004,
2. Adelstein, Frank, [Gupta, Sandeep KS](#), [Richard III, Golden](#) , [Schwiebert, Loren](#), "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", *Springer*, second edition, 2003.
4. Martyn Mallick, "Mobile and Wireless Design Essentials", *Wiley DreamTech*, 2003
5. A. Tanenbaum "Computer Networks", 4th edition.

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M. Tech. I Year II semester
Computer Science
DATA MINING
(PROFESSIONAL ELECTIVE –III)

L	T	P	C
3	1	-	3

Code : 1N203

Course Objectives:

The main objective is to introduce the student to data warehouse architecture and data mining techniques. Upon completion of this course the student will get an idea on creating architecture and analyze data. Understand the DMQL. Be capable of applying his knowledge to analyze for effective decision making. Be able to explain the role of analyzing architectures.

Course Outcome: After completion of this course, student will be able to

1. Design a data mart or data warehouse for any organization and Develop skills to write queries using DMQL
2. Extract knowledge using data mining techniques
Adapt to new data mining tools
3. Explore recent trends in data mining such as web mining, spatial-temporal mining
4. Differentiate Online Transaction Processing and Online Analytical processing
Learn Multidimensional schemas suitable for data warehousing
5. Understand various data mining functionalities
6. Inculcate knowledge on data mining query languages
Know in detail about data mining algorithms, Be able to adapt to new data mining tools and techniques.

UNIT-I

Data mining Overview and Advanced Pattern Mining

Data mining tasks – mining frequent patterns, associations and correlations, classification and regression For predictive analysis, cluster analysis , outlier analysis; advanced pattern mining in multilevel, multidimensional space – mining multilevel associations, mining multidimensional associations, mining quantitative association rules, mining rare patterns and negative patterns.

UNIT-II

Advance Classification

Classification by back propagation, support vector machines, classification using frequent patterns, other classification methods – genetic algorithms, roughest approach, fuzz>set approach;

UNIT-III

Advance Clustering

Density - based methods –DBSCAN, OPTICS, DENCLUE; Grid-Based methods – STING, CLIQUE; Exception – maximization algorithm; clustering High- Dimensional Data; Clustering Graph and Network Data.

UNIT-IV

Web and Text Mining

Introduction, web mining, web content mining, web structure mining, we usage mining, Text mining – unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

UNIT-V

Temporal Data Mining

Introduction; Temporal Data Mining – Temporal Association Rules, Sequence Mining, GSP algorithm, SPADE, SPIRIT Episode Discovery, Time Series Analysis.

UNIT-VI

Spatial Data Mining

Spatial Mining – Spatial Mining Tasks, Spatial Clustering,. Data Mining Applications.

TEXT BOOKS:

1. Data Mining Concepts and Techniques, Jiawei Han Micheline Kamber, Jian pei, Morgan Kaufmann.
2. Data Mining Techniques – Arun K pujari, Universities Press.

REFERENCE BOOKS:

1. Introduction to Data Mining – Pang-Ning Tan, Vipin kumar, Michael Steinbach, Pearson.
2. Data Mining Principles & Applications – T.V Sveresh Kumar, B.Esware Reddy, Jagadish S Kalimani, Elsevier.

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M. Tech I Year II Semester
 Computer Science
MACHINE LEARNING
 (PROFESSIONAL ELECTIVE –III)

Code: 6P207

L	T	P	C
3	1	-	3

Course Objectives:

Study a wide variety of learning techniques and take decisions on the choice of a suitable learning technique for solving real world problems.

Course Outcome: After completion of this course, student will be able to

1. Identify the aspects needed in designing a learning system and formulate hypothesis.
2. Construct decision trees for appropriate problems and resolve issues in the same.
3. Perform data compression
4. Identify appropriate efficient methods for formulating inferences.
5. Study the structure of a neural network.
6. Design an appropriate neural network that can train, test and predict information.

Unit I

Introduction: Designing a learning system, perspectives and issues in machine learning, a concept learning task, concept learning as search, finding a maximally specific hypotheses, version spaces and the Candidate-Elimination algorithm

Unit II

Decision tree learning: Introduction, representation, appropriate problems for decision tree learning, the basic decision tree learning algorithms, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning

Unit III

Introduction to information theory, probability, entropy and inference, Data compression: The source coding theorem (without proof), limits of compressibility- Huffman coding, hash codes

Unit IV

Probabilities and inference: An example inference task: Clustering, exact inference by complete enumeration, maximum likelihood and clustering, Model comparison and Occam's razor, Monte Carlo methods, efficient Monte Carlo methods

Unit V

Neural networks: Introduction to neural networks, the single neuron as a classifier, capacity of a single neuron, learning as inference

Unit VI

Hopfield networks, boltzmann machines, supervised learning in multilayer networks

Text Books:

1. Machine Learning, Tom M. Mitchell, McGraw Hill, first edition, 1997.
2. Information Theory, Inference, and Learning Algorithms, David J.C. MacKay, first edition, 2005.

Reference Book:

Pattern Classification, [Richard O. Duda](#), [Peter E. Hart](#), David E. Stork, second edition

Syllabus

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M. Tech I Year II Semester

Computer Science

BIG DATA ANALYTICS (PROFESSIONAL ELECTIVE –III)

Code: 6P209

L	T	P/D	C
3	1	-	3

Course Objectives:

The main objective is to introduce the student to Big Data Analytics Platform. Upon completion of this course the student will get an idea on Statistical and Machine Learning Concepts and their application in real time.

- Understand the required concepts like Data mining, Regression modeling etc.

Course Outcomes: The students must able to understand

- 1) The big Data platform, Challenges of Conventional Systems, Predictive Analytics, Data Mining, and Real Time Analysis by providing an advanced, practical background that allows the students to lead and participate in Big Data and Data Analytics projects.
- 2): Regression Modeling - Multivariate Analysis - Bayesian Modeling and Time series analysis.
- 3) The course incorporates a deep-dive into Big Data, the Data Analytics lifecycle, Machine Learning (ML), Hadoop (MapReduce, HDFS) and Tez, as well as the Apache projects Zookeeper, Storm, Kafka, Cassandra, HBase, and Mahout. Various Machine Learning algorithms are scrutinized and actual cases studies are conducted to solve comprehensive Big Data problems.
- 4) Be capable of applying this knowledge to given application for better analysis
- 5) Be able to use Hadoop etc for map reduce etc.
- 6) Be able to identify and address various case studies.

UNIT I

INTRODUCTION TO BIG DATA: Introduction to BigData Platform – Traits of Big data - Challenges of Conventional Systems - Web Data – Evolution Of Analytic Scalability - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - ReSampling - Statistical Inference - Prediction Error.

UNIT II

DATA ANALYSIS : Regression Modeling - Multivariate Analysis - Bayesian Modeling - Inference and Bayesian Networks - Support Vector and Kernel Methods - Analysis of Time Series: Linear Systems Analysis - Nonlinear Dynamics - Rule Induction - Neural Networks: Learning And Generalization - Competitive Learning - Principal Component Analysis and Neural Networks - Fuzzy Logic: Extracting Fuzzy Models from Data - Fuzzy Decision Trees - Stochastic Search Methods.

UNIT III

MINING DATA STREAMS : Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT IV

FREQUENT ITEMSETS AND CLUSTERING : Mining Frequent Itemsets - Market Based Model – Apriori Algorithm – Handling Large Data Sets in Main Memory – Limited Pass Algorithm – Counting Frequent Itemsets in a Stream – Clustering Techniques – Hierarchical – K-Means – Clustering High Dimensional Data – CLIQUE And PROCLUS – Frequent Pattern based Clustering Methods – Clustering in NonEuclidean Space – Clustering for Streams and Parallelism.

UNIT V

FRAMEWORKS AND VISUALIZATION : MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed File Systems – Visualizations - Visual Data Analysis Techniques - Interaction Techniques;

UNIT VI:

Systems and Analytics Applications - Analytics using Statistical packages-Approaches to modeling in Analytics – correlation, regression, decision trees, classification, associationIntelligence from unstructured information-Text analytics-Understanding of emerging trends and technologies-Industry challenges and application of Analytics

TEXT BOOKS:

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. AnandRajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
4. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
5. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.
6. Jiawei Han, MichelineKamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓		✓	

Syllabus for M. Tech I Year II Semester

Computer Science

INTERNET OF THINGS (PROFESSIONAL ELECTIVE –III)

Code: 6P211

L	T	P	C
3	1	-	3

Course Objectives:

Learn Terminology, technology and applications ,IoT system management using M2M (machine to machine) with necessary protocols ,Python Scripting Language preferred for many IoT applications Raspberry PI as a hardware platform for IoT sensor interfacing

Course Outcomes: After completing this course, student shall be able to

1. Identify the implementation layers of an IoT application system
2. Describe the management of an IoT system using necessary protocols
3. Design, Develop and Illustrate IoT applications using Raspberry PI platform and Python Scripting
4. Implement web based services on IoT devices
5. Raspberry PI as a hardware platform for IoT sensor interfacing
6. Implementation of web based services for IoT with case studies

Unit I: Introduction to Internet of Things

Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates

Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

Unit II: IoT and M2M

Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics; IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

Unit III: Developing IoT

IoT Design Methodology - Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

Unit IV: IoT Physical Devices and Endpoints

Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

Unit V: IoT Physical Servers and Cloud Offerings

Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API

Unit VI: Case Studies Illustrating IoT Design

Home Automation – Smart Lighting, Home intrusion detection, **Cities** – Smart parking, **Environment** – Weather monitoring system, Weather reporting bot, Air pollution monitoring, Forest fire detection, **Agriculture** – Smart irrigation, **Productivity applications** – IoT printer

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓	✓	

Syllabus for M. Tech I Year II Semester
Computer Science
CYBER SECURITY & CYBER LAWS
(PROFESSIONAL ELECTIVE –III)

Code: 1N204

L	T	P	C
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Course Objectives

Understand various security attacks, cyber crimes and how they are planned, vulnerabilities of mobile and wireless devices and the crimes in mobile, in E-mail and wireless devices.

Course Outcomes: After completion of this course, student will be able to

1. Learn the various forms of cyber crimes, security attacks in stealing information.
2. To learn IT act related to various cyber crimes.
3. Understand the methodology of attacks, Attack vectors.
4. To learn about the Mobile security, Credit card security.
5. To understand security implications for organizations.
6. Understand security policies for organizations.
7. Understand IT ACT 2000, legal aspects and cyber laws in India.
8. Understand the need for computer Forensic and digital forensic life cycle.
9. Understand Social media marketing and Security Risks persist.

UNIT-I

Introduction to Cybercrime:

Introduction, Cybercrime and Information security, who are cybercriminals, Classifications of

Cybercrimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

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

Cybercrimes and Cyber security: the Legal Perspectives

Introduction

Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment

Cyber law, Technology and Students: Indian Scenario.

UNIT V

Understanding Computer Forensics

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody concept, Network Forensics, Approaching a computer, Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques

Forensics Auditing

UNIT VI

Cyber Security: Organizational Implications

Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text book:

1. **Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives**, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. **Introduction to Cyber Security** , Chwan-Hwa(john) Wu,J.David Irwin.CRC Press T&F Group

Reference book:

1. **Cyber Security Essentials**, James Graham, Richard Howard and Ryan Otson, CRC Press.

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓				

Syllabus for M. Tech I Year II Semester
 Computer Science and Engineering
SOFTWARE ARCHITECTURE AND DESIGN PATTERN
(PROFESSIONAL ELECTIVE –III)

Code: 6P205

L	T	P	C
3	1	-	3

Course Objectives:

The main objective is to introduce the student to architecture of software and design Patterns. Upon completion of this course the student will Get an idea on envisioning architecture, creating an architecture, analyzing architecture.

- Understand the creational and structural patterns.
- Be capable of applying his knowledge to create an architecture for given application.
- Be able to explain the role of analyzing architectures.
- Be able to identify different structural patterns.

Course Outcomes: After completing this course, students should able to

1. Explain Architecture Business Cycle, Architectural patterns, reference models, reference architectures, and architecture structures.
2. Describe architecture, Quality Attributes, styles, patterns and design of Architecture along with the Documentation of architecture.
3. Discuss Software Architecture evaluation, Architecture design decision making, SAAM, ATAM and CBAM. And plan software architecture in future.
4. Plan and use Creational patterns and Structural patterns application development.
5. **Solving problems using** Induction learning, Decision Tree, Statistical learning methods, learning with hidden variables, EM algorithm, Instance based learning and Neural Networks.
6. Explain Behavioral patterns using Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template method and Visitor.

UNIT I

Envisioning Architecture

The Architecture Business Cycle, What is Software Architecture, Architectural styles and patterns.

UNIT II

Creating an Architecture

Quality Attributes, Moving from quality to Architecture, UNIT Operations, Achieving qualities, designing the Architecture, Documenting the architecture, Reconstructing Software Architecture, shared information systems

UNIT III

Analyzing Software Architecture

Analyzing development qualities at the architectural level, SAAM, ATAM, CBAM, Architecture Reviews

Moving from Architecture to Systems

Software Product Lines, Building systems from off the shelf components, Reuse of Architectural assets within an organization.

UNIT IV

Patterns

what is pattern? Pattern categories, Pattern Description, Patterns and Software Architecture, Pattern Systems, Classification, Selection, Creational Patterns.

UNIT V

Design Patterns Catalogue, Structural Pattern, Behavioural Patterns, Pattern Community, Designing a document editor

Tools for Architectural design, Unicon, A4 - Exploiting style in architectural design, Architectural Interconnection.

UNIT VI

Case Studies:

Key word in Context, The World Wide Web - a case study in interoperability, Instrumentation software, cruise control, three vignettes in mixed styles, CORBA - a case study on Industry Standard computing infrastructure, Flight Simulation – a case study in architecture for integration, Celsius Tech – a case study in product line development.

TEXT BOOKS

- 1 Software Architecture in Practice, 2nd Edition by Len Bass, Paul Clements, Rick Kazman, published by Pearson Edition
2. Design Patterns, by Erich Gamma, Pearson Education
3. Mary Shaw David Garlan, "Software Architectural Perspectives on an emerging discipline",
EEE, PHI 1996

PO1	PO2	PO3	PO4	PO5	PO6
	✓			✓	✓

**Syllabus for M. Tech I Year I Semester
Computer Science
ENTREPRENEURSHIP AND INNOVATION
(OPEN ELECTIVE-I)**

Code: 6ZC13

T	P	C
3	1	3

Course Objective: The objective of the course is to make students understand the nature of entrepreneurship, and to motivate the student to start his/her own enterprise with innovative skills.

Course Outcome: After completion of this course, student will be able to

1. Understand who exactly is called as an entrepreneur and skills and qualities to required to be an entrepreneur
2. Gain knowledge on legal aspects of business
3. Evaluation of markets and selection of feasible business operations
4. Sources of raising capital to start business and various government institutions and schemes that support business operation
5. Essence of innovation for an entrepreneur to be successful
6. Describe innovation business strategies

UNIT I

NATURE OF ENTREPRENEURSHIP: Characteristics, Qualities and skills of an Entrepreneur, functions of entrepreneur, Entrepreneur scenario in India and Abroad. Forms of Entrepreneurship: Small Business, Importance in Indian Economy, Types of ownership, sole trading, partnership, Joint Stock Company and other forms. First-Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies, and Managing Newness.

UNIT II

ASPECTS OF PROMOTION: Generation of new entry opportunity, SWOT Analysis, Technological Competitiveness, legal regulatory systems, patents and trademarks, Intellectual Property Rights- Project Planning and Feasibility Studies- Major steps in product development.

UNIT III

MANAGEMENT OF SMALL BUSINESS: Pre feasibility study - Ownership - budgeting – project profile preparation - Feasibility Report preparation - Evaluation Criteria- Market and channel selection- Product launching - Monitoring and Evaluation of Business- Effective Management of Small business.

UNIT IV

SUPPORT SYSTEMS FOR ENTREPRENEURS: Institutional Support, Training institution, Financial Institutions and Aspects: Sources of raising Capital, Debt-Equity, Financing by Commercial Banks, Government Grants and Subsidies, Entrepreneurship Promotion Schemes of Department of Industries (DIC), KVIC, SIDBI, NABARD, NSIC, APSFC, IFCI and IDBI. New Financial Instruments. Research and Development – Marketing and legal aspects, Taxation benefits, Global aspects of Entrepreneurship.

UNIT V

INTRODUCTION TO INNOVATION: Meaning of innovation, sources of innovative opportunity, 7 sources of innovative opportunity, Principles of innovation, the enablers of innovation, business insights, insights for innovation, technical architecture for innovation, focus on the essence of innovation.

UNIT VI

PROCESS AND STRATEGIES FOR INNOVATION: Process of innovation, the need for a conceptual approach, Factors contributing to successful technological innovation, Strategies that aim at innovation, impediments to value creation and innovation.

Books Recommended:

- Robert D Hisrich, Michael P Peters, Dean A Shepherd: Entrepreneurship, TMH, 2009
- Peter Drucker (1993), “Innovation and Entrepreneurship”, Hyper Business Book.

References:

- Bholanath Dutta: Entrepreneurship – Text and cases, Excel, 2009.
- Vasanth Desai: Entrepreneurship, HPH, 2009
- Barringer: Entrepreneurship, Pearson, 2009.
- C.K. Prahalad, M.S. Krishnan, The new age of Innovation – TATA McGRAW-HILL Edition 2008
- H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
- Stay Hungry Stay Foolish, Rashmi Bansal and published by IIM., Ahmedabad

PO1	PO2	PO3	PO4	PO5	PO6
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**Syllabus for M. Tech I Year I Semester
Computer Science
OPERATIONS RESEARCH
(OPEN ELECTIVE-I)**

Code: 6WC30	L T P/D
C	3 1 --

Course Objective:

Identify and develop operational research models from the verbal description of the real system. Understand the mathematical tools that are needed to solve optimization problems.

Course Outcomes:

After completing the subject, students will be able to:

- understand the application & techniques of OR & Formulate & Obtain solution problems using linear programming (LP) by different methods
- understand the transportation problem their formulation and solution, understand the job sequencing under different condition
- understand the significance of replacement and the techniques of replacement of various types of items
- understand the Game theory concept & solutions and its industrial significance
- understand the importance of queue system and various possible configuration of queues, concept of inventory system, various inventory models
- concept of stage wise optimization and its implications, concept of simulation and its uses

UNIT – I

INTRODUCTION: Definition, Characteristics and Phases (or steps) of OR method, Types of models, applications.

LINEAR PROGRAMMING PROBLEM- Formulation – Graphical solution, Simplex method-Types of variables, Unbounded solution Artificial variables techniques -Two-phase method, Big-M method -Degeneracy, Duality Principle-examples

UNIT – II

TRANSPORTATION PROBLEM – Formulation – methods of finding initial solution, Optimal solution-MODI method, Special cases in TP: unbalanced, maximization case, Degeneracy.

ASSIGNMENT PROBLEM – Formulation – Optimal solution - Variants of Assignment Problem-Unbalanced, Maximization, Traveling Salesman problem.

UNIT – III

SEQUENCING – Introduction – Terminology, Assumptions, Johnson’s procedure- Processing n jobs through two machines – Processing n jobs through three machines – Processing two jobs through ‘ m ’ machines.

REPLACEMENT: Introduction – Types of failure, Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, Group replacement.

UNIT – IV

THEORY OF GAMES: Introduction, Definitions, Pure strategies-Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Mixed Strategies- Rectangular games without saddle points- Dominance principle – 2×2 games , $m \times 2$ & $2 \times n$ games -Graphical method.

UNIT – V

WAITING LINES: Introduction, Terminology, Structure of a queue, Calling population characteristics-size, behavior, pattern of arrivals, Kendall-Lee notation, Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

INVENTORY : Introduction, Inventory costs, Concept of EOQ, Single item Deterministic models without shortages and with shortages, Single item inventory models with one price break and multiple price breaks, Stochastic models – Instantaneous demand and no set up cost.

UNIT – VI

SIMULATION: Definition – Types of simulation – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages

DYNAMIC PROGRAMMING: Introduction – Bellman’s Principle of optimality – Applications of dynamic programming- shortest path problem -capital budgeting problem — linear programming problem.

TEXT BOOKS:

1. Operations research / Hira & Gupta
2. Operation Research /J.K.Sharma/MacMilan publishers.

REFERENCES:

1. Operations research/V.K.Kapoor

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Syllabus for M. Tech I Year II Semester

Computer Science

BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT (OPEN ELECTIVE –I)

T P C
4 0 3

Code: 6ZC03

Course Objective: The objective of the course is to provide to students an understanding of Banking Operations, Insurance Market, and Risk Management Principles and techniques to control the risk, & the major Institutions involved and the Services offered within this framework.

Course Outcome: After completion of this course, student will be able to

1. Students will be able to understand history of banking business in India and various services rendered by the banks.
2. They can understand role of RBI, impact of NPAs on banking sector in India.
3. They can understand the importance of insurance for individuals and business organizations.
4. They will be able to realize the role of IRDAI in control of Insurance industry in India.
5. They will be able to become masters in risk management for individuals and business organizations.
6. They can know the concepts of stock exchange and other financial markets to for better growth of their earnings.

UNIT I

INTRODUCTION TO BANKING BUSINESS: Introduction to Banking sectors-History of banking business in India, Structure of Indian banking system: Types of accounts, advances and deposits in a bank New Dimensions and products- E-Banking, Mobile-Banking, Net Banking, CRM, cheque system and KYC system.

UNIT II

BANKING REFORMS AND REGULATIONS: Banking regulation Act-1949, Reserve Bank of India Act-1934, Establishment of RBI, Functions and credit control system; Role of commercial banks and its functions. Banking sector reforms in India and deficiencies in Indian banking including problems accounts and Non-Performing Assets.

UNIT III

INTRODUCTION TO INSURANCE: Introduction to insurance, Need and importance of Insurance, principles of Insurance, characteristics of insurance contract, branches of insurance and types of insurance; life insurance and its products: Role of Agents and brokers.

UNIT IV

INSURANCE BUSINESS ENVIRONMENT: Regulatory and legal frame work governing the insurance sector, history of IRDA and its functions: Business and economics of insurance, need for changing mindset and latest trends.

UNIT V

INTRODUCTION TO RISK MANAGEMENT: Introduction to Risk, meaning and types of risk in business and individual, Risk management process, methods: Risk identification and measurement, Risk management techniques; Non insurance methods.

UNIT VI

FINANCIAL RISK MANAGEMENT: Introduction to Financial markets. Financial risk management techniques –Derivatives, Hedging and Portfolio management techniques: Derivatives and types of Derivatives-Futures, options and swaps: Shares, Commodity and Currency trading in India.

Books Recommended:

- Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
- General Principles of Insurance Harding and Evariantly
- Mark S. Dorfman: Risk Management and Insurance, Pearson, 2009.
- Reddy K S and Rao R N: Banking and Insurance, Paramount publishers, 2013

References:

- Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
- Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
- G. Koteswar: Risk Management Insurance and Derivatives, Himalaya, 2008.
- Gulati: Principles of Insurance Management, Excel, 2009.
- James S Trieschmann, Robert E. Hoyt & David N. Sommer: Risk Mgt. & Insurance, Cengage, 2009.
- Dorfman: Introduction to Risk Management and Insurance, 8/e, Pearson, 2009.
- P.K. Gupta: Insurance and Risk Management, Himalaya, 2009.
- Vivek & P.N. Asthana: Financial Risk Management, Himalaya, 2009.
- Jyotsna Sethi & Nishwan Bhatia : Elements of Banking and Insurance, 2/e, PHI, 2012.

PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M. Tech I year II semester
Computer Science
INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE –I)

Code: 6QC33

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Course Objective:

This course is intended to impart awareness on intellectual property rights and various regulatory issues related to IPR

Course Outcomes: After completing this course, students should able to

CO:1	Demonstrate a breadth of knowledge in Intellectual property
CO:2	Overview of Patents, Searching ,filling and drafting of Patents
CO:3	Overview of copyright & GI .
CO:4	Overview of Trade Mark & Trade Secret,
CO:5	Overview of Integrated Circuit and Industrial Design.
CO:6	Knowledge about different national and international : Conventions and Treaties Governing the IPRs

Unit I: Introduction to IPR: Discovery, Invention, Creativity, Innovation, History & Significance of IPR, Overview of IPR -Patent, Copyright, Trade Mark, Trade Secret , GI, Industrial Design & Integrated Circuit, Non-patentable criteria

Unit II: Patents: Patents- Patentability Criteria, Types of Patents-Process, Product & Utility Models, Software Patenting and protection, Patent infringement- Case studies- Apple Vs Samsung, Enfish LLC Vs Microsoft, Overview of Patent search-Types of Searching, Public & Private Searching Databases, Basics of Patent Filing & Drafting, Indian Patents Law

Unit III: Copyrights and Geographical Indications: Types of Copyrights, Procedure for filing, copyright infringement, Copyright Law, Geographical Indications -Tirupati Laddu , Darjeeling Tea, Basmati rice

Unit IV: Trademark and Trade secrets: Trade Marks –Commercial importance, protection, registration, Case Studies- Sabena and Subena, Castrol Vs Pentagon, Trade Secrets- Case Studies-Kentucky Fried Chicken (KFC), Coca-Cola

Unit V: Protection of Industrial Designs & Integrated Circuits: Industrial Designs – Scope, protection, filing, infringement; Integrated Circuits & Layout design, Semiconductors, Unfair competition, Designs Act.

Unit VI: International Conventions & Treaties: Overview of WTO, GATT, TRIPS, WIPO, Berne Convention, Rome convention, Paris Convention, Patent Cooperation Treaty (PCT), Madrid Protocol, Budapest Treaty, Hague agreement

Text Book:

1. Deborah E. Bouchoux, Intellectual Property for Paralegals – The law of Trademarks, Copyrights, Patents & Trade secrets, 3rd Edition, Cengage learning, 2012
2. N.S. Gopalakrishnan & T.G. Agitha, Principles of Intellectual Property, Eastern Book Company, Lucknow, 2009.

References

1. M. M. S. Karki , Intellectual Property Rights: Basic Concepts, Atlantic Publishers, 2009
2. Neeraj Pandey & Khushdeep Dharni, Intellectual Property Rights, Phi Learning Pvt. Ltd
3. Ajit Parulekar and Sarita D’ Souza, Indian Patents Law – Legal & Business Implications; Macmillan India ltd, 2006.
4. B. L. Wadehra. Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India 2000.
5. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010.

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Syllabus for M. Tech I year II semester
Computer Science
BIOINFORMATICS
(Open Elective – I)

Code: 6QC47

L T P/D C
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Course Objective:

To impart knowledge on basic techniques of Bioinformatics and to provide a practical description of the tools and current trends in the field including its impact on biology, computer science engineering and information technology

Course Outcomes:

CO:1	Demonstrate knowledge and understanding of interdisciplinary nature of computer science , Information technology and biotechnology
CO:2	Analyze and interpret homology by using basic bioinformatics problems and their solutions
CO:3	Demonstrate the ability to solve biological problems using basic computer science Programming tools and software
CO:4	Develop the ability to identify computational problems within the living systems at molecular level
CO:5	Develop the ability to evaluate the evolutionary relationships among various organisms using Computational methods.
CO:6	Gain an understanding of working in interdisciplinary teams of biologists, biochemists, medical researchers, geneticists, and allied engineering branches.

UNIT I : SCOPE OF BIOINFORMATICS and BIOLOGICAL DATABASES

History, definition, importance and applications of bioinformatics in information technology, Introduction to biological data, Organization and management of databases, Nucleotide databases (Genbank), Protein Databases(UNI PROT)

UNIT II: SEQUENCE ALIGNMENT Database searching, Basic concepts of sequence homology Dynamic Programming, Dot Matrix analysis, Smith-Waterman Algorithm, Needleman-Wunsch Algorithm, Scoring matrices: PAM and BLOSUM matrices

UNIT III: SEQUENCE-BASED DATABASE SEARCHES BLAST and FASTA algorithms, various versions of basic BLAST and FASTA, Use of these methods for sequence analysis including the on-line use of the tools and interpretation of results.

UNIT IV: MULTIPLE SEQUENCE ALIGNMENT Basic concepts of various approaches for MSA algorithms (e.g. progressive, hierarchical etc.). Algorithm of CLUSTALW and its application

UNIT V: PHYLOGENETIC ANALYSIS Definition and description of phylogenetic trees. Distance based and character based algorithms of phylogenetic analysis

UNIT VI: GENE AND PROTEIN STRUCTURE PREDICTION Introduction to Next Gen sequencing ,Biological sequence/structure, Human Genome Project, Gene structure and DNA sequences, Pattern recognition and prediction, Protein Secondary structure prediction methods, Algorithms of Chou Fasman, GOR methods. Protein homology modeling.

TEXT BOOKS:

1. Bioinformatics. David Mount, 2000. CSH Publications

REFERENCES:

1. Bioinformatics: A Machine Learning Approach P. Baldi. S. Brunak, MIT Press 1988.
2. Genomics and Proteomics-Functional and Computational aspects. Springer Publications. Editor-Sandor Suhai.
3. Bioinformatics- Methods and Protocols-Human Press. Stephen Misener, Stephen A. Krawetz.
4. Bioinformatics – A Practical guide to the Analysis of Genes and Proteins – Andreas D.Baxevanis, B.F. Francis Ouellette

PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M. Tech I year II semester
Computer Science
EMBEDDED SYSTEMS
Open Elective – I

Code: 6T217

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Course objective : Undersstand embedded system concepts and architecture and programming of 8051 micro controller.

On completion of this course you should be able to:

1. Understand the basics of Embedded design process
2. Explore the architecture of 8051 microcontrolle .
3. Understand assembly language programming concepts of 8051 microcontroller.
4. Explore interfacing of 8051
5. Understand the concepts of RTOS .
6. Explore thebasic design of rtos.

UNIT-1

Introduction to Embedded Systems : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design. (Chapter I from Text Book 1, Wolf).

Unit – II

8051 Micro controller : Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. (Chapter 3 from Text Book 2, Ayala).

UNIT-III

Basic Assembly Language Programming Concepts : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic. Jump and Call Instruction.

(Chapters 4,5,6,7 and 8 from Text Book 2, Ayala).

UNIT –IV

8051 Interfacing : Interfacing with Keyboards, Displays, D/A and A/D Converters, Programming multiple Interrupts, Serial Data Communication. (Chapter 10 and 11 from Text Book 2, Ayala).

UNIT – V

Introduction to Real – Time Operating Systems : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management.

(Chapter 6 and 7 from Text Book 3, Simon).

UNIT – VI

Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS uC-OS / Vx-Works / RT Linux; Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

TEXT BOOKS :

1. Computers and Components, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.
3. An Embedded Software Primer, David E. Simon, Pearson Education.

REFERENCES :

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.

PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M. Tech I Year II Semester
Computer Science
INTERNET TECHNOLOGIES AND SERVICES LAB

Code: 1N270

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Course Outcomes:

1. Write syntactically correct HTTP messages and describe the semantics of common HTTP methods
2. and header fields
3. Discuss differences between URIs, URNs, and URLs, and demonstrate a detailed understanding of
4. http-scheme URLs, both relative and absolute
5. Describe the actions, including those related to the cache, performed by a browser in the process of
6. visiting a Web address
7. Install a web server and perform basic administrative procedures, such as tuning communication
8. parameters, denying access to certain domains, and interpreting an access log
9. Write a valid standards-conformant HTML document involving a variety of element types, including
10. hyperlinks, images, lists, tables, and forms
11. Use CSS to implement a variety of presentation effects in HTML and XML documents, including
12. explicit positioning of elements
13. Demonstrate techniques for improving the accessibility of an HTML document

LIST OF EXERCISES:

i) Internet Technologies

1. Develop static pages (using Only HTML) of an online Book store. The pages should resemble:

www.amazon.com the website should consist the following pages.

Home page, Registration and user Login

User Profile Page, Books catalog

Shopping Cart, Payment By credit card

Order Conformation

2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

3. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

4. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using Servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

5. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

6. Implement the “Hello World!” program using JSP Struts Framework.

ii) Additional Assignment Problems

Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.

Write a java swing application that takes a text file name as input and counts the characters, words and lines in the file. Words are separated with white space characters and lines are separated with new line character.

Write a simple calculator servlet that takes two numbers and an operator (+, -, /, * and %) from an HTML page and returns the result page with the operation performed on the

operands. It should check in a database if the same expression is already computed and if so, just return the value from database. Use MySQL or PostgreSQL.

Write an HTML page that contains a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

Write a servlet that takes name and age from an HTML page. If the age is less than 18, it should send a page with “Hello <name>, you are not authorized to visit this site” message, where <name> should be replaced with the entered name. Otherwise it should send “Welcome <name> to this site” message.

Write a calculator program in HTML that performs basic arithmetic operations (+, -, /, * and %). Use CSS to change the foreground and background color of the values, buttons and result display area separately. Validate the input strings using JavaScript regular expressions. Handle any special cases like division with zero reasonably. The screen may look similar to the following:

Write a Java program that creates a calculator GUI, as shown in figure. Extra components may be added for convenience:

The Color Scheme may be Black on White or Blue on Yellow (selectable) and accordingly all components colors must be changed. The values can be either entered or increased or decreased by a step of 10. The operators are +, -, / and * (selectable). Once any change takes place, the result must be automatically computed by the program.

Write a Java Application that will read an XML file that contains personal information (Name, Mobile Number, age and place. It reads the information using SAX parser. After reading the information, it shows two input Text Fields in a window, one for tag name and the other for value. Once these two values are given, it should list all the records in the XML file that match the value of the given field in a text area (result box). For example, if the two text boxes are entered with “name” and “ABCD” then it should show all the records for which name is “ABCD”? An Illustration is given below that takes a mobile number and lists all the records that have the same mobile number.

Consider the following web application for implementation:

Value 1 Value 2 Result

+ =

Operator

The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions. If name and password matches, serves a welcome page with user's full name. If name matches and password doesn't match, then serves “password mismatch” page

If name is not found in the database, serves a registration page, where users full name, present user name (used to login) and password are collected. Implement this application in:

Pure JSP

Pure Servlets

Struts Framework

Implement a simple arithmetic calculator with +, -, /, *, % and = operations using Struts Framework

The number of times the calculator is used should be displayed at the bottom (use session variable).

iii) Internet Technologies and Services Lab - Additional Problems

Create a web Service in Java that takes two city names from the user and returns the distance between these two from data available from a table in MySQL.

Write a java and a C# client which use the above service

Write a Java program that takes a file as input and encrypts it using DES encryption. The program should check if the file exists and its size is not zero.

Write a Java program that generates a key pair and encrypts a given file using RSA algorithm.

Write a Java program that finds digest value of a given string.

Consider the following xml file for encryption

```
<?xml version="1.0"> <transaction> <from>12345</from> <to>54321</to>
<amount>10000</amount>
<secretcode>abc123</secretcode> <checksum></checksum> </transaction>
```

Replace <from> and <to> values with the RSA encrypted values represented with base64 encoding assuming that the public key is available in a file in local directory "pubkey.dat". Encrypt <secretcode> with AES algorithm with a password 'secret'. The checksum of all the field values concatenated with a delimiter character '+' will be inserted in the checksum and the xml file is written to encrypted.xml file.

Assume that a file 'config.xml', which has the following information:

```
<users>
<user> <name>abc</name> <pwd>pwd123</pwd> <role>admin</role> <md5>xxx</md5>
</user>
<user> <name>def</name> <pwd>pwd123</pwd> <role>guest</role> <md5>xxx</md5>
</user>
</users>
```

Replace name and role with DES encrypted values and pwd with RSA encrypted values (represent the values with base64 encoding). The public key is available in "public.key" file in current directory. Replace xxx with respective MD5 values of all the fields for each user. Write the resulting file back to config.xml.

Write an HTML page that gives 3 multiple choice (a,b,c and d) questions from a set of 5 preloaded questions randomly. After each question is answered change the color of the

question to either green or blue using CSS. Finally on clicking OK button that is provided, the score should be displayed as a pop-up window. Use Java Script for dynamic content.

Write an HTML page that has 3 countries on the left side (“USA”, “UK” and “INDIA”) and on the right side of each country, there is a pull-down menu that contains the following entries: (“Select Answer”, “New Delhi”, “Washington” and “London”). The user will match the Countries with their respective capitals by selecting an item from the menu. The user chooses all the three answers (whether right or wrong). Then colors of the countries should be changed either to green or to red depending on the answer. Use CSS for changing color.

Write an HTML Page that can be used for registering the candidates for an entrance test. The fields are: name, age, qualifying examination (diploma or 10+2), stream in qualifying examination. If qualifying examination is “diploma”, the stream can be “Electrical”, “Mechanical” or “Civil”. If the qualifying examination is 10+2, the stream can be “MPC” or “BPC”. Validate the name to accept only characters and spaces.

Write an HTML page that has two selection menus. The first menu contains the states (“AP”, “TN” and “KN”) and depending on the selection the second menu should show the following items: “Hyderabad”, “Vijayawada”, “Kurnool” for AP, “Chennai”, “Salem”, “Madurai” for TN and “Bangalore”, “Bellary”, “Mysore” for KN.

Write an HTML page that has phone buttons 0 to 9 and a text box that shows the dialed number. If 00 is pressed at the beginning, it should be replaced with a + symbol in the text box. If the number is not a valid international number (+ followed by country code and 10 digit phone number) the color of the display should be red and it should turn to green when the number is valid. Consider only “+91, +1 and +44 as valid country codes. Use CSS for defining colors.

Write an HTML page that has a text box for phone number or Name. If a number is entered in the box the name should be displayed next to the number. If 00 is pressed at the beginning, it should be replaced with a + symbol in the text box. If a name is entered in the text box, it should show the number next to the name. If the corresponding value is not found, show it in red and show it in green otherwise. Use CSS for colors. Store at least 5 names and numbers in the script for testing.

A library consists of 10 titles and each title has a given number of books initially. A student can take or return a book by entering his/her H T No as user ID and a given password. If there are at least two books, the book is issued and the balance is modified accordingly.

- (a) Use RDBMS and implement it with JSP.
- (b) Use XML File for data and Implement it with JSP
- (c) Use RDBMS and implement it with Servlets
- (d) Use XML File for data and Implement it with Servlets

A Bus Reservation System contains the details of a bus seat plan for 40 seats in 2x2 per row arrangement, where the seats are numbered from 1 to 40 from first row to last row. The customer can visit the website and can reserve a ticket of his choice if available by entering his details (Name, Address, Gender and Age). The customer can cancel the ticket by entering the seat number and his name as entered for reservation.

- (a) Use RDBMS and implement it with JSP.
- (b) Use XML File for data and Implement it with JSP
- (c) Use RDBMS and implement it with Servlets
- (d) Use XML File for data and Implement it with Servlets.

Implement a simple messaging system with the following details:

When a student logs in with his/her HTNO and a given password, they should get all the messages posted to him/her giving the ID of sender and the actual message. Each message may be separated with a ruler. There should be a provision for the user to send a message to any number of users by giving the IDs separated with commas in the "To" text box.

- (a) Use RDBMS and implement it with JSP.
- (b) Use XML File for data and Implement it with JSP
- (c) Use RDBMS and implement it with Servlets
- (d) Use XML File for data and Implement it with Servlets.

There is an image of 600x100 size which can be logically divided into 12 button areas with labels (0-9, +, =).

Write a javascript calculator program that uses this image as input virtual keyboard and three text areas for two input numbers and result of sum of these numbers. Add a CSS that can be used to change the colors of text and background of text areas and the page. The input numbers can be up to 4 digits each.

Develop a web application that takes user name and password as input and compares them with those available in an xml user database. If they match, it should display the welcome page that contains the user's full name and last used date and time retrieved from a client cookie. On logout it stores new time to the cookie and displays a goodbye page. If authentication fails, it should store the attempt number to the client cookie and displays an error page. Add necessary CSS that takes care of the font, color of foreground and background.

A web application has the following specifications:

The first page (Login page) should have a login screen where the user gives the login name and password. Both fields must be validated on client side for a minimum length of 4 characters, name should be lower case az characters only and password should contain at least one digit. On submitting these values, the server should validate them with a MySQL database and if failed, show the login page along with a message saying "Login Name or Password Mismatch" in Red color below the main heading and above the form. If successful, show a welcome page with the user's full name (taken from database) and a link to Logout. On logout, a good bye page is displayed with the total time of usage (Logout time – login time). Specify the Schema details of table and web.xml file contents.

Implement it using (a) JSP Pages (b) Servlets (c) Struts

Design a struts based web portal for an international conference with following specifications:

The welcome page should give the details of the conference and a link to login. If login fails, direct them back for re-login and also provide a link for registration. On successful registration/login, the user will be directed to a page where s/he can see the status (accepted/rejected) of their already submitted papers followed by a form for submitting a doc file to the conference. Provide a logout button on all pages including the home page, once the user logs in. Implement validation framework to check that the user name is in the form of CCDDCC and password is in the form of (CCSDDD) (C for character, S for special character (one of @, #, \$, %, ^, & and !) and D for digit)., Database should be accessed through Connection Pool for MySql for user information. Provide scope for internationalization in future. Assume any missing information and mention it first.

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓				

**M. Tech I year II semester
Computer Science
LITERATURE REVIEW & SEMINAR - II**

Code: IN271

L	T	P	C
-	-	3	1

Max. Marks: 100

After studying this course, the students will be able to

1. Identify a research topic
2. Collect literature
3. Write technical review paper
4. Present seminar
5. Discuss the queries and Publish research paper

There shall be three seminar presentations during I year I semester and I year II Semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the Department in a report form and shall make an oral presentation before the Departmental Committee, which shall consist of the Head of the Department, a senior Faculty Member and the Supervisor and will jointly evaluate the report and presentation. For each Seminar there will be only internal evaluation of 25 marks. A candidate has to secure a minimum of 50% to be declared successful.

In the First semester the report must be in the form of the review paper with a format used by IEEE / ASME etc. In the Second semester Technical Seminar in the form of Independent Review Paper must be of high quality fit for publication in a reputed conference / journal.

The evaluation format for seminar is as follows:

- Day to day evaluation by the Supervisor : 20 marks
- Final Report : 20 marks
- Presentation : 60 marks (20 Abstract seminar +40 Final Presentation)

The presentation includes content (5) + Participation (5) + Presentation (10) for a total of 20 marks and double for 40 marks for final presentation.

A Student has to concentrate on the following sections while writing technical paper or presenting seminar.

Contents:

- Identification of specific topic, Analysis
- Organization of modules, Naming Conventions
- Writing style, Figures
- Feedback
- Miscellaneous

REFERENCES:

Teach Technical Writing in Two Hours per Week by Norman Ramsey

For Technical Seminar the student must learn few tips from sample seminars and correcting himself, which is continues learning process

REFERENCE LINKS:

IV. <http://www.cs.dartmouth.edu/~scot/givingTalks/sld001.htm>

V. <http://www.cse.psu.edu/~yuanxie/advice.htm>

VI. <http://www.eng.unt.edu/ian/guides/postscript/speaker.pdf>

NOTE: A student can use any references for this process, but must be shared in classroom.

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓				✓

Syllabus for M. Tech I Year II semester
Computer Science
PROJECT SEMINAR – 1(ABSTRACT)

Code: 1N272

L	T	P	C
-	-	-	2

Max. Marks: 100

In I year II semester, a project seminar shall be conducted for 100 marks and for 2 credits (there is no external evaluation). The evaluation for the project seminar shall be done in two stages, i.e. in the middle of the semester and at the end of the semester. The mid-semester seminar evaluation shall carry 10 marks and the end semester seminar evaluation shall carry 15 marks. The report for the mid-semester project seminar will carry 5 marks and remaining marks shall be for presentation and discussion. The report for end semester project seminar shall be for 5 marks and the remaining marks shall be for presentation and discussion. A candidate shall secure a minimum of 50% to be declared successful.

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓				

Syllabus for M. Tech I Year II semester
Computer Science
COMPREHENSIVE VIVA-VOCE – II

Code: 1N273

L	T	P	C
-	-	-	1

Max. Marks: 100

There shall be a Comprehensive Viva-Voce Examination. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects, he/she studied during the M.Tech course of study, The Comprehensive Viva-Voce is valued for 100 marks. There are 50 marks to be evaluated by the internal committee and 50 marks for the end semester evaluation by a committee constituted with internal members and external evaluator. A candidate has to secure a minimum of 50% of total marks subject to securing a minimum of 40% mark in external examination to be declared successful.

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓				✓

Syllabus for M. Tech II Year I semester
Computer Science

PROJECT WORK REVIEW - I

Code: 1N370

L	T	P	C
-	-	-	12

Max. Marks: 100

In II year I semester, a project work review shall be done by PRC for 100 marks and for 12 credits (there is no external evaluation) in each of the semester. The evaluation for the project reviews shall be done in 4 stages (not less than 4 weeks between two consecutive stages) including end semester evaluation.

Each stage project review shall carry 20 marks and the end semester review shall carry 40 marks (50% by PRC and 50% by supervisor). The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey and design in Project Review- I. A candidate shall secure a minimum of 50% to be declared successful in Project Review- I. If candidate fails to fulfill minimum marks, he has to reappear during the supplementary examination.

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓				✓

Syllabus for M. Tech II Year II semester
Computer Science
PROJECT WORK REVIEW- II

Code: 1N470

L T P C
- - -
12
Max. Marks: 100

In II year II semester, a project work review shall be done by PRC for 100 marks and for 12 credits (there is no external evaluation) in each of the semester. The evaluation for the project reviews shall be done in 4 stages (not less than 4 weeks between two consecutive stages) including end semester evaluation.

Each stage project review shall carry 20 marks and the end semester review shall carry 40 marks (50% by PRC and 50% by supervisor). In the case of Project Review II, the Supervisor and PRC will examine implementation, testing and final execution of the project. A candidate shall secure a minimum of 50% to be declared successful in Project review II. If candidate fails to fulfill minimum marks, he has to reappear during the supplementary examination.

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓				✓

Syllabus for M. Tech II Year II semester
Computer Science
PROJECT EVALUATION (VIVA-VOICE)

Code: 1N471

L T P C
- - - **24**

Course Outcome: By the end of this course, students will be able to

1. Critically and theoretically analyze the systems/products they are going to design or develop.
2. Apply the theoretical knowledge gained to bring out innovative products.
3. Effectively communicate in a variety of forms including written, visual, verbal, online and technical literacy.
4. Work and participate as effective members in a group within a professional environment.
5. Develop an ongoing critical awareness of learning needs in the application of appropriate technologies.
6. Gain as much knowledge and experience in areas of the area of Digital Systems and Computer Electronics

EVALUATION OF PROJECT/DISSERTATION WORK

Every candidate shall be required to submit a thesis or dissertation on a topic approved by the Project Review Committee.

1. A Project Review Committee (PRC) shall be constituted with Head of the Department as Chairperson, Project Supervisor and one senior faculty member of the Departments offering the M. Tech. Programme.
2. Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects, both theory and practical.

3. After satisfying 2, a candidate has to submit, in consultation with his Project Supervisor, the title, objective and plan of action of his project work to the PRC for approval. Only after obtaining the approval of the PRC the student can initiate the Project work.
4. If a candidate wishes to change his supervisor or topic of the project, he can do so with the approval of the PRC. However, the PRC shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of project proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.
5. A candidate shall submit his project status report in four stages at least with a gap of 4 weeks between two consecutive stages.
6. The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of all theory and practical courses (no backlogs) with the approval of PRC not earlier than 40 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Head of the Department and make an oral presentation before the PRC.
7. After approval from the PRC, the soft copy of the thesis should be submitted to the College for ANTI-PLAGIARISM for the quality check and the plagiarism report should be included in the final thesis. If the copied information is less than 24%, then only thesis will be accepted for submission.
- 8 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College.
- 9 In II year I semester and II semester, a project work review I and II shall be done by PRC for 100 marks and for 12 credits (there is no external evaluation) in each of the semester. The evaluation for the project reviews shall be done in 4 stages (not less than 4 weeks between two consecutive stages) including end semester evaluation. Each stage project review shall carry 20 marks and the end semester review shall carry 40 marks (50% by PRC and 50% by supervisor). The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey and design in Project Review I. In the case of Project Review II, the Supervisor and PRC will examine implementation, testing and final execution of the project. A candidate shall secure a minimum of 50% to be declared successful in Project review I and II. If candidate fails to fulfill minimum marks, he has to reappear during the supplementary examination.
10. For Project Evaluation (Viva Voce) in II Year II Sem. there are external marks of 200 for 24 credits. HoD shall submit a panel of 3 examiners, eminent in that field. Principal will appoint one of them as examiner.

11. The thesis shall be adjudicated by examiner selected by the College. If the report of the examiner is not favourable, the candidate shall revise and resubmit the Thesis. If the report of the examiner is unfavourable again, the thesis shall be summarily rejected.
12. If the report of the examiner is favourable, Project Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the external examiner who adjudicated the Thesis. Candidate has to secure minimum of 50% marks in Project Evaluation (Viva-Voce) examination.
13. If he fails to fulfill as specified in 12, he will reappear for the Viva-Voce examination only after three months. In the reappeared examination also, fails to fulfill, he will not be eligible for the award of the degree.
14. The Head of the Department shall coordinate and make arrangements for the conduct of Project Viva- Voce examination.