

COURSE STRUCTURE AND DETAILED SYLLABUS

for

M.Tech course

in

Computer Science and Engineering

(with effect from the Academic year 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)

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Department of Computer Science and Engineering
M.Tech (Computer Science and Engineering)
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	6P101	Advanced Computer Architecture	3	1	-	3	25	75
2	6P102	Advanced Data Structures and Algorithms	3	1	-	3	25	75
3	6P103	Databases System Concepts	3	1	-	3	25	75
4	6P104	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	6P115	Research Methodology	2	-		2	25	75
8	6P170	Data Structures through Java lab	-	-	4	2	25	75
9	6P171	Literature Review and Seminar-I	-	-	3	1	100	-
10	6P172	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
6P105	Artificial Intelligence	6P110	Natural Language Processing
6P106	Semantic Web and Social Networking	6P111	Cloud Computing
6P107	Computer Graphics	6P112	Human Computer Interaction
6P108	Software Process and Project Management	6P113	Software metrics and Quality Assurance
6P109	Advanced Computer Networks	6P114	Python Programming

I Year		COURSE STRUCTURE	II Semester					
S. No.	Subject Code	Subject Name	L	T	P	C	Marks	
							CIE	SEE
1	1N104	Network Security	3	1	-	3	25	75
2	6P202	Advanced Operating Systems	3	1	-	3	25	75
3	6P203	Web Technologies & Services	3	1	-	3	25	75
4	6P204	Data warehousing and Data Mining	3	1	-	3	25	75
5		PROFESSIONAL ELECTIVE III	3	1	-	3	25	75
6		OPEN ELECTIVE	3	1	-	3	25	75
7	6P270	Web Technologies and Informatics Lab	-	-	4	2	25	75
8	6P271	Literature Review and Seminar-II	-	-	3	1	100	-
9	6P272	Project Seminar – I	-	-	3	2	100	-
10	6P273	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
6P205	Software Architecture and Design Patterns	6ZC03	Banking Operations, Insurance and Risk Management
6P206	Image Processing And Pattern Recognition	6QC33	Intellectual Property Rights
6P207	Machine Learning	6T217	Embedded Systems
6P208	Information Retrieval Systems	6ZC13	Entrepreneurship and Innovation
6P209	Big Data Analytics	6H233	Ethics, Morals, Gender Sensitization and Yoga
6P210	Mobile Computing	6QC47	Bio-informatics
6P211	Internet of Things		

II Year	COURSE STRUCTURE	I Semester
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Code	Subject	L	T	P	Credits	Marks	
						CIE	SEE
6P370	Project work Review I	-	-	-	12	100	-
Total Credits		--	--	--	12	100	--

II Year	COURSE STRUCTURE	II Semester
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Code	Subject	L	T	P	Credits	Marks	
						CIE	SEE
6P470	Project work Review II	--	--	--	12	100	--
6P471	Project Evaluation (Viva-Voice)	-	-	-	24	---	200
Total Credits		--	--	--	36	100	200

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

CIE: Continuous Internal Evaluation

SEE: Semester End Exam

PEO AND PO

PROGRAMME EDUCATIONAL OUTCOMES (PEOs)

PEO- I: Analyze, design and develop software to carryout research on scientific and multidisciplinary engineering areas, by publishing technical papers.

PEO-II: Pursue a successful career in academia with master's degree in Computer Science and Engineering having in depth domain knowledge by using modern engineering techniques and tools for sustainable development through lifelong learning.

PEO-III: Will be able to practice professional ethics, financial aspects along with awareness of information security, legal aspects, gender sensitization, environmental and social needs for carrying project works.

PROGRAMME OUTCOMES (POs)

PO1: An ability to independently carry out research /investigation and development work to solve practical problems.

PO2: An ability to write and present a substantial technical report/document.

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

PO4: Apply modern engineering techniques, resources and IT tools available in Computer Science and Engineering to solve complex engineering problems and demonstrate the knowledge for sustainable development through life –long learning.

PO5: Become a complete professional with high integrity, ethics, , awareness of information security, associated IT act, gender sensitization becomes excellent professional and with empathy towards the environmental and social needs.

PO6: Understanding of engineering and management principles and application of these principles to finalize technical and financial aspects of a project in multi disciplinary areas.

PO/PEO	1	2	3	4	5	6
I	✓	✓				✓
II			✓	✓		
III					✓	✓

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

**Syllabus for M. Tech I Year I Semester
Computer Science and Engineering
ADVANCED COMPUTER ARCHITECTURE**

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: After completion of this course, student will be 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. 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)- over coming 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
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PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
ADVANCED DATA STRUCTURES AND ALGORITHMS

Code: 6P102

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 the computer field. Various aspects of algorithm development. Qualities of a good solution.

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, Trees in java.util- TreeSet, Tree Map Classes, Tries(examples only),Comparison of Search trees. Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

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 an
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PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M.Tech I Year I Semester
 Computer Science and Engineering
DATABASES SYSTEM CONCEPT

Code: 6P103

L	T	P	C
3	1	-	3

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.
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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, and Performance, 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.
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PO1	PO2	PO3	PO4	PO5	PO6
✓	✓		✓		

**Syllabus for M. Tech. I Year I semester
Computer Science and Engineering
JAVA PROGRAMMING**

L	T	P	C
3	1	-	3

Code : 6P104

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 Outcomes: 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.
6. Understand the concepts of network programming and how to write network programs.

Course Objectives Unit Wise :

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

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

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
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PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M. Tech. I Year I semester
Computer Science and Engineering
ARTIFICIAL INTELLIGENCE
(PROFESSIONAL ELECTIVE – I)

L T P C
3 1 - 3

Code: 6P105

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

Introduction: Introduction to Artificial Intelligence, Turing Test Approach, Intelligent agents: Agents and Environments, Concept of rationality, Nature of environments, Structure of agents, Problem solving agents - Problem formulation.

UNIT II

Game Theory: Searching for solutions, Searching with partial information, Heuristic search strategies - Greedy best first search, A* search Game Playing: Adversarial search - Games, Minimax, algorithm, Optimal decisions in multiplayer games, Alpha-Beta pruning, Imperfect real time decisions.

Case studies: Tic-tac-toe game

UNIT III

Knowledge and Reasoning : Logical Agents - Knowledge Based Agents, Wumpus world problem, Propositional logic, Reasoning patterns in propositional Logic.

UNIT IV

First order logic : Syntax, Semantics, Usage, Inference in first order logic, Comparisons with Propositional inferences, Unification and Lifting, Forward chaining, Backward chaining, Resolution.

UNIT V

Planning: Classical planning problem, Language of planning problems, Expressiveness and extensions, Planning with state-space search, Partial Order Planning, Planning Graphs, Conditional Planning, Continuous Planning, Multiagent Planning.

Case studies: STRIPS

UNIT VI

Learning: Forms of Learning, Inductive Learning, Learning by correcting mistakes and recording cases, Learning by Managing Multiple models, Learning by Building Identification Trees, Learning by training Neural Nets

Case studies: Constructing Neural Network with MATLAB or SCILAB for AND, OR and EX-OR gates

TEXT BOOKS

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education.
2. Artificial Intelligence, 3rd Edition, Patrick Henry Winston, Pearson Education.

REFERENCES

1. Artificial Intelligence , 2nd Edition, E.Rich and K.Knight (TMH).
 2. Artificial Intelligence and Expert Systems – Patterson PHI.
 3. Expert Systems: Principles and Programming- Fourth Edition, Giarrantana/ Riley, Thomson.
 4. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education
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PO1	PO2	PO3	PO4	PO5	PO6
✓	✓	✓			

Syllabus for M. Tech. I Year I semester
Computer Science and Engineering
SEMANTIC WEB AND SOCIAL NETWORKING
(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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PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M.Tech. I Year I Semester
Computer Science and Engineering
COMPUTER GRAPHICS
(PROFESSIONAL ELECTIVE-I)

Code: 6P107

L	T	P	C
3	1	-	3

Course Objectives:

The main objective is to introduce the student to fundamentals of Computer Graphics to enable them to design animated scenes for virtual object creations,

Understand the Application Areas of Computer Graphics.

- Be capable of applying this knowledge to use display devices and work stations.
- Be able to implement Viewing and Transformation techniques.
- Be able to adapt to new 3D geometric Representations animation tools.

Course outcomes:

After undergoing the course, Students should be able to understand

- Out Put display devices and Input devices
- Develop skills to write Filling algorithms
- Know the concepts of how to draw Points, Lines and circle and Ellipse algorithms
- Adapt to new Computer graphics algorithms and tools
- Explore the knowledge of Window to View port Transformations and basic Mathematical transformations like Scaling, Translation and Rotation
- 3 D object Representations using Polygon Surface, Spline representations and curves
- Learn Visible Surface detection Methods
- Understand Illusion Models and Surface Rendering Methods
-
- Inculcate knowledge on Image process concepts
- Know in detail about Computer Graphics Algorithms and Use of Various tools

UNIT- I

Introduction: Application areas of Computer Graphics, Overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.

Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT-II

2 – D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to viewport coordinate transformation, viewing functions, Cohen- Sutherland and Cyrus-beck line clipping algorithms, Sutherland -Hodgeman polygon clipping algorithm.

UNIT- III

3- D Object Representation : Polygon surfaces, quadric surfaces. spline representation, Hermite curve, Bezier curve and B-spline curves. Bezier and B-spline surfaces, sweep representations, octrees BSP Trees,

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and Clipping.

UNIT. IV

Visible surface detection methods: Classification, back. face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub division and octree methods/

Illumination Models and Surface rendering Methods: Basic illumination models, polygon rendering method.

UNIT- V

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame system, Motion specification.

TEXT BOOKS

1. “Computer Graphics C version”, Donald Hearn and M. Pauline Baker, Pearson education.
2. “Computer Graphics Second edition”, Zhigand xiang. Roy Plastock, Schaum’s outlines. rats Mc Graw 19 edition.

REFERENCE BOOKS

1. Computer Graphics Principles & practice, second edition In C, Foley, VanDam, Feiner and Hugues, Pearson Education.
 2. Procedural elements lot Computer Graphics, David F Rogers. Tata Mc Graw hill,2nd edition.
 3. Principles of interactive Computer Graphics. Neuman and Sprout TMH.
 4. Principles of Computer Graphics. Shalni, Govil-Pal, Springer.
 5. ‘Computer Graphics. Steven Harrington, TMH
 6. Computer Graphics F.S.H. S.M.Kelley. PHI.
 7. Computer Graphics P.Shirley, Sieve Marschner a Others, Cengage Learning.
 8. Computer Graphics & Animation. M.C.Trivedi. Jaico Publishing House
 9. An Integrated Introduction to Computer Graphics and Geometric Modelling. R.Gopdman, CRC Press, Taylor&Francis Group.
 10. Computer Graphics. Rajesh K Maurya India.
-

PO1	PO2	PO3	PO4	PO5	PO6
✓			✓		✓

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

Code: 6P108

L	T	P	C
3	1	-	3

Course Objectives:

Understand various determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project, differentiate organization structures and project structures. 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. Waterfall model, classical water fall model

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, Majormilestones, Minor milestones, Periodic status assessments.

Process Planning Work breakdown structures, Planning guidelines, cost and schedule estimatingprocess, iteration planning process, Pragmatic planning.

UNIT V

Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation.

Project Control and process instrumentation 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 I Semester
 Computer Science and Engineering
ADVANCED COMPUTER NETWORKS
(PROFESSIONAL ELECTIVE –I)

Code: 6P109

L	T	P	C
3	1	-	3

Course Objective:

Features of advanced computer networks are deeply rooted to concepts of computer networks. One should have very good understanding of computer networks which may help in learning advanced computer networks in an easy manner. This course handles the networking concepts in detail to a greater extent which is very important as per the growing business of this area. The student is trained with the networking essentials such as standards and protocols in establishing successful communication between two ends over a vast network space.

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

1. List different type of networks , physical media and understand the purpose of internet
2. Compute error correction code checksum and describe Multiple Access Protocols, Ethernet
3. List network layer routing algorithm , protocols and Congestion Control techniques
4. Draw IPv4 ,IPv6 TCP/UDP header format and describe each field
5. Understand the concepts of - Mobile Ad-Hoc Networks ,and Wireless Sensor Networks
6. Explain overview of VPNs, Tunneling Overlay Networks VoIP and Multimedia Networking

UNIT I

Computer Networks and the Internet: What is the Internet, The Network edge, The Network core, Access Networks and physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet – **(Chapter 1) of T1.**

Foundation of Networking Models: 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - **(Chapter 2) of T2.**

UNIT II

The Link Layer and Local Area Networks: Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet – **(Chapter 5) of T1**

Unit - III

Routing and Internetworking: Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer – **(Chapter 7) of T2**

UNIT IV

Logical Addressing: IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – **(Chapter 19, 20) of T3**

Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control – **(Chapter 8) of T2**

Application Layer: Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing – **(Chapter 2) of T1**

UNIT V

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs) - **Mobile Ad-Hoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks – **Wireless Sensor Networks** and Protocol Structures - **(Chapter 6, 19, 20) of T2**

UNIT VI

VPNs, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony – **(Chapters 16, 18) of T2**

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose, Keith W. Ross*, Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, *Nader F. Mir*, Pearson Education, 2007

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networking , *S.Keshav*, Pearson Education, 1997
 2. Computer Networks: Principles, Technologies And Protocols For Network Design, *Natalia Olifer, Victor Olifer*, Wiley India, 2006.
 3. Computer Networks, *Andrew S. Tanenbaum*, Fourth Edition, Prentice Hall.
 4. Fundamentals of Business Data Communications, Jerry FitzGerald and Alan Dennis, Tenth Edition, Wiley, 2009.
 5. Campus Network Design Fundamentals, *Diane Teare, Catherine Paquet*, Pearson Education (CISCO Press)
 6. Data Communications and Networking, *Behrouz A. Forouzan*, Fourth Edition, Tata McGraw Hill, 2007
-

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓		✓	

Syllabus for M. Tech I Year I Semester
 Computer Science and Engineering
NATURAL LANGUAGE PROCESSING
(PROFESSIONAL ELECTIVE –II)

Code: 6P110

L	T	P	C
3	1	-	3

Objectives:

The goal of natural language processing is to help computers understand human speech in order to do away with computer languages like Python, Java, Ruby, or C all together.

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

1. To acquire basic understanding of linguistic concepts and natural language representation through grammatical expressions./tools.
2. To familiar to work with NLTK package for text processing of possible natural language texts.
3. To acquire basic understanding of possible grammar representational concepts and issues associated with them. .
4. To analyze and implement language models for both forms of languages (text form and speech form).
5. Capable to analyze how different parsers functions and their role in designing statical classifiers.
6. To understand different phases of NLP, features identification, per-processing, modeling possible extraction techniques and comparing them with contemporary machine learning techniques.

UNIT I

Introduction and Overview What is Natural Language Processing, hands-on demonstrations. Ambiguity and uncertainty in language. The Turing test.

Regular Expressions Chomsky hierarchy, regular languages, and their limitations. Finite-state automata. Practical regular expressions for finding and counting language phenomena. A little morphology. Exploring a large corpus with regex tools.

UNIT II

Programming in Python An introduction to programming in Python. Variables, numbers, strings, arrays, dictionaries, conditionals, iteration. The NLTK (Natural Language Toolkit)

String Edit Distance and Alignment Key algorithmic tool: dynamic programming, a simple example, use in optimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

UNIT III

Context Free Grammars Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing, bottom-up parsing, and the problems with each. The desirability of combining evidence from both directions **Non-probabilistic Parsing** Efficient CFG parsing with CYK, another dynamic programming algorithms. Early parser. Designing a little grammar, and parsing with it on some test data.

Probability Introduction to probability theory Joint and conditional probability, marginals, independence, Bayes rule, combining evidence. Examples of applications in natural language.

Information Theory The "Shannon game"--motivated by language! Entropy, crossentropy, information gain. Its application to some language phenomena.

UNIT IV

Language modeling and Naive Bayes

Probabilistic language modeling and its applications. Markov models. N-grams. Estimating the probability of a word, and smoothing. Generative models of language. Part of Speech Tagging and Hidden Markov Models, Viterbi Algorithm for Finding Most Likely HMM Path Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese word segmentation, prosody, information extraction, etc.

UNIT V

Probabilistic Context Free Grammars

Weighted context free grammars. Weighted CYK. Pruning and beam search.

Parsing with PCFGs

A tree bank and what it takes to create one. The probabilistic version of CYK. Also: How do humans parse? Experiments with eye-tracking. Modern parsers.

Maximum Entropy Classifiers

The maximum entropy principle and its relation to maximum likelihood. Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks

UNIT VI

Maximum Entropy Markov Models & Conditional Random Fields

Part-of-speech tagging, noun-phrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP.

Lexical Semantics Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing for multinomial's.

Information Extraction & Reference Resolution- Various methods, including HMMs. Models of anaphora resolution. Machine learning methods for co reference.

TEXT BOOKS:

1. "Speech and Language Processing": Jurafsky and Martin, Prentice Hall
2. "Statistical Natural Language Processing"- Manning and Schutze, MIT Press
3. "Natural Language Understanding". James Allen. The Benajmins/Cummings Publishing Company

REFERENCES BOOKS:

1. Cover, T. M. and J. A. Thomas: Elements of Information Theory. Wiley.
 2. Charniak, E.: Statistical Language Learning. The MIT Press.
 3. Jelinek, F.: Statistical Methods for Speech Recognition. The MIT Press.
 4. Lutz and Ascher - "Learning Python", O'Reilly
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PO1	PO2	PO3	PO4	PO5	PO6
✓		✓		✓	

Syllabus for M. Tech I Year I Semester
 Computer Science and Engineering
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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PO1	PO2	PO3	PO4	PO5	PO6
✓		✓			

Syllabus for M. Tech. I Year I semester
Computer Science and Engineering
HUMAN COMPUTER INTERACTION
(PROFESSIONAL ELECTIVE –II)

Code : 6P112

L	T	P	C
3	1	-	3

Course Objectives:

After completing this course students must be able to understand and make use of:

1. The human components functions, the importance of User Interface.
2. The Computer components functions.
3. The Interaction between the human and computer components.
4. Paradigms, Interaction design basics, HCI in the software process, Design rules, Implementation supports, Evaluation techniques, Universal design (Optional).

Course Outcomes:

- 1, understand the Importance of Design and could differentiate between Good & Bad Design
- 2, Differentiates between GUI and WUI and understands the usage of each one.
- 3, Understands the Human level of Perception and Abilities and designs accordingly
- 4, Describes the way of designing the Screen
- 5, Understands how to design new Windows and its Components.
- 6, Understands the usage of new Tools for Creating, Editing the screen Designs.

UNIT I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design - A brief history of Screen design.

UNIT II

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT III

Design process – Human interaction with computers, importance of human characteristics human consideration in Design, Human interaction speeds, understanding business functions.

UNIT IV

Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT V

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

Components – text and messages, Icons and increases – Multimedia, colours, uses problems, choosing colors.

Case studies: windows GUI.

UNIT VI

Software tools – Specification methods, interface – Building Tools.

Interaction Devices – Keyboard and function keys – pointing devices - speech recognition digitization and generation – image and video displays – Printers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCES:

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON.
 2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
 3. User Interface Design, Soren Lauesen , Pearson Education
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PO1	PO2	PO3	PO4	PO5	PO6
✓			✓		

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

PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

**Syllabus for M. Tech. I Year I semester
Computer Science and Engineering
PYTHON PROGRAMMING
(Professional Elective -II)**

Code: 6P114

L T P/D C
3 1 - 3

Course Objectives:

Use Python interactively, execute a Python script at the shell prompt, use Python types, expressions, and None, use string literals and string type, use Python statements (if...elif..else, for, pass, continue, . . .), understand the difference between expressions and statements, understand assignment semantics, write and call a simple function., utilize high-level data types such as lists and dictionaries, understand the difference between mutable and immutable types, write a simple class and access methods and attributes, import and utilize a module, read from and write to a text file.

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

1. Gains exposure towards Python versions and their specifications.
2. Build programs using primitive data types.
3. Write applications that include functions, modules, packages along with respective exceptional handling mechanism.
4. Writes applications using OO features of Python
5. Develops web based applications to deal with data communication between client and server modules and also process data that is stored in possible databases.
6. Hands on exposure on SciPy/Tkinter/Plot Py modules.

Unit -I :

Introduction to Python: History, Features ,Setting up path ,Working with Python Basic Syntax, Variable and Data Types ,Operator. Conditional Statements(If ,If- else ,Nested if-else) Looping (for,While Nested loops) Control Statements(Break , Continue ,Pass)

Unit-II:

Functions: Defining a function ,Calling a function ,Types of functions ,Function Arguments, Anonymous functions ,Global and local variables

String Manipulation: Accessing Strings, Basic Operations, String slices , Function and Methods

Lists : Accessing list ,Operations ,Working with lists Function and Methods

Tuple: Accessing tuples, Operations, Working .

Dictionaries: Accessing values in dictionaries, Working with dictionaries, Properties Functions and Methods.

Unit-III:

Modules :Importing module , Math module , Random module ,Packages , Composition

Input-Output : Printing on screen ,Reading data from keyboard ,Opening and closing file

Exception Handling : Exception,Exception Handling,Except clause ,Try ? finally clause
User Defined Exceptions

Unit-IV:

Advance Python- OOPs concept: Class and object , Attributes , Inheritance, Overloading
Overriding , Data hiding .

Regular expressions---Match function ,Search function ,Matching VS Searching,Modifiers
Patterns.

Unit -V:

CGI : Introduction, Architecture ,CGI environment variable, GET and POST methods
Cookies ,File upload.

Python for Database: Introduction , Connections , Executing queries ,Transactions Handling
error

Unit -VI:

Working with NumPy/Plot Py/SciPy/GUI Programming, Introduction ,Tkinter programming ,
Tkinter widgets

Text books:

- 1.Think Python: How to Think Like a Computer Scientist Allen B. Downey, O'Reilly publications.
2. Learning with Python by [Jeffrey Elkner](#), [Chris Meyers](#) [Allen Downey](#), Dreamtech Press.

Reference books:

1. Introduction to Computation and Programming using Python, Revised and Expanded Edition, John V. Guttag, The MIT Press.
 2. Programming Python,Fourth Edition by Mark Lutz, O'Reilly
 3. Python Programming using problem solving approach, Reema Thareja, Oxford Higher Education.
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PO1	PO2	PO3	PO4	PO5	PO6
✓	✓		✓	✓	

**Syllabus for M. Tech I Year I Semester
Computer Science and Engineering
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
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PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M. Tech I Year I Semester
Computer Science and Engineering
ADVANCED DATA STRUCTURES and ALGORITHMS using JAVA LAB

Code: 6P170

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)**
-

PO1	PO2	PO3	PO4	PO5	PO6
✓	✓				

Syllabus for M. Tech I Year I Semester

Computer Science and Engineering
Literature Review and Seminar-I

Code: 6P171

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 and Engineering
Comprehensive Viva-Voce-I

Code: 6P172

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
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Syllabus for M. Tech I Year II Semester

Computer Science

NETWORK SECURITY

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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PO1	PO2	PO3	PO4	PO5	PO6
✓	✓	✓			

Syllabus for M. Tech I Year II Semester
 Computer Science and Engineering
ADVANCED OPERATING SYSTEMS

L T P C
3 1 - 3

Code: **6P202**

Course Objective:

Understand the types of operating systems along with the differences and significance of each like standalone, distributed, multimedia operating systems, real- time operating systems and mobile computing. Learn the importance and the scope for the development in the current state available operating systems.

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

1. Study and explore the internals of different types of operating system.
2. Explain advanced concepts in distributed operating systems.
3. Identify advanced topics such as multimedia operating systems, real- time operating systems and mobile computing.
4. To understand different memory management techniques.
5. Identify the methods used in defining and assessing criteria for measuring the extent to which a computer system is appropriate for its current deployment and future evolution

UNIT – I:

Operating System Introduction, Structures-Simple Batch, Multi Programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating-System Services, System Calls, Virtual Machines, System Design and Implementation, Microsoft Windows Overview, Modern UNIX Systems Overview, Linux Overview .

UNIT – II: Process and CPU Scheduling - Process concepts and scheduling, Operation on processes, Cooperating Processes, Threads, and Inter process Communication Scheduling Criteria, Scheduling Algorithm, Multiple -Processor Scheduling, Real-Time Scheduling, Windows XP Thread and SMP Management , Linux Process and thread Management , Linux Scheduling , Windows XP Scheduling.

UNIT – III: Memory Management and Virtual Memory, Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging. Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithm, Allocation of Frames, Thrashing, Linux Memory Management, Windows XP Memory Management.

UNIT – IV: File System Interface and Implementation -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free space Management, Directory

Management, Directory Implementation, Efficiency and Performance. Deadlocks – System Model, Dead locks Characterization, Methods for Handling Dead locks, Dead lock, Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

UNIT – V: Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors, UNIX Concurrency Mechanism, Linux Kernel Concurrency Mechanism, Windows XP Concurrency Mechanism.

UNIT – VI : Introduction to Distributed systems: Goals of distributed system, hardware and software concepts, design issues. Communication in Distributed systems: remote procedure call and group communication. Synchronization in Distributed systems: Clock synchronization, Mutual exclusion, Election algorithms, the Bully algorithm, a ring algorithm, atomic transactions, Deadlocks: deadlock in distributed systems, Distributed deadlock prevention, and distributed dead lock detection. Shared Memory, page based Distributed shared memory, shared variable distributed shared memory.

Text Books:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne : Operating System Principles, 7th Edition, John Wiley, 2006. (I, II, III, IV, V).
 2. Andrew. S.Tanenbaum : Distributed Operating Systems, 1st Edition, PHI, 1995. (VI, VII, VIII). Reference Books: 1. Stallings : Operating Systems – Internals and Design Principles, 6th Edition, Pearson Education/PHI, 2009. 2. Charles Crowley : Operating System - A Design Oriented Approach, 1st Edition, TMH, 1998.
 3. Andrew S Tanenbaum : Modern Operating Systems, , 3rd Edition, Pearson/PHI,2008. 18
 4. Dhamdhare : Operating Systems – A concept based approach, 2nd Edition, TMH, 2006.
 5. Daniel P Bovet and Marco Cesati : Understanding the Linux Kernel, 3rd Edition, O’Reilly, 2005. Distributed Operating Systems – Concepts and Design – Pradeep K. Sinha, IEEE 1997.
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PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M. Tech I Year II Semester

Computer Science and Engineering

WEB TECHNOLOGIES & SERVICES

Code: 6P203

L	T	P	C
3	1	-	3

Course Objectives:

To Understand Web Services and implementation model for SOA and its Principles, Benefits, XML concepts, paradigms needed for testing Web Services, Test Strategies for SOA-based applications, functional testing, compliance testing and load testing of Web Services, bug-finding ideas in testing Web Services.

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

1. Understand the importance of Middleware Technologies in the Distributed systems.
2. Understand the structure of Web Service and its Components
3. Develop the SOAP based Web Services with XML
4. Develop a UDDI Registry and its importance
5. Understand the advantages of RESTful Web Services and its Implementation
6. Understand security issues and solutions

UNIT- I

Evolution and Emergence of Web Services – Evolution of distributed computing. Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of webservices, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

UNIT -II

Web Service Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services. Describing Web Services – WSDL introduction, nonfunctional service description, WSDL 1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

UNIT III

Brief Over View of XML – XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation. SOAP : Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in a SOA, Reliable messaging,

The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP.

UNIT – IV

Registering and Discovering Services : The role of service registries, Service discovery, UniversalDescription, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDIImplementation, UDDI with WSDL, UDDI specification, Service Addressing and Notification, Referencing and addressing Web Services, Web Services Notification.

UNIT V

What Is REST?, Review of HTTP Requests and Responses, HTTP as an API, A First RESTful Example, Why Use Servlets for RESTful Web Services? **RESTful Web Services:** The Service Side, the Client Side. Implementation of RESTful Web Services using Jersey.

UNIT - VI

SOA and web services security considerations, Network-level security mechanisms, Application-level security topologies, XML security standards, Semantics and Web Services, The semantic interoperability problem, The role of metadata, Service metadata, Overview of .NET and J2EE, SOA and Web Service Management, Managing Distributed System, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange.

TEXT BOOKS:

1. Web Services & SOA Principles and Technology, Second Edition, Michael P. Papazoglou.
2. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.
3. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.

REFERENCE BOOKS:

1. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.
 2. Building web Services with Java, 2nd Edition, S. Graham and others, Pearson Education.
 3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
 4. McGovern, et al., "Java web Services Architecture", Morgan Kaufmann Publishers, 2005.
 5. J2EE Web Services, Richard Monson-Haefel, Pearson Education
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PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

**Syllabus for M. Tech. I Year II Semester
Computer Science and Engineering
DATAWAREHOUSING AND DATA MINING**

L	T	P	C
3	1	-	3

Code : 6P204

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

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining

Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives, Data Mining Query Languages, Architectures of Data Mining Systems

UNIT II

Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation

Data Cube Computation: Efficient Methods for simple Data Cube Computation (Full Cube, Iceberg Cube, Closed Cube and Shell Cube), Discovery Driven exploration of data cubes

UNIT III

Concepts Description: Characterization and Comparison: Data Generalization and Summarization-Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

UNIT IV

Mining Association Rules in Large Databases : Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT V

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.

UNIT VI

Cluster Analysis Introduction: Introduction to machine learning, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

TEXT BOOK:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER
Harcourt India.
2. Introduction to Data Mining - First Edition, by Pang-Ning Tan, Michael Steinbach and Vipin Kumar, ISBN-13: 978-0321321367

REFERENCES:

1. Data Mining Introductory and advanced topics –MARGARET H DUNHAM,
PEARSON EDUCATION
 2. Data Mining Techniques – ARUN K PUJARI, University Press.
 3. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY.
Pearson Edn Asia.
 4. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT
EDITION.
 5. The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT
EDITIO
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PO1	PO2	PO3	PO4	PO5	PO6
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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
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PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M. Tech I Year II Semester
 Computer Science and Engineering
IMAGE PROCESSING AND PATTERN RECOGNITION
(PROFESSIONAL ELECTIVE –III)

Code: 6P206

L	T	P	C
3	1	-	3

Course Objectives:

The main objective is to introduce the student to various digital image pre-processing techniques. Upon completion of this course the student will get an idea on application of Image processing techniques.

- Understand the theory and algorithms.
- Be capable of applying this knowledge to recognize patterns of given Image Processing application.
- Be able to develop applications.

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

1. Covers the basic theory and algorithms that are widely used in digital image processing
2. Expose students to current technologies and issues that are specific to image processing systems
3. Develop applications using image processing techniques
4. Develop critical thinking about shortcomings of the state of the art in image processing
5. Understand fundamental methods of pattern recognition related to Image Processing applications
6. Be able to understand different pattern recognition methods

UNIT I

The digitized image and its properties: Applications of image processing, image function, image representation, sampling, quantization, colour images, metrics and topological properties of digital images, histograms, image quality, noise image. Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform– Separable Image Transforms - Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms, DWT.

UNIT II

Image pre-processing: Pixel brightness transformation, position dependent brightness correction, grey scale transformation; geometric transformation, Histogram equalization ,local pre-processing- image smoothening, Sharpening filters – Homomorphic filtering, edge detectors, zero-crossing, scale in image processing, canny edge d

etection, parametric edge models, edges in multi spectral images, local pre-processing and adaptive neighbourhood pre processing; image restoration

UNIT III

Image Segmentation-Threshold detection methods, optimal thresholding, multispectral thresholding, thresholding in hierarchical data structures; edge based image segmentation-edge image thresholding, edge relaxation, border tracing, border detection.

UNIT IV

Mathematical Morphology—Basic morphological concepts, four morphological principles, binary dilation, erosion, Hit or miss transformation, opening and closing; thinning and skeleton algorithms; Morphological segmentation -particles segmentation and watersheds, particles segmentation.

UNIT V

Image textures-statistical texture description, methods based on spatial frequencies, co-occurrence matrices, edge frequency, and texture recognition method applications
Image representation and description-representation, boundary descriptors, regional descriptors

UNIT VI

Pattern recognition fundamentals: Basic concepts of pattern recognition, fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model.

TEXT BOOKS

1. Image Processing Analysis and Machine Vision by Millan sonka,Vaclav Hiavac,Roger Boyle,Vikas publishing House, Brooks/Cole.
 2. Digital Image Processing Second Edition by Rafel C. Gonzalez Richard E. Woods. Pearson Education
 3. Pattern Recognition principles by Julus T. Tou and Rafel C. Gonzalez, Addison –Wesley publishing company.
 4. Pattern Recognition and Image Analysis by Earl Gose, Richard Johnsonbaugh, Prentice Hall of India private limited, 1999.
 5. A.K. Jain, PHI, New Delhi (1995)-Fundamentals of Digital Image Processing.
-

PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M.Tech I Year II Semester
 Computer Science and Engineering
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 Strok, second edition

Syllabus

PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M. Tech I Year II semester
 Computer Science and Engineering
INFORMATION RETRIEVAL SYSTEMS
(PROFESSIONAL ELECTIVE –III)

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: After completing this course, students should able to

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.
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PO1	PO2	PO3	PO4	PO5	PO6
✓		✓	✓		

Syllabus for M. Tech I Year II Semester
 Computer Science and Engineering
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. Data mining, Regression modeling etc.

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

- 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
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PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M. Tech. I Year II semester
Computer Science and Engineering
MOBILE COMPUTING
(PROFESSIONAL ELECTIVE –III)

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. Learn WAP protocols, Bluetooth and The Necessary Tools for Android.

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

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.
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PO1	PO2	PO3	PO4	PO5	PO6
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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

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Syllabus for M. Tech I Year II Semester
Computer Science Engineering
BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT
(OPEN ELECTIVE –I)

Code: 6ZC03

T	P	C
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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:

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

References:

1. Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
 2. Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
 3. G. Koteshwar: Risk Management Insurance and Derivatives, Himalaya, 2008.
 4. Gulati: Principles of Insurance Management, Excel, 2009.
 5. James S Trieschmann, Robert E. Hoyt & David N. Sommer: Risk Mgt. & Insurance, Cengage, 2009.
 6. Dorfman: Introduction to Risk Management and Insurance, 8/e, Pearson, 2009.
 7. P.K. Gupta: Insurance and Risk Management, Himalaya, 2009.
 8. Vivek & P.N. Asthana: Financial Risk Management, Himalaya, 2009.
 9. Jyotsna Sethi & Nishwan Bhatia : Elements of Banking and Insurance, 2/e,PHI, 2012.
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PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M. Tech I year II semester
Computer Science and Engineering
INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE –I)

Code: 6QC33

L T P C

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- 3

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

Code: 6T217

L	T	P/D	C
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Course objective : Understand Embedded system concepts and architecture and programming of 8051 micro Controller

Course Outcomes: On completion of this course you should be able to:

1. Understand the basics of Embedded design process
2. Explore the architecture of 8051 microcontroller .
3. Understand assembly language programming concepts of 8051 microcontroller.
4. Explore interfacing of 8051
5. Understand the concepts of RTOS .
6. Explore the basic 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, Elsevier.
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.
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Syllabus for M. Tech I year II semester
Computer Science and Engineering
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 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:

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

References:

1. Bholanath Dutta: Entrepreneurship – Text and cases, Excel, 2009.
 2. Vasanth Desai: Entrepreneurship, HPH, 2009
 3. Barringer: Entrepreneurship, Pearson, 2009.
 4. C.K. Prahalad, M.S. Krishnan, The new age of Innovation – TATA McGRAW-HILL Edition 2008
 5. H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
 6. Stay Hungry Stay Foolish, Rashmi Bansal and published by IIM., Ahmedabad
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Syllabus for M. Tech I year II semester
 Computer Science and Engineering
ETHICS, MORALS, GENDER SENSITIZATION AND YOGA
 (Open Elective – I)

Code: 6H233

L T P/D C
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Course Outcome: After completion of this course, student will be able to

1. Discriminate between right and wrong from their own behavior and judge the same in others.
2. Understand how moral development involves thoughts, feelings, and behaviors regarding right and wrong and get intrapersonal and interpersonal dimensions.
3. Understand Engineer's Responsibility for safety and risk.
4. Understand rules and principles set by the society in a customary way.
5. Perceive gender literacy and understand the importance of gender perspective and in turn delve into gender issues.
6. Understand and appreciate the importance of yoga for an enriched life style.

UNIT I: HUMAN VALUES AND MORALS

Why Value Education, Understanding Social Factors, System, Structure and Source of Generic Values; Morals, Values and Ethics; Integrity; Work Ethics; Service Learning-Civic Virtue-Respect for Others-Living Peacefully-Caring-Sharing; Honesty; Courage; Value Time; Cooperation; Commitment; Empathy; Self Confidence; Spirituality; Character; Loyalty; Confidentiality

UNIT II: ENGINEERING ETHICS AND PERSONALITY DEVELOPMENT

Ethical Principles, Ethical Theories, , Use of Ethical Theories, Types of Inquiry, Engineering and Ethics, Engineering Ethics, Moral Autonomy of Engineers, Professional Ethics, Consensus and Controversy, Ethics in Business, Global business, Understanding Factors of Success, Human Aspirations, Personality and Our Identity, Understanding SELF, Happiness and Self-Interest, Positive Thinking, Custom and Religion, Understanding responsibility toward society, Understanding National and cultural Ethos; Professionalism

UNIT III:ENGINEERING AS SOCIAL EXPERIMENTATION

Comparison with Standard Experiments; Knowledge Gained; Learning from the Past; Engineer as Manager, Consultants and leaders and responsible social Experimenter; Engineers personality Trait, Big Five Personality model, Conscientiousness ,Accountability-Roles of Codes-Codes and Experimental Nature of Engineering; Engineer's Responsibility for safety and Risk, Concept of Safety-Types of Risks

UNIT IV: GLOBAL PERSPECTIVE

Distinguish between Bribes and Gifts; Occupational Crimes; Globalization- Cross-Cultural Issues; Environmental Ethics; Internet and Computer Codes of Ethics

Case Study:

Ethics in Military and Weapons Development-Ethics in Research work

UNIT V: GENDER SENSITIZATION

Introduction to Gender Study; Introduction to Gender Spectrum; Point of view; Gender and Structure of Knowledge; Contribution of Women in growth and development as Technologist, Scientist, R&D, GDP, Social Life, National Development, International Perspective”- Life Exemplary Madame Curie, Durga bai Deshmukh, Kalpana Chawla, Chanda Kochar, Mary Kom, Indra Gandhi, Mother Teresa, Indra Nooyi, Golda Meir, Margaret Thatcher and other achievers

UNIT VI: YOGA

Introduction to Yoga in India; Origin and Development; Theoretical understanding of yoga; Stress Management : Modern and Yogic perspectives ; Tackling ill-effects of Frustration, Anxiety and Conflict through modern and Yogic methods; Meditation Techniques; Suryanamaskar; Pranayama.

TEXT BOOKS:

1. Indian Culture Values And Professional Ethics(For Professional Students) by Prof.P.S.R.Murthy ; B.S.Publications.
2. Professional Ethics and Human Values by M. Jayakumar, Published by University Science Press,
3. Telugu Academy, Hyderabad, 2015, Towards A World of Equals, A Bilingual Text Book on Gender.

REFERENCE BOOKS:

1. The Yoga Sutras of Patanjali by Swami Satchitananda
 2. The Secret Power of Yoga by Nischala Joy Devi
 3. Light on Pranayama by B.K.S. Iyengar
 4. Books on the Art of Living by Poojya Sri Sri Ravi Shanker
 5. Making It Relevant: Mapping the meaning of women’s studies in Tamilnadu by Anandi S and Swamynathan P
 6. Feminism is for Everybody; Passionate Politics by Bell Hooks
 7. Gender by Geetha V
 8. “Growing up Male” in what is worth teaching by K Kumar
 9. The Lenses of Gender: Transforming the Debate on Sexual Inequality - Sandra Lipsitz Bem
 10. The Lenses Of Gender - by ANNE MURPHY
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Syllabus for M. Tech I year II semester
Computer Science and Engineering
BIOINFORMATICS
(Open Elective – I)

Code: 6QC7
C

L T P/D

3 1 - 3

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
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PO1	PO2	PO3	PO4	PO5	PO6
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Syllabus for M.Tech I Year II Semester
Computer Science and Engineering
WEB TECHNOLOGIES AND INFORMATICA LAB

Code: 6P270

L	T	P	C
-	-	4	2

Objectives:

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

LIST OF EXERCISES:

- 1) Create a simple webpage using HTML5.
 - 2) Use frames to Include Images and Videos.
 - 3) Add a Cascading Style sheet for designing the web page.
 - 4) Design a dynamic web page with validation using JavaScript.
 - 5) Design a catalogue in PHP with AJAX.
 - 6) Simple application to demonstrate Web Service.
 - 7) Design a simple online test web page in PHP.
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Informatica Lab

1. Build a Data Warehouse to perform filter transformation for the employee database.
 2. Add the commission of 1000 Rs in the Salary field of Employee table using Expression Transformation.
 3. Using Aggregator transformation display the average salary of employees in each departments.
 4. Using Joiner transformation display the Sailor_Name form Sailors table and Boat_Name from Boats table in a new table.
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**Syllabus for M. Tech I year II semester
Computer Science and Engineering**

LITERATURE REVIEW & SEMINAR - II

Code: 6P271

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.

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Syllabus for M. Tech I Year II semester
Computer Science and Engineering

PROJECT SEMINAR - I

Code: 6P272

L	T	P	C
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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
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Syllabus for M. Tech I Year II semester
Computer Science and Engineering

COMPREHENSIVE VIVA-VOCE – II

Code: 6P273

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.

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Syllabus for M. Tech II Year I semester
Computer Science and Engineering

PROJECT WORK REVIEW - I

Code: 6P370

	L	T	P
		C	
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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.

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

Code: 6P470

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.

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Syllabus for M. Tech II Year II semester
Computer Science and Engineering

PROJECT WORK (VIVA-VOICE)

Code: 6P471

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.
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