SCHEME AND SYALLABUS

B. Tech. Computer Science & Engineering

Evaluation Schemes form I Year to IV Year

w.e.f. 2017-2018

G. B. PANT ENGINEERING COLLEGE

GHURDAURI, PAURI GARHWAL, Uttarakhand-246194

(An Autonomous Institution of the Government of Uttarakhand)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION

Build a strong research and teaching environment to produce skilled, Innovative and socially responsible computer professionals.

MISSION

- Provide quality undergraduate and graduate education in both the theoretical and applied foundations of Computer Science and Engineering.
- To motivate the students for higher studies and research in the frontier areas of Computer Science and Engineering
- To prepare our students to succeed and contribute towards society.
- Train the students to effectively apply this education to solve real-world problems thus amplifying their potential for lifelong high-quality careers.
- To collaborate with industries and government organizations

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Students will gain the ability to identify, formulate, and solve challenging IT problems.

PEO2: Students will develop professional skills that will prepare them for immediate employment or higher studies in Computer Science & Engineering and related disciplines.

PEO3: Students will be provided with educational foundations that prepare them for leadership roles along diverse career paths.

PEO 4: Students will be trained to become future entrepreneurs.

PEO 5: Students will develop an understanding of the social and human context in which their engineering contributions will be utilized.

PEO 6: Students will learn to communicate the ideas effectively in team environment.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

EVALUATION SCHEME
B. Tech. (COMPUTER SCIENCE & ENGINEERING)
I-YEAR (I/II-SEMESTER) (Common for all Branches)
(Effective from session: 2017-18)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
THEORY										
1.	TCS 111/121	BASIC COMPUTER ENGINEERING	3	1	-	30	20	50	100	150
PRACTICAL										
2.	PCS 111/121	BASIC COMPUTER ENGINEERING (Pr)	-	-	2	10	15	25	25	50

EVALUATION SCHEME
B. Tech. (COMPUTER SCIENCE & ENGINEERING)
II-YEAR (III-SEMESTER)
(Effective from session: 2017-18)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
THEORY										
3.	TCS 231	DATA STRUCTURES	3	1	-	30	20	50	100	150
4.	TCS 232	DIGITAL ELECTRONICS	3	1	-	30	20	50	100	150
5.	TCS 233	OBJECT ORIENTED PROGRAMMING AND DESIGN	3	1	-	30	20	50	100	150
6.	TCS 234	DISCRETE STRUCTURES	3	1	-	30	20	50	100	150
7.	TAH 232	MATHEMATICS- III	3	1	-	30	20	50	100	150
PRACTICAL										
8.	PCS 231	DATA STRUCTURES (Pr)	-	-	2	10	15	25	25	50
9.	PCS 232	DIGITAL ELECTRONICS (Pr)	-	-	2	10	15	25	25	50
10.	PCS 233	OBJECT ORIENTED PROGRAMMING AND DESIGN(Pr)	-	-	2	10	15	25	25	50
11.	PCS 234	COMPUTER WORKSHOP (Pr)	-	-	2	10	15	25	25	50
12.	GPP 231	GENERAL PROFICIENCY	-	-	-	-	50	50	-	50
SEMESTER TOTAL			**15**	**5**	**8**	**190**	**210**	**400**	**600**	**1000**

EVALUATION SCHEME
B. Tech. (COMPUTER SCIENCE & ENGINEERING)
II-YEAR (IV-SEMESTER)
(Effective from session: 2017-18)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
THEORY										
1.	TCS 241	DATABASE MANAGEMENT SYSTEMS	3	1	-	30	20	50	100	150
2.	TCS 242	JAVA PROGRAMMING	3	1	-	30	20	50	100	150
3.	TCS 243	OPERATING SYSTEMS	3	1	-	30	20	50	100	150
4.	TCS 244	COMPUTER NETWORKS	3	1	-	30	20	50	100	150
5.	TCS 245	COMPUTER ORGANIZATION	3	1	-	30	20	50	100	150
PRACTICAL										
6.	PCS 241	DATABASE MANAGEMENT SYSTEMS (Pr)	-	-	2	10	15	25	25	50
7.	PCS 242	JAVA PROGRAMMING (Pr)	-	-	2	10	15	25	25	50
8.	PCS 243	OPERATING SYSTEMS (Pr)	-	-	2	10	15	25	25	50
9.	PCS 244	COMPUTER NETWORKS (Pr)	-	-	2	10	15	25	25	50
10.	GPP 241	GENERAL PROFICIENCY	-	-	-	-	50	50	-	50
SEMESTER TOTAL			**15**	**5**	**8**	**190**	**210**	**400**	**600**	**1000**

EVALUATION SCHEME
B. Tech. (COMPUTER SCIENCE & ENGINEERING)
III-YEAR (V-SEMESTER)
(Effective from session: 2017-18)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
THEORY										
1.	TCS 351	ANALYSIS AND DESIGN OF ALGORITHMS	3	1	-	30	20	50	100	150
2.	TCS 352	SOFTWARE ENGINEERING	3	1	-	30	20	50	100	150
3.	TCS 353	WEB TECHNOLOGY	3	1	-	30	20	50	100	150
4.	TCS 354	MICROPROCESSOR & ITS APPLICATIONS	3	1	-	30	20	50	100	150
5.	TCS 355	THEORY OF COMPUTATION	3	1	-	30	20	50	100	150
PRACTICAL										
6.	PCS 351	ANALYSIS AND DESIGN OF ALGORITHMS (Pr)	-	-	2	10	15	25	25	50
7.	PCS 352	SOFTWARE ENGINEERING (Pr)	-	-	2	10	15	25	25	50
8.	PCS 353	WEB TECHNOLOGY (Pr)	-	-	2	10	15	25	25	50
9.	PEC 354	MICROPROCESSOR & ITS APPLICATIONS (Pr)	-	-	2	10	15	25	25	50
10.	GPP 351	GENERAL PROFICIENCY	-	-	-	-	50	50	-	50
SEMESTER TOTAL			**15**	**5**	**8**	**190**	**210**	**400**	**600**	**1000**

EVALUATION SCHEME
B. Tech. (COMPUTER SCIENCE & ENGINEERING)
III-YEAR (VI-SEMESTER)
(Effective from session: 2017-18)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
THEORY										
1.	TCS 361	COMPILER DESIGN	3	1	-	30	20	50	100	150
2.	TCS 362	AD HOC & SENSOR NETWORKS	3	1	-	30	20	50	100	150
3.	TCS 363	NETWORK SECURITY	3	1	-	30	20	50	100	150
4.	TCS 364	ARTIFICIAL INTELLIGENCE	3	1	-	30	20	50	100	150
5.	TAH 361	INDUSTRIAL ECONOMICS & MANAGEMENT	3	1	-	30	20	50	100	150
PRACTICAL										
6.	PCS 361	COMPILER DESIGN (Pr)	-	-	2	10	15	25	25	50
7.	PCS 362	AD HOC & SENSOR NETWORKS (Pr)	-	-	2	10	15	25	25	50
8.	PCS 363	NETWORK SECURITY (Pr)	-	-	2	10	15	25	25	50
9.	PCS 364	SEMINAR	-	-	2	-	50	50	-	50
10.	GPP 361	GENERAL PROFICIENCY	-	-	-	-	50	50	-	50
SEMESTER TOTAL			**15**	**5**	**8**	**180**	**245**	**425**	**575**	**1000**

EVALUATION SCHEME
B. Tech. (COMPUTER SCIENCE & ENGINEERING)
IV-YEAR (VII-SEMESTER)
(Effective from session: 2017-18)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
THEORY										
1.	TCS 471	COMPUTER GRAPHICS & ANIMATION	3	1	-	30	20	50	100	150
2.	TCS 472	COMPUTER ARCHITECTURE	3	1	-	30	20	50	100	150
3.	TCS 473	ADVANCED DATABASE TECHNOLOGY	3	1	-	30	20	50	100	150
4.	ECS 47X	ELECTIVE-I	3	1	-	30	20	50	100	150
5.	ECS 47Y	ELECTIVE-II	3	1	-	30	20	50	100	150
PRACTICAL										
6.	PCS 471	COMPUTER GRAPHICS AND ANIMATION (Pr)	-	-	2	10	15	25	25	50
7.	PCS 472	INDUSTRIAL TRAINING	-	-	2	-	50	50	-	50
8.	PCS 473	PROJECT-I	-	-	4	25	25	50	50	100
9.	GPP 471	GENERAL PROFICIENCY	-	-	-	-	50	50	-	50
SEMESTER TOTAL			**15**	**5**	**8**	**185**	**240**	**425**	**575**	**1000**

ELECTIVE-I		**ELECTIVE-II**	
COURSE CODE	**SUBJECT**	**COURSE CODE**	**SUBJECT**
ECS 470	BIG DATA ANALYTICS	ECS 475	E-COMMERCE
ECS 471	STATISTICAL MODELING AND QUEUEING THEORY	ECS 476	MODELING & SIMULATION
ECS 472	MOBILE COMPUTING	ECS 477	MICROCONTROLLER AND EMBEDDED SYSTEMS
ECS 473	EMERGING TRENDS & TECHNOLOGIES	ECS 478	DIGITAL IMAGE PROCESSING
ECS 474	CYBER FORENSICS AND ETHICAL HACKING	ECS 479	SOFTWARE PROJECT MANAGEMENT

EVALUATION SCHEME
B. Tech. (COMPUTER SCIENCE & ENGINEERING)
IV-YEAR (VIII-SEMESTER)
(Effective from session: 2017-18)

S. No.	COURSE CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
THEORY										
1.	TCS 481	DISTRIBUTED COMPUTING	3	1	-	30	20	50	100	150
2.	TCS 482	DATA WAREHOUSING AND DATA MINING	3	1	-	30	20	50	100	150
3.	ECS 48X	ELECTIVE-III	3	1	-	30	20	50	100	150
4.	ECS 48Y	ELECTIVE-IV	3	1	-	30	20	50	100	150
PRACTICAL										
5.	PCS 481	DATA WAREHOUSING AND DATA MINING (Pr)	-	-	2	10	15	25	25	50
6.	PCS 482	PROJECT II	-	-	6	50	50	100	200	300
7.	GPP 481	GENERAL PROFICIENCY	-	-	-	-	50	50	-	50
SEMESTER TOTAL			**12**	**4**	**8**	**180**	**195**	**375**	**625**	**1000**

ELECTIVE-III		**ELECTIVE-IV**	
COURSE CODE	**SUBJECT**	**COURSE CODE**	**SUBJECT**
ECS 480	CLOUD COMPUTING	ECS 485	NETWORK CONGESTION CONTROL & AVOIDANCE TECHNIQUES
ECS 481	BIO-INSPIRED COMPUTING	ECS 486	FUZZY LOGIC THEORY
ECS 482	HIGH SPEED NETWORKS	ECS 487	GRID COMPUTING
ECS 483	REAL TIME SYSTEMS	ECS 488	QUERY & TRANSACTION PROCESSING
ECS 484	MEDICAL IMAGING	ECS 489	SOFT COMPUTING

TCS 111/ 121 - Basic Computer Engineering

B.Tech. Semester –I/II (Computer Science &Engg.)

L T P		
3 1 0	**Class Work**	**: 50 Marks**
	Exam.	**: 100 Marks**
	Total	**: 150 Marks**
	Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Know about the components of computer system, binary codes and different number systems
- Learn about the concepts of various types of operating system, services and features of operating system.
- Design programming involving decision control structures, loops, functions, pointer and structure.
- Express the solutions to real world problems clearly and precisely in c language.
- Learn the basic components of internet, computer networks and networks topologies .

UNIT-I: AN INTRODUCTION OF COMPUTER SYSTEM

Anatomy of a digital Computer, Different Units of Computer System, Classification of Computer Systems, Radix Number systems. Binary codes: BCD, Gray, EBCDIC, ASCII

Operating System: Operating System Concepts, Operating System services, Types of Operating Systems, Introduction to PC Operating Systems: Unix/Linux, DOS, and Windows.

UNIT-II: PROGRAMMING LANGUAGES AND ALGORITHMS

Machine, Assembly and High Level Language; Assembler, Linker, Loader, Compiler, Interpreter, debuggers, Programming fundamentals: problem definition, algorithms, flowcharts and their symbols.

UNIT-III: COMPUTER NETWORKS

Basic concepts of Computer Networks, Working of Internet and its Major features. Network Topologies: Bus, Star, Ring, Hybrid, Tree, Complete, Irregular; Types of Networks: LAN, MAN and WAN.

Electronic Mail: advantages and disadvantages, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, Newsgroups, mailing lists, chat rooms.

UNIT-IV: BASICS OF 'C' LANGUAGE

C Fundamentals, Basic data types, local and external variables and scope, formatted input/ output, expressions, selection statements, loops and their applications; arrays, functions, recursive functions, Strings literals, arrays of strings.

UNIT-V: ADVANCED FEATURES OF 'C' LANGUAGE

Pointers, Structures, Unions and Enumerations, Preprocessor directives, storage classes, type's qualifiers, Low level programming (Bitwise operators, Bit fields in structures, other low level techniques), error handling, file operations (low level/high level).

BOOKS

1. Dennis M Ritchie, Brian W. Kernighan, "The C Programming Language", PHI, 1988.
2. D. S. Yadav, "Fundamentals of Information Technology", New Age Pub, 2010 .
3. Reema Theraja, "Computer Fundamentals and Programming in C" Oxford Publication.
4. Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, "Information Technology", TMH, 1998.
5. Byron C Gottfried , "Theory and Problem of Programming with C" , TMH.
6. Jack B. Rochester ,"Using Computers and Information, Que Education & Training, 1996.
7. K.N. King , "C Programming – A Modern Approach", WW Norton & Co, 1996.

TCS 231: Data Structures

B.Tech. Semester –III (Computer Science &Engg.)

L T P		
3 1 0	**Class Work**	**: 50 Marks**
	Exam.	**: 100 Marks**
	Total	**: 150 Marks**
	Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Implement basic Abstract Data Types like linked list, queue and stack using both static and dynamic memory allocations.
- Recognize the data organization and applications of binary trees and binary search trees
- Analyze the importance of self-balancing trees for effective organizing the data.
- Identify suitable algorithms for solving hashing, shortest path, network link analysis, and minimum spanning tree.
- Identify data structuring strategies that are appropriate to a given contextual problem.

UNIT I: BASIC TERMINOLOGY

Elementary Data Organization, Data Structure Operations, Array Definition and Analysis, Representation of Linear Arrays in Memory, Traversing of Linear Arrays, Insertion and Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays, Sparse Matrix.

UNIT II: STACKS AND QUEUES

Operations on Stacks- Push, Pop, Representation of stacks, Applications of stacks - Polish expression and their compilation conversion of infix expression to prefix and postfix expression, Tower of Hanoi problem, Representation of Queues, Operations on queues: Create, Add, Delete, Priority Queues, Dequeues, Circular Queue.

UNIT III: LINKED LISTS

Singly linked lists: Representation of linked lists in memory, Traversing, Searching, Insertion into, Deletion from linked list, Polynomial Addition, Header Linked List, Doubly linked list, generalized list.

UNIT IV: TREES& GRAPHS

Basic Terminology, Binary Trees and their representation, expression evaluation, Complete Binary trees, Extended binary trees, Traversing binary trees, Searching, Insertion and Deletion in binary search trees(with and without recursion), AVL trees, Threaded trees, B trees.

Graphs: Terminology and Representations, Graphs & Multigraphs, Directed Graphs, Sequential representation of graphs, Adjacency matrices, Transversal Connected Component and Spanning trees, Shortest path Algorithm.

UNIT V: SEARCHING, SORTING METHODOLOGIES

Bubble sort, Selection Sort, Insertion Sort, Linear Search, Binary Search. Stack -Quick Sort, Merge Sort. Two way Merge Sort, Queue- Radix Sort. Tree – Heap Sort.

TEXT BOOK

1. M. A. Weiss, “Data Structures and Algorithm Analysis in C”, 2nd Edition, Pearson Education, 2005.

REFERENCES

1. A.V. Aho, J. E. Hopcroft, and J. D. Ullman, “Data Structures and Algorithms”, 1st Edition, Pearson Education, Reprint 2003.
2. R. F. Gilberg, B. A. Forouzan, “Data Structures”, 2nd Edition, Thomson India Edition, 2005.
3. Jean Paul Tremblay & Pal G. Sorenson, “An Introduction to Data Structures and Applications” McGraw-Hill.
4. R.L. Kruse, B.P. Leary, C.L. Tondo, Data Structures and Program Design in C, PHI.
5. A.M. Tenenbaum, Langsam, Moshe J. Augentem, Data Structures using C, PHI.
6. Data Structure and Program design in C by Robert Kruse, PHI

TCS 232: Digital Electronics

B.Tech. Semester –III (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Recall Number System and number Conversion.
- Distinguish different methods used for simplification of Boolean functions.
- Contrast combinational circuits and Sequential circuits.
- Reconstruct and implement synchronous sequential circuits.
- Compose programs in Hardware Description Language for synchronous sequential circuits.

UNIT I: NUMBER SYSTEMS AND BOOLEAN ALGEBRA

Review of Number Systems: Number representation: Signed, Unsigned, Fixed point, Floating point. Computer codes: BCD, Gray code, Excess 3 code, Error detection and correction codes, Parity, Hamming codes. Boolean algebra: Basic Postulates and theorems, Switching functions, Canonical forms, Logic gates. Simplifications of Boolean functions using Karnaugh map and tabulation methods

UNIT II: COMBINATIONAL LOGIC DESIGN

Analysis and design procedures of Combinational circuits, Arithmetic Circuits**:** Binary / BCD adders and subtractors, Carry look-ahead adder, Magnitude comparator, Code conversion Decoders, Encoders, Multiplexers and Demultiplexers.

UNIT III: SYNCHRONOUS SEQUENTIAL LOGIC

Sequential Devices**:** General model of sequential circuits, Latch, Design of Flip Flops, Master slave configuration. Mealy/Moore models -Sequence detector, Concept of state, State diagram, State table, State reduction procedures using Implication chart, Design of synchronous sequential circuits, Up-down / Modulus counters, Serial adder, Binary counters.

UNIT IV: ASYNCHRONOUS SEQUENTIAL LOGIC

Introduction to Asynchronous Sequential Circuits: Fundamental mode and Pulse mode circuits, Analysis and design of asynchronous sequential circuits: Reduction of state and flow tables, Race-free state assignment, Hazards.

UNIT V: PROGRAMMABLE LOGIC DEVICES AND HDL

Introduction to PLDs – ROM, PAL, PLA, Implementation of digital functions using PLDs. Introduction to Hardware Description Language, Behavioral, Dataflow and gate level modelling, Simple HDL codes for combinational circuits and sequential circuits

TEXT BOOKS

1. M. Morris Mano, “Digital Design”, 5th Edition, Pearson Education, 2013.
2. D.A. Godse, A.P. Godse, **“**Digital Electronics”, 3rd Revised Edition, Technical Publications, 2008.

REFERENCES

1. Charles H. Roth, Jr. “Fundamentals of Logic Design”, 4th Edition, Jaico Publishing House, 2000.
2. Donald D. Givone, “Digital Principles and Design”, Tata McGraw-Hill, 2003.

TCS 233: Object Oriented Programming

B.Tech. Semester –III (Computer Science &Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of the course, the students will be able to

- Use pointers and dynamic memory allocation in C++ classes
- Recognize and use object oriented programming constructs to write object oriented programs
- Describe encapsulation, polymorphism and inheritance
- Create and modify objects using C++ classes
- Determine the appropriate objects required to solve a programming problem
- Practice exception handling mechanisms to handle runtime errors
- Differentiate function templates and class templates
- Explain about the namespaces

UNIT I: BASIC CONCEPTS

Object oriented programming concepts: objects, classes, methods and messages, abstraction and encapsulation, inheritance, abstract classes, polymorphism. Introduction to C++ Classes and objects: classes, structures and classes, unions and classes, friend functions, friend classes, inline functions, parameterized constructors, static class members, scope resolution operator, nested classes, local classes, passing objects to functions, returning objects, object assignment. Arrays, Pointers, References and Dynamic Allocation Operators: Arrays of Objects, Pointers to Objects, Type Checking, This Pointer, Pointers to Derived Types, Pointers to Class Members, References, Dynamic Allocation Operators.

UNIT II: FUNCTION OVERLOADING AND CONSTRUCTORS

Function Overloading, Overloading Constructors, Copy Constructors, Finding the Address of Overloaded Functions, Overload Anachronism, Default Function Arguments, Function Overloading and Ambiguity. Operator overloading: Creating a member Operator Function, Operator Overloading Using Friend Function, Overloading New and Delete, Overloading Special Operators, Overloading Comma Operator.

UNIT III: INHERITANCE AND POLYMORPHISM

Inheritance: Base-Class Access Control, Inheritance and Protected Members, Inheriting Multiple Base Classes, Constructors, Destructors and Inheritance, Granting Access, Virtual Base Classes. Polymorphism: Virtual Functions, Virtual Attribute and Inheritance, Virtual Functions and Hierarchy, Pure Virtual Functions, Using Virtual Functions, Early vs. Late Binding Run-Time Type ID and Casting Operators: RTTI, Casting Operators, Dynamic Cast.

UNIT IV: TEMPLATES AND EXCEPTION HANDLING

Templates: Generic Functions, Applying Generic Functions, Generic Classes, Type name and Export Keywords, Power of Templates. Exception Handling: Fundamentals, Handling Derived Class Exceptions Exception Handling Options, Understanding terminate() and unexpected(), uncaught_exception () Function, Exception and bad_exception Classes – Applying Exception Handling.

UNIT V: I/O STREAMS

Streams and formatted I/O, Overloading<< and >>. File: File Classes, File Operations. Namespaces: Namespaces, std namespace. Standard Template Library: Overview, Container Classes, General Theory of Operation, Lists, String Class, Final Thoughts on STL.

TEXT BOOKS

1. Herbert Schildt, “C++: The Complete Reference”, 4th Edition, Tata McGraw-Hill, 2003.
2. Paul Deitel, Harvey Deitel, “C++ How to Program”, 8th Edition, Prentice Hall, 2011.

REFERENCES

1. Ira Pohl, “Object Oriented Programming using C++”, 2nd Edition, Pearson Education, Reprint 2004.
2. Stanley B. Lippman, Josee Lajoie, Barbara E. Moo, “C++ Primer”, 5th Edition, Pearson Education, 2013.
3. B. Stroustrup, “The C++ Programming language”, 3rd Edition, Pearson Education, 2004.
4. E. Balagurusamy, “Object Oriented Programming with C++”, Tata McGraw-Hill, 2008.

TCS 234: Discrete Structure

B.Tech. Semester –III (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Formulate and interpret statements presented in normal forms and determine their validity by applying the rules and methods of propositional calculus.
- Determine when a relation is reflexive, symmetric, anti-symmetric, or transitive and apply the different properties of functions.
- Apply fundamental counting algorithms to solve problems related to permutations, combinations and recurrence relations.
- Explain the various concepts of Lattices.
- Interpret the basic concepts of graphs in modelling and other applications.

UNIT I: LOGIC AND PROOFS

Propositions and Logical operators, Truth table-Propositions generated by a set-Equivalence and implication, Basic laws, Some more connectives, Functionally complete set of connectives, Normal forms Proofs in Propositional calculus.

UNIT II: SETS, RELATIONS AND FUNCTIONS

Basic Definitions-Set operations, Laws of set theory, Partitions, Relations, Properties of relations, Matrices of relations, Closure operations on relations, Functions, injective, surjective and bijective functions.

UNIT III: COMBINATORICS

The basics of counting, The pigeonhole principle, Permutations and combinations, Recurrence relations, Solving Linear recurrence relations, Generating functions, Principles of inclusion and exclusion.

UNIT IV: LATTICE THEORY

Partial ordering, Posets, Lattices as Posets, Properties of lattices, Lattices as Algebraic systems, Sub lattices, Direct product and Homomorphism, Some Special lattices.

UNIT V: GRAPH THEORY

Graphs and graph models, Graph terminology and special types of graphs, Representing graphs and graph isomorphism, connectivity, Euler and Hamiltonian graphs

TEXT BOOKS

1. Kenneth H. Rosen, “Discrete Mathematics and Its Applications (with Combinatorics and Graph Theory)”, 6th Edition, Special Indian Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi (5th Reprint, 2008).
2. Tremblay J.P. and Manohar R., “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw-Hill Pub. Company Limited, New Delhi, 35th Reprint 2008.

REFERENCES

1. Ralph P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, 4th Edition, Pearson Education Asia, Delhi, 2002.
2. A. Tamilarasi and A.M. Natarajan, “Discrete Mathematics and its Applications”, Khanna Publishers, 3rd Edition 2008.
3. T. Veerarajan, “Discrete Mathematics with Graph Theory and Combinatorics”, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, 2007.

TAH 232: Mathematics –III

B.Tech. Semester –III (Computer Science &Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Use the Cauchy Riemann equations to test analytic function and construct such a function given the real or imaginary part.
- Evaluate residues and use the Residue Theorem to evaluate contour integrals.
- Construct Fourier series of periodic function.
- Calculate Fourier Transform and its Inverse Transform.
- Use numerical techniques for solving linear system of equations and numerical integration problems.

UNIT I: ANALYTIC FUNCTIONS

Functions of a complex variable, Analytic functions, Necessary conditions, Cauchy, Riemann equation and Sufficient conditions (excluding proofs), Harmonic and orthogonal properties of analytic function, Harmonic conjugate, Construction of analytic functions, Conformal mapping : w= z+c, cz, 1/z and bilinear transformation.

UNIT II: COMPLEX INTEGRATION

Complex integration, Statement and applications of Cauchy's integral theorem and Cauchy's integral formula, Singular points, Residues, Residue theorem, Application of residue theorem to evaluate real integrals, Unit circle and semi-circular contour(excluding poles on boundaries).

UNIT III: FOURIER SERIES

Dirichlet's conditions, General Fourier series, Odd and even functions, Half range sine series, Half range cosine series, Complex form of Fourier series, Parseval's identity, Harmonic analysis.

UNIT IV: FOURIER TRANSFORMS

Fourier integral theorem (without proof), Fourier transform pair, Sine and Cosine transforms, Properties, Transforms of simple functions, Convolution theorem, Parseval's identity.

UNIT V: NUMERICAL METHODS

LU decomposition for system of linear equations, Numerical solutions of non-linear algebraic equations: Secant method, Bisection method, Newton-Raphson method, Numerical Integration: Trapezoidal and Simpson's rule for single and double integrals.

TEXT BOOKS

1. Grewal, B.S, "Higher Engineering Mathematics", Khanna Publishers, 40th Edition, 2007.
2. Bali N. P. and Manish Goyal, "Textbook of Engineering Mathematics", Laxmi Publications Private Limited, 7th Edition, Reprint 2010.

REFERENCES

1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, 2007.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publishing House Private Limited, 3rd Edition, 2007.
3. P. Kandasamy, K. Thilagavathy and K. Gunavathy, "Numerical Methods", S. Chand & Company Limited, 2003.

PCS 231: Data Structures (Pr)

B.Tech. Semester-III (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Develop programs using dynamic memory allocation and linked list Abstract Data Types.
- Apply Stack ADT and Queue ADT to solve problems.
- Identify and implement the suitable data structures for the given problem.
- Solve real world problems by finding minimum spanning tree and Shortest path algorithm.

LIST OF EXPERIMENTS

1. Write programs to implement the following using an array.
    a) Stack ADT
    b) Queue ADT
2. Write programs to implement the following using a singly linked list.
    a) Stack ADT
    b) Queue ADT
3. Write program to implement the deque (double ended queue) ADT using a doubly linked list.
4. Write a program to perform the following operations:
    a) Insert an element into a binary search tree.
    b) Delete an element from a binary search tree.
    c) Search for a key element in a binary search tree.
5. Write a program to implement circular queue ADT using an array.
6. Write a program to implement all the functions of a dictionary (ADT) using hashing.
7. Write a program to perform the following operations on B-Trees and AVL-trees:
    a) Insertion.
    b) Deletion.
8. Write programs for the implementation of BFS and DFS for a given graph.
9. Write programs to implement the following to generate a minimum cost spanning tree:
    a) Prim's algorithm.
    b) Kruskal's algorithm.
10. Write a program to solve the single source shortest path problem.
    (Note: Use Dijkstra's algorithm).
11. Write program that uses non-recursive functions to traverse a binary tree in:
    a) Pre-order.
    b) In-order.
    c) Post-order.
12. Write programs for sorting a given list of elements in ascending order using the following sorting methods:
    a) Quick sort.
    b) Merge sort.

PCS 232: Digital Electronics (Pr)

B.Tech. Semester-III (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Describe the basic concept of Number System and number Conversion.
- Implement different methods used for simplification of Boolean functions.
- Implement and analyse the combinational circuits and Sequential circuits.
- Implement synchronous sequential circuits.

LIST OF EXPERIMENTS

1. To verify the De-Morgan's theorems using NAND/NOR gates.
2. To design the full adder and half adder using AND, OR and X- OR gates.
3. To implement the logic circuits using decoder.
4. To implement the logic circuits using multiplexer.
5. To design parity generator and checker circuits.
6. To design and implement RS FLIP FLOP using basic latches.
7. Realization and testing of basic logic gates using discrete components.
8. Realization and testing of CMOS IC characteristics.
9. Realization and testing of TTL IC characteristics.
10. Realization and testing of RAM circuit using IC 7489.
11. Realization and testing of Interfacing of CMOS-TTL and TTL-CMOS ICs.

PCS 233: Object Oriented Programming (Pr)

B.Tech. Semester-III (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon successful completion of this course, students will be able to

- Design object oriented programs with static members and friend functions using C++
- Implement C++ programs with operator overloading and type conversions
- Develop class templates for various data structures like stack, queue and linked list.
- Apply function templates concepts in standard sorting algorithms such as bubble sort, insertion sort, merge sort and quick sort.
- Create classes with necessary exception handling
- Construct simple test applications using dynamic polymorphism.

LIST OF EXPERIMENTS

1. Design C++ classes with static members, methods with default arguments, friend functions. (for example, design matrix and vector classes with static allocation, and a friend function to do matrix-vector multiplication).
2. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
3. Implement complex number class with necessary operator overloading and type conversions such as integer to complex, double to complex, complex to double etc.
4. Overload the new and delete operators to provide custom dynamic allocation of memory.
5. Develop C++ class hierarchy for various types of inheritances.
6. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
7. Develop a template of linked-list class and its methods.
8. Develop templates of standard sorting algorithms such as bubble sort, insertion sort and quick sort.
9. Design stack and queue classes with necessary exception handling.
10. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).

PCS 234: Computer Workshop (Pr)

B.Tech. Semester-III (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to:

- Demonstrate how to use the UNIX Shell commands.
- Use the Shell programming constructs.
- Learn tracing mechanisms (for debugging), user variables, Shell variables, read-only variables, positional parameters, reading input to a Shell script.
- Know about the computer system and its installation process.
- Know about the networking devices and their installation process.

LIST OF EXPERIMENTS

1. Study of UNIX OS, vi Editor.
2. Use of Basic UNIX Shell Commands:
   ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.
3. Shell Programming:
   a. Interactive shell scripts
   b. Positional parameters
   c. Arithmetic Operators
   d. if-then-fi, if-then-else-fi, nested if-else
   e. Logical operators
   f. if - elif, case structure
   g. while, until, for loops, use of break
   h. Metacharacters
4. Shell scripts for the following:
   a. Showing the count of users logged in
   b. Printing column wise list of files in your home directory
   c. To count lines, words and characters in its input (do not use wc)
5. C Programming on UNIX:
   a. Dynamic Storage Allocation
   b. Pointers
   c. Functions
   d. File Handling
6. To open the cabinet of Computer to observe external connections, different cables and connectors and disassemble the computer.
7. Install the Hard Disk to make partition of Hard disk, observe Partition Information, delete partitions, format Hard Disk, connect two Hard disks in Master and Slave mode, defrag Hard Disk, free more space by FAT32, by compressing, by drive space, by removing unnecessary files, remove Hard Disk faults by Scandisk, by Norton disk diagnosis (NDD), copy Hard Disk by Ghost, By Disk Copy, By Master/Slave, carry out Hard Disk Jumper setting, backup & restore Hard Disk, recover lost data by Mirror, Image, Ghost, Lost clusters, Recycle bin, Undelete, unformat Partition, measure access time of Hard Disk, carry out Master Boot record of Hard Disk by Fdisk, make Hard Disk bootable, carry Head Parking of Hard Disk, remove Virus from Hard Disk, label Partition of Hard Disk, make dual boot system, maintain Hard Disk, troubleshoot Hard Disk faults, observe Hard disk cables and test Hard disk
8. Change Monitor Resolution/ Dot pitch, change Fonts of monitor display screen, change appearance of monitor display screen, adjust Height, Width, Position, Cushion, Trace of display screen, adjust Brightness and Contrast, apply different Themes on display screen, operate Screen saver, set active desktop page
9. Install / Change / Upgrade the mother board, Check the Chip-Set type, Check the CPU and Socket type, Check memory and Socket type,

10. Check connectors and Sockets IDE1, IDE2, FDC KB, PS/2 Mouse, Com1, Com2, LPT1, Game Port
11. RPS Sockets, ATX socket, PCI Bus, AGP, AMR, ISA, USB, BIOS, CMOS, Battery, Control Panel LS, LED, Reset, Key Lock, IRDA, Size - AT/ATX Manufacturer / Drivers, Fan connectors, WOL, Headers Audio, VGA, CD, Modem, LAN

12. Test & measure - BUS speed – system, Slots - PCI, ISA, Ports - Com1, Com2, LPT, Game, BIOS.

13. To Set Motherboard jumpers.

14. To make computer network patch cord, test the line of internet/intranet., install Access point, install the Switch, install the Hub, configure IP address, configure Subnet masking, opening and closing of ports, configure Router.

TCS 241: Database Management Systems

B.Tech. Semester –IV (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of the course, students will be able to

- Understand the structure and functions of a database management system
- Exemplify the concept of E-R model
- Demonstrate the basics of SQL and construct queries using SQL.
- Describe the relational database theory, and apply relational algebra Expressions for queries
- Comprehend the concept of database schema normalization rules and techniques
- Understand the basic issues of transaction processing and concurrency control.
- Grasp data storage, indexing and query processing techniques.

UNIT I: INTRODUCTION

Purpose of Database System, Views of data, Data Models, Database Languages, three level Database System Architecture, Database users and Administrator, Entity–Relationship(E-R) model, Constraints, Keys, E-R Diagrams, Weak Entity Sets, Extended E-R features, Design of E-R database schema, E-R schema to tables

UNIT II: RELATIONAL MODEL

Structure of relational database, Relational Algebra: Fundamental operations, Additional Operations, Extended Relational-Algebra operations, Tuple Relational Calculus – Domain Relational Calculus. SQL: Basic structure, Set operations, Aggregate functions, Null Values, Nested subqueries, Views, Data Definition Language, Embedded SQL, Dynamic SQL, Domain Constraints, Referential Integrity, Assertions, Triggers, Security and Authorization.

UNIT III: DATABASE DESIGN

Functional Dependencies: First, Second, Third Normal Forms, Closure, Armstrong's Axioms, Canonical cover, Decomposition, Properties of Decomposition, Dependency Preservation, Boyce-Codd Normal Form, Fourth Normal Form, Fifth Normal Form.

UNIT IV: TRANSACTION MANAGEMENT

Transaction Concepts, ACID Properties , Recovery, System Recovery, Media Recovery, Two Phase Commit, Save Points, SQL Facilities for recovery. Concurrency: Locking Protocols, Two Phase Locking, Intent Locking, Recovery Isolation Levels, SQL Facilities for Concurrency**,** Deadlocks - issues

UNIT V: DATA STORAGE AND QUERYING

Storage structures: RAID. File Organization: Organization of Records, Indexing, Ordered Indices, B+ tree Index Files, B tree Index Files. Query Processing: Overview, Measures of Query Cost, Selection Operation, Evaluation of Expression, Introduction to Big Data Analysis.

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", 4th Edition, Tata McGraw Hill, 2002.
2. C.J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2006.

REFERENCES

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 4th Edition, Pearson / Addison-Wesley, 2007.
2. Raghu Ramakrishnan, "Database Management Systems", 3rd Edition, Tata McGraw-Hill, 2003.

TCS 242: JAVA Programming

B.Tech. Semester –IV (Computer Science & Engg.)

L T P		
3 1 0	**Class Work**	**: 50 Marks**
	Exam.	**: 100 Marks**
	Total	**: 150 Marks**
	Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of the course, the students will be able to

- Write Java programs with properly-designed constants, variables, methods and string handling to solve simple problems.
- Design Java object classes based on Object-Oriented concepts
- Use simple try-catch blocks for Exception Handling and manage I/O streams oriented interactions.
- Develop multi-thread programming for concurrency control based applications
- Construct user interfaces for Java applications and applets using GUI elements

UNIT I: JAVA BASICS AND OOPS

The Genesis of Java, Overview of Java, Data Types, Variables, and Arrays, Operators, Control Statements, Introducing Classes, Methods and Classes, Inheritance: Basics, Using Super, Creating a Multilevel Hierarchy, Method overriding, Using Abstract Classes.

UNIT II: MULTITHREADED PROGRAMMING IN JAVA

Packages and Interfaces: Packages, Access Protection, Importing Packages, Interfaces Definitions and Implementations, Exception Handling: Types, Try and Catch, Throw, Multithreaded Programming: Creating Threads, Creating Multiple Threads, Thread Priorities, Synchronization, Inter Thread Communication, Suspending, Resuming and Stopping Threads.

UNIT III: I/O AND EXPLORING JAVA I/O

I/O Basics, Reading Console Input, Writing Console output, Native Methods, I/ O Classes and Interfaces, File, The Byte Streams, The Character Streams, Using Stream I/ O, Serialization. String Handling, Special string operations, Character extraction, string comparison, Modifying a String.

UNIT IV: APPLETS, EVENT HANDLING AND AWT

Applet Basics, Applet Architecture, Applet Display Methods, Passing parameters to applets, Event Handling, Delegation Event Model, Event Classes, Event Listener Interfaces, Working with Windows, Graphics, Colors and Fonts, Using AWT Controls, Layout Managers and Menus.

UNIT V: JDBC, RMI AND SERVLETS

The Design of JDBC, The Structured Query Language, JDBC Configuration, Executing SQL, Query Execution Statements, Scrollable and Updatable Result Sets, Row Sets, Metadata, RMI, Architecture, A simple client/server application using RMI, Servlets, Life cycle of a servlet, The javax.servlet Package, The javax.servlethttp Package , Handling HTTP Requests and Responses.

TEXT BOOKS

1. D. Norton, Herbert Schildt, “Java 2 - The Complete Reference” 5th Edition, Tata McGraw Hill, 2011.
2. Hortsmann & Cornell, “CORE JAVA 2 Advanced Features – VOL-II”, Pearson Education, 2002.

REFERENCES

1. Deitel & Deitel, “Java How to Program”, Prentice Hall of India, 2010.
2. Herbert Schildt, “Java: A Beginner's Guide”, Tata McGraw Hill, 2007.
3. Keyur Shah, “Gateway to java programmer sun certification”, Tata McGraw-Hill, 2002.

TCS 243: Operating Systems

B.Tech. Semester –IV (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of the course, the students will be able to

- Identify the functions of Operating Systems.
- Discuss the concepts of process management.
- Predict and analyse deadlocks.
- Describe the importance of storage management.
- Understand the basics of file systems and I/O systems.

UNIT I: PROCESSES

Introduction to operating systems, operating system structures, system calls, system programs, system structure, Processes: Process concept, Process scheduling, Operations on processes, Cooperating processes, Interprocess communication, Communication in client-server systems.

UNIT II: THREADS, PROCESS SCHEDULING AND SYNCHRONIZATION

Threads: Multi-threading models, Threading issues, CPU Scheduling: Scheduling criteria, Scheduling algorithms, Multiple processor scheduling, Real time scheduling, Algorithm Evaluation, Process Synchronization: The critical-section problem, Semaphores, Classic problems of synchronization, critical regions, Monitors.

UNIT III: DEADLOCK

Deadlock: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT IV: STORAGE MANAGEMENT

Memory Management: Background, Swapping, Contiguous memory allocation, Paging, Segmentation, Segmentation with paging, Virtual Memory: Background, Demand paging, Process creation, Page replacement, Allocation of frames, Thrashing.

UNIT V: FILE SYSTEMS AND I/O SYSTEMS

File System Interface: File concept, Access methods, Directory structure, File system mounting, Protection File-System Implementation: Directory implementation, Allocation methods, Free space management, efficiency and performance, I/O Systems, kernel I/O subsystem, streams, performance, Mass Storage Structure: Disk scheduling, Disk management, Swap space management.

TEXT BOOKS

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne “Operating System Principles”, 6th Edition, John Wiley & Sons (Asia) India Private Limited, 2009.

REFERENCES

1. Andrew S. Tanenbaum, “Modern Operating Systems”, 2nd Edition, Pearson Education, 2004.
2. Gary Nutt, “Operating Systems”, 3rd Edition, Pearson Education, 2004.
3. Harvey M. Deitel, “Operating Systems”, 3rd Edition, Pearson Education, 2004.
4. Dhananjay M. Dhamdhere, “Operating Systems A Concept – Based Approach”, 3rd Edition, McGraw Hill Education (India) Private Limited, New Delhi, 2003.

TCS 244: Computer Networks

B.Tech. Semester –IV (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Describe and distinguish the functionalities of layers in OSI architecture
- Illustrate the various flow and error control techniques and identify the best method for efficient data transmission.
- Enumerate different medium access control mechanisms
- Apply various routing algorithms for a network and determine the optimal path
- Integrate the working of protocols in higher level layers.

UNIT I: INTRODUCTION

Data Communications Networks, Networks Type, Protocol Layering, TCP/IP Suite, OSI Model, Addressing, Guided Media, Unguided Media, Circuit switched networks , Packet switching, Structure of a switch, Bridges.

UNIT II: DATA LINK LAYER

Introduction, Link Layer Addressing, Error Detection and Correction, Block Coding, Cyclic Codes, Checksum, Data Link Control (DLC), DLC Services, Data Link Layer Protocols, HDLC, PPP, Media Access Control **,**Wired LANs: Ethernet, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless LAN IEEE 802.11, Bluetooth.

UNIT III: NETWORK LAYER

Network layer Services, Packet Switching, Network Layer Performance, IPV4 Addresses, Forwarding of IP Packets, Internet Protocol (IP), Unicast Routing Algorithms, Unicast Routing Protocols, Multicasting Basics, Intra domain and Inter domain Multicast Protocols.

UNIT IV: TRANSPORT LAYER

Introduction, Transport layer Protocol: Stop and Wait protocol, Go Back N Protocol, Selective Repeat Protocol, Piggybacking, User Datagram Protocol: Datagram, Services, Applications, Transmission Control Protocol: Services , Features, Connections, Flow control, Error Control, Congestion control, Timers.

UNIT V: APPLICATION LAYER

Domain Name Space (DNS), SMTP, FTP, HTTP, WWW, Security, Cryptography, Firewall, Cellular Telephony, Satellite Networks.

TEXT BOOK

1. Behrouz A. Forouzan, “Data Communication and Networking”, 5th Edition, Tata McGraw-Hill, 2013.

REFERENCES

1. Andrew S. Tanenbaum, David J. Wetherall, “Computer Networks”, 5th Edition, Prentice Hall 2010.
2. William Stallings, “Data and Computer Communications”, 8th Edition, Pearson Education, 2007.
3. Nader F. Mir, “Computer and Communication Networks”, Pearson Education, 2007.
4. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, 4th Edition, Morgan Kauffmann Publishers Inc., 2007.

TCS 245: Computer Organization

B.Tech. Semester –IV (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of the course, the students will be able to

- Appreciate the role of functional units and various architectural features
- Interpret the execution procedure
- Analyze the hardwired and programmed ALU design techniques
- Identify the factors that degrade pipeline performance and its counter measure
- Depict the role of each memory in the memory hierarchy

UNIT I: BASIC STRUCTURE OF COMPUTERS

Functional units, Basic operational concepts, Bus structures, Performance, Memory locations and addresses, Memory operations, Instructions and instruction sequencing, Instruction set architecture, Addressing modes, I/O Operations

UNIT II: BASIC PROCESSING UNIT

Fixed point arithmetic, Addition and subtraction of signed numbers, multiplication of positive Numbers-signed operand multiplication and fast multiplication, restoring and non-restoring division algorithm, floating point numbers and operation. Fundamental concepts: Execution of a complete instruction, Multiple bus organization, Hardwired control, Micro programmed control.

UNIT III: PIPELINING

Basic concepts, Data hazards, Instruction hazards, Influence on instruction sets, Data path and control considerations, superscalar operations, Performance considerations.

UNIT IV: MEMORY SYSTEM

Basic concepts, Semiconductor RAM, ROM, Speed, Size and cost, Cache memories, Improving cache performance, Virtual memory, Memory management requirements, Associative memories, Secondary storage devices.

UNIT V: MULTIPROCESSOR

Symmetric shared memory and Distributed shared memory multiprocessors, Performance issues of symmetric and distributed shared memory, Synchronization, Models of memory consistency: An introduction, Snoopy bus protocols, Directory based protocols.

TEXT BOOKS

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, 5th Edition, Tata McGraw-Hill, 2002.
2. John L. Hennessey, David A. Patterson, “Computer Architecture A Quantitative Approach”, 4th Edition, Morgan Kaufmann, 2007.

REFERENCES

1. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/ Software interface”, 3rd Edition, Elsevier, 2005.
2. William Stallings, “Computer Organization and Architecture – Designing for Performance”, 6th Edition, Pearson Education, 2003.

PCS 241: Database Management Systems (Pr)

B.Tech. Semester-IV (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

Prerequisites: Knowledge of Database is essential.

COURSE OUTCOMES

Upon successful completion of the course, the students will be able to

- Understand, appreciate and effectively explain the concepts of database Technologies.
- Declare and enforce integrity constraints on a database using RDBMS.
- Devise a complex query using SQL DML/DDL commands.
- Create views and use in-built functions to query a database.
- Write PL/SQL programs including stored procedures, stored functions and triggers.
- Design and build GUI applications using a 4GL.

LIST OF EXPERIMENTS

1. Build the following database schemas and perform the manipulation operations on these schemas using SQL DDL, DML, TCL and DCL commands.

   (I) Database Schema for a customer-sale scenario

   Customer(Custid : integer, cust_name: string)
   Item(item_id: integer, item_name: string, price: integer)
   Sale(bill_no: integer, bill_data: date, cust_id: integer, item_id:
   integer, qty_sold: integer)

   For the above schema, perform the following:-

   a) Create the tables with the appropriate integrity constraint
   b) Insert around 10 records in each of the tables
   c) List all the bills for the current date with the customer names and item numbers
   d) List the total Bill details with the quantity sold, price of the item and the final amount
   e) List the details of the customer who have bought a product which has a price>200
   f) Give a count of how many products have been bought by each customer
   g) Give a list of products bought by a customer having cust_idas 5
   h) List the item details which are sold as of today
   i) Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount
   j) Create a view which lists the daily sales date wise for the last one week
   k) Identify the normalization of this schema. Justify your answer.
   l) If the schema is not normalized then normalize the schema.

   (II) Database Schema for an Employee-pay scenario
   Employee(emp_id : integer, emp_name: string)
   Department (dept_id: integer, dept_name:string)
   Paydetails(emp_id : integer, dept_id: integer, basic: integer,
   deductions: integer, additions: integer, DOJ: date)
   payroll(emp_id : integer, pay_date: date)

For the above schema, perform the following:—

a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List the employee details department wise
d) List all the employee names who joined after particular date
e) List the details of employees whose basic salary is between 10,000 and 20,000
f) Give a count of how many employees are working in each department
g) Give a names of the employees whose netsalary>10,000
h) List the details for an employee_id=5
i) Create a view which lists out the emp_name, department, basic, deductions, netsalary
j) Create a view which lists the emp_name and his netsalary
k) Identify the normalization of this schema. Justify your answer
l) If the schema is not normalized then normalize the schema.

2. Construct a PL/SQL program to find largest number from the given three numbers.
3. Build a PL/SQL program to generate all prime numbers below 100.
4. Construct a PL/SQL program to demonstrate %type and %row type attributes.
5. Develop a PL/SQL procedure to find reverse of a given number.
6. Create a PL/SQL procedure to update the salaries of all employees 10% in their basic pay.
7. Execute a PL/SQL procedure to demonstrate IN, OUT and INOUT parameters.
8. Design a PL/SQL trigger before/after update on employee table for each row/statement.
9. Create a PL/SQL trigger before/after delete on employee table for each row/statement.
10. Build a PL/SQL trigger before/after insert on employee table for each row/statement.
11. Design and build the following applications using SQL and front end tool and generate report
    - Student information system for your college
    - Hospital Management System
    - A video library management system
    - Inventory management system for a hardware / sanitary item shop
    - Banking System
    - Railway Reservation System
    - Car Insurance Company

PCS 242: JAVA Programming (Pr)

B.Tech. Semester-IV (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

Prerequisites: Knowledge JAVA Programming is essential.

COURSE OUTCOMES

Upon successful completion of the course, the students will be able to

- Develop programs using object oriented concepts, exception handling and multi-threading.
- demonstrate java features such as Inheritance, Interfaces, Polymorphism for different scenarios
- Design and implement data driven applications and assign responsibilities.
- develop web application using JDBC and Servlets

LIST OF EXPERIMENTS

1. Develop a java program to find the sum of odd and even numbers in an array.
2. Develop a java program to print the prime numbers between n1 to n2 using class, objects and methods.
3. Develop a program for calculating the age of a person and display the age in the form of years, months and days.
4. Demonstrate a program for method overloading. Consider the different types of transaction modes used for transferring money. (Credit card, Debit card, Net banking etc).
5. Create an Abstract class and calculate the area of different shapes by overriding methods.
6. Develop a Library application using multiple inheritances. Consider Book, Magazines and Journals as base classes and Library as derived class. In the Book class, perform the operations like SearchBook, IssueBook, ReturnBook, RenewBook, and Fine Calculation. In the Magazines and Journals classes, perform issue and return operations.
7. Develop a program for banking application with exception handling. Handle the exceptions in following cases:
    a) Account balance <1000
    b) Withdrawal amount is greater than balance amount
    c) Transaction count exceeds 3
    d) One day transaction exceeds 1 lakh.
8. Create a Student database and store the details of the students in a table. Perform the SELECT, INSERT, UPDATE and DELETE operations using JDBC connectivity.
9. Design a login page using servlets and validate the username and password by comparing the details stored in the database.

Mini-project (Any One)

(Front End: Java, Back End: Oracle, Define classes for the application and assign responsibilities)

- Central Library OPAC Engine
- ATM Banking
- Online Shopping
- E-Ticketing System
- Student Information Management System
- City Info Browser
- E-mail Server

PCS 243: Operating Systems (Pr)

B.Tech. Semester-IV (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

Prerequisites: Knowledge of C/C++ Programming is essential.

COURSE OUTCOMES

Upon successful completion of the course, the students will be able to

- Understand the system calls and I/O system calls in UNIX
- Evaluate the process scheduling algorithms FCFS, SJF, Priority and Round robin
- Simulate the process communication through various techniques
- Simulate memory management schemes
- Simulate File allocation Techniques

(Implement the following on LINUX or other UNIX like platform. Use C for high-level language implementation)

LIST OF EXPERIMENTS

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, stat, opendir, readdir
2. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
3. Write C programs to simulate UNIX commands like ls, grep, etc.
4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time (2 sessions)
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time (2 Sessions).
6. Developing Application using Inter Process communication (using shared memory and pipes)
7. Simulate the Producer – Consumer problem using semaphores (using UNIX system calls).
8. Simulate First fit, best fit and Worst fit memory management algorithms.
9. Simulate Page Replacement Algorithms(FIFO, LRU and Optimal)
10. Simulate Paging memory management scheme
11. Simulate file allocation techniques (Linked, Indexed or Contiguous)

PCS 244: Computer Networks (Pr)

B.Tech. Semester-IV (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

Prerequisites: Knowledge of C/C++ Programming is essential.

COURSE OUTCOMES

Upon Completion of this course, the students will be able to

- Learn about hardware component like RJ-45 connector, CAT-6 Cable etc.
- Implement the various services of data link layer.
- Configuration of router, hub, switch etc,
- Configuration of server in programming mode they will lean about socket programming, client server programming for deeply understanding TCP/IP model and various protocols.

In simulation area they will work on Cisco networking, NS-2 or NS-3 tools for more clearly understanding about computer network

1. Installation and configuration of NS2 and QualNet
2. Creating a network: nodes, links and queues, Creating connections, traffic and computing routers Insertion of errors and analysis of trace file.
3. Study of basic network command and network configuration commands.
4. Simple project on NS2 – wired, wireless and combination of wired and wireless
5. Implementation of new protocols in NS2
6. Simulation study of pure ALOHA protocol;
7. Simulation study of slotted ALOHA protocol;
8. Simulation study of Token Bus LAN protocol;
9. Simulation study of Token Ring LAN protocol;
10. Simulation study of WAN protocol like Frame Relay, X. 25;
11. Study of 802.11 wireless LAN protocol
12. Implement the Distance Vector Routing protocol for finding the shortest path.
13. Write a program to connect server with client and passes information from one system to another and vice versa that by creating / establishing connection.

TCS 351: Analysis and Design of Algorithms

B.Tech. Semester –V (Computer Science & Engg.)

L T P		
3 1 0	**Class Work**	**: 50 Marks**
	Exam.	**: 100 Marks**
	Total	**: 150 Marks**
	Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of the course, the students will be able to

- Solve recurrence equations by considering time and space complexity.
- Analyze the complexities of various problems in different domains.
- Solve the problems using proper algorithms and design techniques.
- Synthesize efficient algorithms in common engineering design situations.

UNIT I: ALGORITHM ANALYSIS

Algorithm Analysis, Time Space Tradeoff, Asymptotic Notations, Conditional asymptotic notation, Removing condition from the conditional asymptotic notation, Properties of big-Oh notation, Recurrence equations, Solving recurrence equations, Analysis of linear search.

UNIT II: PROBLEM-SOLVING TECHNIQUES

Divide and Conquer: General Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Greedy Algorithms: General Method, Container Loading, Knapsack Problem.

UNIT III: DYNAMIC PROGRAMMING

Dynamic Programming: General Method, Multistage Graphs, Bellman–Ford–Moore algorithm, All-Pair shortest paths, Floyd's–Warshall algorithm, Optimal binary search trees, 0/1 Knapsack, Traveling salesperson problem.

UNIT IV: BACKTRACKING

Backtracking: General Method, N-Queens problem, Sum of subsets, Graph coloring, Hamiltonian problem, Knapsack problem.

UNIT V: ANALYSIS OF GRAPH

Graph Traversals, Connected Components, Spanning Trees, Biconnected components, Branch and Bound: General Methods (FIFO & LC), 0/1 Knapsack problem, Introduction to NP-Hard and NP-Completeness.

TEXT BOOKS

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Computer Algorithms / C++", 2nd Edition, Universities Press, 2007. (UNITS II to V)
2. K.S. Easwarakumar, "Object Oriented Data Structures using C++", Vikas Publishing House Private Limited, 2000. (UNIT I)

REFERENCES

1. T. H. Cormen, C. E. Leiserson, R.L. Rivest, and C. Stein, "Introduction to Algorithms", 2nd Edition, Prentice Hall of India Private Limited, 2003.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.

TCS 352: Software Engineering

B.Tech. Semester – V (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Identify appropriate software design model based on requirement analysis.
- Formulate Software Requirements Specification (SRS) reports for the real world application
- Translate a specification into a design, and identify the components to built the architecture
- Plan a software engineering process to account for quality issues and non-functional requirement
- Estimate the work to be done, resources required and the schedule for a software project plan

UNIT I: INTRODUCTION TO SOFTWARE ENGINEERING

Introduction: Definition of terms, The Evolving role of software, Software characteristics, Software applications, Software myths. The Software process: A generic view of process. Process models: Prescriptive Models, Water fall model, Incremental process model, Specialized process models. Software engineering practice: Communication Practices, Planning practices, Deployment.

UNIT II: SOFTWARE PROJECT ANALYSIS

System Engineering: Computer based system, System engineering hierarchy, Business process engineering, Product engineering, System modelling. Requirements engineering: Requirements engineering tasks, Initiating the requirements engineering process, Negotiating and validating requirements. Analysis modelling: Analysis modelling approaches, Data modelling concepts, Flow oriented modelling, Behavioural model.

UNIT III: SOFTWARE DESIGN CONCEPTS

Design Engineering: Design in the context of software engineering, Design process and design quality. Creating architectural design: Software architecture, Data design, Architectural styles and design. Modelling Component level design: Component, Conducting component design. Golden rules of User Interface design.

UNIT IV: IMPLEMENTATION ISSUES

Implementation issues: Introduction, Structured coding techniques, Coding style, Standards and guidelines, Documentation guidelines. Estimation: Observations on estimation, Project planning process, Software scope and feasibility, Resources, Software project estimation, Decomposition techniques, Empirical estimation models.

UNIT V: PROJECT SCHEDULING AND CHANGE MANAGEMENT

Project scheduling: Basic concepts, Project scheduling, Defining a task set for software project. Risk Management: Risk mitigation, monitoring and management. Change management: Software Configuration Management, SCM repository and process.

TEXT BOOK

1. Roger S. Pressman, “Software Engineering: A Practitioner's Approach”, 6th Edition, Tata McGraw-Hill Edition, 2010.

REFERENCES

2. Shari Lawrence Pfleeger, Joanne M. Atlee, “Software Engineering: Theory and Practice”, Pearson Education, 4th Edition, 2010.
3. Waman S Jawadekar, “Software Engineering: Principles and Practice”, Tata McGraw-Hill Edition, 2008.

TCS 353: WEB Technology

B.Tech. Semester – V (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Learn the best practices for designing Web forms and Usability Reviews
- Understand the Principles behind the design and construction of Web applications
- Develop and Deploy an Enterprise Application

UNIT I: WEB ARCHITECTURE

History of Web, Protocols governing Web, Creating Websites for individual and Corporate, World, Cyber Laws, Web Applications, Writing Web Projects, Identification of Objects, Target Users, Web Team, Planning and Process of Web Development Phases.

UNIT II: HTML

HTML Basic concepts, Good web design, Images and Anchors, Style sheets, positioning with style sheets. Basic Interactivity and HTML: FORMS, form control, new and emerging form elements.

XML: Relationship between HTML, SGML and XML, Basic XML, Valid documents, ways to use XML, XML for data files, embedding XML into HTML documents. Converting XML to HTML for Display, Displaying XML using CSS and XSL, rewriting HTML as XML, the future of XML.

UNIT III: CGI USING PERL

Introduction to CGI, Alternative technologies, The Hypertext Transport protocol, URLs, HTTP, Browser requests, Server Responses, Proxies, Content Negotiation, The common Gateway Interface, The CGI Environment, Environment variables, CGI Output, forms and CGI, Sending Data to the server, form Tags, Decoding from input, Architectural Guidelines, Coding Guidelines, Efficiency and optimization.

UNIT IV: ASP

A simple ASP.NET application, Writing ASP.NET Code, ASP.NET Objects, Introduction to Forms: Web forms, user controls, custom controls, creating controls at runtime. Validity ASP.NET Pages: using validations controls, Customizing validation.

UNIT V: DATABASES

Creating Databases, SQL statements, Using Datasets, Data binding, Data binding Controls. Files: Reading and writing files using ASP.NET

TEXT BOOKS

1. Jeffrey C. Jackson, “Web Technologies: A Computer Science Perspective”, Prentice Hall, 2007
2. Herbert Schildt, “Java: The Complete Reference”, McGraw-Hill Professional, 2006.

REFERENCE

1. Thomas A Powell, HTML: The Complete Reference, Tata McGraw-Hill Publications.
2. Scott Guelich, Shishir Gundavaram, Gunther Birznieks; CGI Programming with PERL: Creating Dynamic Web pages, 2/e, O’ Reilly.
3. Doug Tidwell, James Snell, Pavel Kulchenko; Programming Web Services with SOAP, O’ Reilly
4. Pardi, XML in Action, Web Technology, PHI
5. Yong, XML step by step, PHI
6. Aaron, Weiss, Rebecca Taply, Kim Daniels, Stuven Mulder, Jeff Kaneshki, Web Authoring Desk reference, Techmedia publications, ASP.NET Chris payme, Techmedia

TCS 354: Microprocessor& its Applications

B.Tech. Semester –V (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Understand the basics of 8085 microprocessor and its instruction set.
- Understand the 8086 architecture and its instruction set.
- Understand the 8086 programming.
- Know about the 8086 microprocessor's interfaces and their architecture
- Describe the evolution and various types of advanced microprocessors.

UNIT I: Introduction to Microprocessors

Evolution of Microprocessors, Classification of microprocessors, Basic functional blocks of a microprocessor, Microprocessor- based system (Organization of microcomputer).

UNIT II: 8085 MICROPROCESSOR

Architecture; Addressing modes; Instruction Set: Data transfer instructions, Arithmetic instructions, Logical instructions, Branching instructions, Machine control instructions; Timing diagram of 8085 instructions; Assembly Language Programming..

UNIT III: 8086 MICROPROCESSOR

Architecture, Physical address, segmentation, memory organization, Bus cycle, Instruction Set, Addressing modes, difference between 8085 & 8086, Assembler Directives , Assembly Language Programming of 8086.

UNIT IV: 8051 MICROCONTROLLERS

Fundamental differences of microprocessors and microcontrollers, Introduction to Architecture and instruction set of 8051 microcontroller.

UNIT V: ADVANCE MICROPROCESSORS

Architecture and functional description of Programmable Peripheral Interface (8255), operating modes: BSR, I/O mode- Mode 0, 1 and 2, Programming 8255, Architecture and functional description of USART (8251), Priority Interrupt Controller (8259), interfacing of A/D and D/A converters, Memory Interfacing, Application of peripheral devices: temperature control, waveform generation and stepper motor control.

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Books:

1. R.S. Gaonkar, "Microprocessor Architecture, Programming and Applications with 8085/8080A", Wiley Eastern Limited.
2. Barry B. Brey, Intel Microprocessors, 8th Edition, Pearson Education/Prentice Hall.
3. Y.C. Liu and G.A. Gibson, "Microprocessor Systems: The 8086/8088 Family Architecture, Programming & Design", PHI.
4. A.K. Ray and K.M. Bhurchandi, "Advanced Microprocessors and Peripherals", TMH.
5. D.V. Hall, "Microprocessors and Interfacing", TMH, 2nd Ed.

TCS 355: Theory of Computation

B.Tech. Semester –V (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Understand the basics of finite automata and their capabilities.
- Construct finite state machines and the equivalent regular expressions.
- Construct and prove the equivalence of languages described by pushdown automata and context free grammars
- Prove the equivalence of languages described by Turing machines.
- Understand the key results in algorithmic computability and solvability of problems.

UNIT I: AUTOMATA

Finite Automata (FA), Deterministic Finite Automata (DFA), Non-deterministic Finite Automata (NFA), Finite Automata with Epsilon transitions.

UNIT II: REGULAR EXPRESSIONS AND LANGUAGES

Regular Expression , FA and Regular Expressions, Proving languages not to be regular, Closure properties of regular languages, Equivalence and minimization of Automata.

UNIT III: CONTEXT-FREE GRAMMARS AND LANGUAGES

Context-Free Grammar (CFG), Parse Trees, Ambiguity in grammars and languages, Definition of the Pushdown Automata, Languages of a Pushdown Automata, Equivalence of Pushdown Automata and CFG.

UNIT IV: PROPERTIES OF CONTEXT-FREE LANGUAGES

Normal forms for CFG, Pumping Lemma for CFL, Closure Properties of CFL, Turing Machines, Programming Techniques for TM: Subroutines.

UNIT V: UNDECIDABILITY

A language that is not Recursively Enumerable (RE), An un-decidable problem that is RE Undecidable problems about Turing Machine - Post's Correspondence Problem.

TEXT BOOK

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", 3rd Edition, Pearson Education, 2007.

REFERENCES

1. Thomas A. Sudkamp, "An Introduction to the Theory of Computer Science, Languages and Machines", 3rd Edition, Pearson Education, 2007.
2. J. Martin, "Introduction to Languages and the Theory of computation", 3rd Edition, Tata McGraw Hill, 2007.

PCS 351: Analysis and Design of Algorithms (Pr)

B.Tech. Semester-V (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon successful completion of the course, the students will be able to

- Solve recurrence equations by considering time and space complexity.
- Analyze the complexities of various problems in different domains.
- Solve the problems using proper algorithms and design techniques.
- Synthesize efficient algorithms in common engineering design situations.

LIST OF EXCERCISES

1. Programming that uses recurrence relations to analyze recursive algorithms.
2. Computing best, average, and worst case time complexity of various sorting techniques.
3. Performance analysis of different internal and external sorting algorithms with different type of data set.
4. Use of divide and conquer technique to solve some problem that uses two different algorithm for solving small problem.
5. Implementation of different basic computing algorithms like Hash tables, including collision-avoidance strategies, Search trees (AVL and B-trees).
6. Consider the problem of eight queens on an (8x8) chessboard. Two queens are said to attack each other if they are on the same row, column, or diagonal. Write a program that implements backtracking algorithm to solve the problem i.e. place eight non-attacking queens on the board.
7. Write a program to find the strongly connected components in a digraph.
8. Write a program to implement file compression (and un-compression) using Huffman's algorithm.
9. Write a program to implement dynamic programming algorithm to solve the all pairs shortest path problem.
10. Write a program to solve 0/1 knapsack problem using the following:
    a. Greedy algorithm.
    b. Dynamic programming algorithm.
    c. Backtracking algorithm.
    d. Branch and bound algorithm.
11. Write a program that uses dynamic programming algorithm to solve the optimal binary search tree problem.
12. Write a program for solving traveling sales persons problem using the following:
    a. Dynamic programming algorithm.
    b. The back tracking algorithm.
    c. Branch and Bound.

PCS 352: Software Engineering (Pr)

B.Tech. Semester-V (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

Course Outcome

Upon successful completion of this course, the student will be able to:

- Apply software development practices in projects
- Express project requirements in IEEE SRS format
- Design using standard design methodologies
- Implement the project using a programming language and platform
- Test and debug the project

LIST OF EXERCISES

1. Prepare the SRS document. You should identify the appropriate requirements for each problem.
2. Draw the Use Case diagrams, Domain Models, and Class Diagrams using Rational Rose. Draw the Sequence Diagrams and Collaboration Diagrams for each Use Case, using Rational Rose. Draw the State Chart Diagrams and Activity Diagrams using Rational Rose, wherever necessary.
3. Develop the corresponding software using Java with an interactive GUI and appropriate Database.
4. Develop software to automate the bookkeeping activities of a 5-star hotel. The local newspaper and magazine delivery agency wants to automate the various clerical activities associated with its business. Develop software for this.
5. A small automobile spare parts shop sells the spare parts for vehicles of several makes and models. Each spare part is typically manufactured by several small industries. To streamline the sales and supply ordering, the shop owner wants to automate the activities associated with his business. Develop software for this.
6. Develop software for the automation of the dispensary of your Institute. Develop software for automating various activities of an Estate Office.
7. Develop word-processing software with some limited number of facilities such as making bold, italics, underline, cut, copy and paste, etc.
8. Develop a graphics editor software package, using which one can create/modify several common types of graphics entities.
9. Develop software for automating various activities of the department offices of your Institute.
10. Write a C function for searching an integer value from a large sorted sequence of integer values stored in array of size 100, using the binary search method. Build the control flow graph of this function using any compiler-writing tool.
11. Write a program in Java to determine its cyclomatic complexity.
12. Write a program in Java to determine the number of defects still remaining after testing, using error seeding methodology.

PCS 353: WEB Technology (Pr)

B.Tech. Semester-V (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Understand, analyze and apply the role of languages HTML, JavaScript, JSP in the workings of the web and web applications
- Analyze a web page and identify its elements and attributes.
- Able to develop web pages using JDBC
- Able to build web applications using JSP.
- Develop and Deploy an Enterprise Application.

LIST OF EXERCISES

1. Develop a java application for Bank Transaction with different constraints.
2. Develop a java program to get employees details with given constraints.
3. Analyze and design the java code for given problems.
4. Compute Body Mass Index.
5. Implement Body Mass Index Calculator.
6. Simpsons Database: There is a database for Springfield Elementary School with the following tables:
    a. Courses(id, name, teacher_id)
    b. Grades(student_id, course_id, grade)
    c. Students(id, name, email, password)
    d. Teachers(id, name)
7. World Database: There is a world database with the following tables:
1. Countries (code, name, continent, surface_area, population, life_expectancy, gnp, ...)
2. Cities (id, name, country_code, district, population)
3. CountriesLanguages (country_code, language, official, percentage)
8. Design a web page for an Online voting Form with various HTML components.
9. Design a web page for an Email Registration Form with various HTML components. Develop a Servlet application to receive the email registration information and store the details into a table.
10. Design a web page for integrating the RMI server program to find minimum and maximum of three numbers send by the client program. Design a GUI Form for the RMI client to collect three numbers and display the result of minimum, maximum using Text Field.

PEC 354: Microprocessor& its Applications (Pr)

B.Tech. Semester-V (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Understand about the 8086 processor assembly language
- implement the programs for interfacing devices
- Knowledge about the advanced Microprocessors

LIST OF EXPERIMENTS

1. Write and implement a program for adding two 8- bit numbers using microprocessor.
2. Write and implement a program for subtracting two 8- bit numbers using microprocessor.
3. Write and implement a program for finding the smallest number from a given set of numbers using microprocessor.
4. Write and implement a program for finding the largest number from a given set of numbers using microprocessor.
5. Write and implement a program for arranging the numbers in ascending order of a set of the numbers.
6. Write and implement a program for converting Binary code into Gray code using 8086 microprocessor.
7. Write and implement a program for conversion of data string to its 2's complement using 8086 microprocessor.
8. Write and implement a program for multiplication of the given numbers.
9. Write and implement a program for division of the given numbers.
10. Design and test microprocessor based traffic light control system using 8086 microprocessor.
11. Write and implement a program for interfacing of keyboard controller with microprocessor.

TCS 361: Compiler Design

B.Tech. Semester–VI (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Analyze the source program and recognize the tokens
- Illustrate and compare the various types of parser and their role for the design of compiler.
- Generate three address code from the given program code
- Generate code from directed acyclic graphs
- Optimize the source code using suitable code optimization techniques

UNIT I: LEXICAL ANALYSIS

Introduction to Compiling, Compilers-Analysis of the source program, The phases, Cousins, The grouping of phases, Compiler construction tools, The role of the lexical analyser, Input buffering, Specification of tokens, Recognition of tokens.

UNIT II: SYNTAX ANALYSIS

Syntax Analysis, The role of the parser, Context-free grammars, writing a grammar, Top down parsing, Bottom-up Parsing, LR parsers, Type Checking, Type Systems, Specification of a simple type checker.

UNIT III: INTERMEDIATE CODE GENERATION

Intermediate languages, Declarations, Assignment statements, Boolean expressions, Case statements, Backpatching, Procedure calls.

UNIT IV: CODE GENERATION

Issues in the design of a code generator, The target machine, Run-time storage management, Basic blocks and flow graphs, Next-use information, A simple code generator, Register allocation and assignment, The Directed Acyclic Graph (DAG) representation of basic blocks, Generating code from DAGs.

UNIT V: CODE OPTIMIZATION

Introduction: The principle sources of optimization, Peephole optimization, Optimization of basic blocks, Loops in flow graphs, Introduction to global data-flow analysis, Code improving transformations.

TEXT BOOK

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, “Compilers- Principles, Techniques, and Tools”, Pearson Education Asia, 2008.

REFERENCES

1. David Galles, “Modern Compiler Design”, Pearson Education Asia, 2007.
2. Steven S. Muchnick, “Advanced Compiler Design & Implementation”, Morgan Kaufmann Publishers, 2000.
3. C.N. Fisher, R.J. LeBlanc, “Crafting a Compiler with C”, Pearson Education, 2000.

TCS 362: ADHOC and Sensor Networks

B.Tech. Semester–VI (Computer Science & Engg.)

L T P		
3 1 0	**Class Work**	**: 50 Marks**
	Exam.	**: 100 Marks**
	Total	**: 150 Marks**
	Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Impart the trends in emerging field of wireless ad hoc and sensor networking.
- Focus on layered communication modeling, such as the media access control and network layer.
- Address quality of service issues and network reliability for transmission of real-time information.
- Learn the various routing protocols of ad hoc and sensor networks.

UNIT I: ADHOC NETWORKS INTRODUCTION

Introduction to Wireless Communication Technology, Characteristics of the Wireless Channel, IEEE 802.11a/b Standard, Origin of Ad-hoc Packet Radio Networks, Architecture of PRNETs, Introduction to Ad-hoc Wireless Networks, Heterogeneity in Mobile Devices.

UNIT II: ADHOC NETWORK ROUTING PROTOCOLS

Introduction to designing a Routing Protocol, Classifications of Routing Protocols, Wireless Routing Protocol (WRP), Source–Initiated On–Demand Approaches, Ad hoc On-Demand Distance Vector Routing (AODV, Introduction to Multicast Routing Protocol, Classifications of Multicast Routing Protocols.

UNIT III: QoS AND ENERGY MANAGEMENT

Introduction to QoS in Ad hoc Wireless Networks, Classifications of QoS Solutions, Classification of Energy Management Schemes, Transmission Power Management Schemes, System Power Management Schemes.

UNIT IV: WSN INTRODUCTION

Introduction, Characteristic requirements, Challenges of sensor networks, Emerging technologies for wireless sensor networks, Advantages of sensor networks, Sensor network applications.

UNIT V: WSN PROTOCOLS

Communication protocols, MAC protocols, Naming and Addressing-Routing protocols, Energy efficient routing.

TEXT BOOKS

1. C. Siva Ram Murthy and B.S. Manoj, “Ad Hoc Wireless Networks: Architectures and Protocols”, 2nd Edition, Pearson Education, 2007.
2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach”, Elsevier, 2007.
3. Holger Karl & Andreas Willig, “Protocols and Architectures for Wireless Sensor Networks”, John Wiley, 2005.

REFERENCES

1. C.K. Toh, “Ad hoc Mobile Wireless Networks, Protocols and Systems”, 2nd Edition, Pearson Education, 2009.
2. Azzedine Boukerche, “Handbook of Algorithms for Wireless Networking and Mobile Computing”, 2nd Edition, CRC Press, 2006.
3. Charles E. Perkins, “Ad Hoc Networking”, Addison Wesley, 2000.
4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks- Technology, Protocols, and Applications”, John Wiley, 2007.
5. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.

TCS 363: Network Security

B.Tech. Semester–VI (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Identify the various attacks and its issues.
- Learn usage of cryptographic algorithms for avoiding basic level threats.
- Comprehend the issues involved in Integrity, Authentication and Key Management techniques.
- Realize the importance of user authentication and Kerberos concepts.
- Acquire the knowledge of network security and its applications.

UNIT I: INTRODUCTION

Introduction, Need for security, Principles of Security, Types of Attacks: Passive attack, Active attack, Attacks on confidentiality, Security services, mechanisms and techniques, Substitution Ciphers, Transposition Ciphers.

UNIT II: SYMMETRIC AND ASYMMETRIC KEY ALGORITHMS

Principle of Symmetric and Asymmetric key algorithms, Stream and Block Ciphers, RC4, Data Encryption Standards (DES), Advanced Encryption Standard (AES), Rivest-Shamir-Adleman (RSA) algorithm.

UNIT III: AUTHENTICATION AND KEY MANAGEMENT

Hash functions: Message Digest 5(MD5), Secure Hash Algorithm (SHA), Digital signatures, Symmetric key distribution: Symmetric Encryption-Asymmetric Encryption, Diffie-Hellman key Exchange, X.509 certificates, Public key infrastructure.

UNIT IV: USER AUTHENTICATION AND KERBEROS

Introduction, Authentication basics, Passwords, Authentication Tokens, Certificate-based Authentication, Biometric Authentication, Kerberos.

UNIT V: NETWORK SECURITY AND ITS APPLICATIONS

Firewalls, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction (SET), Security: E-mail.

TEXT BOOKS

1. William Stallings, “Cryptography and Network Security”, 5th Edition, Pearson Education, 2011.
2. Atul Kahate, “Cryptography and Network Security”, 2nd Edition, Tata McGraw-Hill Publishers, 2011.

REFERENCES

1. Behrouz Forouzan, Debdeep Mukhopadhyay, “Cryptography and Network Security” 2nd Edition, Tata McGraw Hill, 2010.
2. Bernard Menezes, “Network Security and Cryptography”, Cengage Learning, India Edition, 2010.
3. Eric Maiwald, “Fundamentals of Network Security”, Tata McGraw-Hill, 2011.

TCS364: Artificial Intelligence

B.Tech. Semester–VI (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

- Explain underlying AI concepts and its achievements.
- Understand neural networks and its role in computation for target results and apply it for particular problem like pattern classification and recognition problems.
- Discuss problem solving methods and strategies.
- Develop an ability to write programs for AI problem solutions.
- Deal with prepositional and predicate logic.
- Address the basic issues of knowledge representation. Extending it to the understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and expert systems, and planning.

UNIT I: INTRODUCTION

Definition of Artificial Intelligence (AI), Evolution of Computing , History of AI, Classical Romantic and modern period, subject area, Architecture of AI machines, logic family, classification of logic.
Production System: Production rules, the working memory, Recognize-act cycle, conflict resolution strategies, refractoriness, specify alternative approach for conflict resolution by Meta rules, Architecture of production system.

UNIT II: PROPOSITIONAL LOGIC

Proposition, tautologies, Theorem proving, Semantic method of theorem proving, forward chaining, backward chaining standard theorems, method of substitution. Theorem proving using Wang's algorithm. Predicate Logic: Alphabet of first order logic (FOL), predicate, well formed formula, clause form, algorithm for writing sentence into clause form, Unification of predicates, unification algorithm, resolution Robinson's interface rule, Scene interpretation using predicate logic.

UNIT III: DEFAULT AND NON MONOTONIC LOGIC

Axiomatic theory, Monotonicity, non-atomic reasoning using McDermott's NML-I, problems with NML-I, reasoning with NML-II, Case study of Truth Maintenance system (TMS), neural network fundamentals.

UNIT IV: IMPRECISION AND UNCERTAINTY

Definition, Probabilistic techniques, Certainty factor based reasoning, conditional probability. Medical diagnosis problem, Bayes' Theorem and its limitations, Bayesian belief network, propagation of belief, Dumpster-Shafer theory of uncertainty management, belief interval, Fuzzy relation, inverse Fuzzy relations, Fuzzy post inverse, Fuzzy Inversion.

UNIT V: INTELLIGENT SEARCH TECHNIQUES

Heuristic function, AND-OR graph, OR Graph, Heuristic search, A* algorithm and examples. Logic Programming with Prolog: Logic program, Horn clause, program for scene interpretation, unification of goals, SLD resolution, SLD tree, flow of satisfaction, controlling back tracking using CUT, command use of CUT, implementation of backtracking using stack, risk of using cuts, fail predicate, application of cut-fail combination, replacing cut-fail by not.

TEXT BOOK

1. Elaine Rich and Kevin Knight: Artificial Intelligence, 3/e, 2008.

REFERENCES

1. Konar: Artificial Intelligence and Soft Computing—Behavioral and Cognitive Modeling of Human Brain, CRC Press, USA.
2. E. Charniak and D. McDermott: Introduction to Artificial Intelligence, Addison Wesley Longman.
3. Elaine Rich, Kevin Knight and Shivashankar B. Nair: Artificial Intelligence, 3/e, 2008, TMH.

TAH 361: Industrial Economics & Management

B.Tech. Semester–VI (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- To understand the basic concepts of cost effectiveness, cost analysis in real time requirements.
- Able to learn the organization system approach.
- Apply the basic concepts of motivation, leadership and productivity techniques.
- Apply the basic concepts of micro economics and income effect.
- Able to learn banking system, Value of money and Indian financial system.

UNIT I: ANALYSIS OF PUBLIC PROJECTS

Benefit/ Cost analysis, qualification of project, cost and benefits, benefit/ cost applications, Cost effectiveness analysis.

UNIT II :INTRODUCTION OF MANAGEMENT

Theories of management, Traditional behavioral, contingency and system approach, Organization as a system.

UNIT III: MOTIVATION AND PRODUCTIVITY

Theories of motivation, leadership styles and managerial grid. Co-ordination, monitoring and control in organizations, Techniques of control, Japanese management techniques.

UNIT IV: MICRO ECONOMICS

Basic concept of Micro Economics, Concept of demand, supply & price, the law pertaining to demand, supply & price indifference curve analysis, price effect, income effect & substitution effect.

UNIT V: MONEY & BANKING

Balance of payment disequilibrium in balance of payment, Functions of money, Value of money, Functions of back: commercial banks & control banking in India. Monetary & fiscal policy: a brief introduction case study pertaining to macro economics. A brief description of Indian Financial system

BOOKS

1. White, “Engineering Economics”, india Willy.
2. Riggs, J.L Bedworth, “Engineering Economics”, McGraw Hill

REFERENCES

1. John, Schemerhorn,“Introduction to Mnagament”, Willy
2. B.Andreosso, D.Jacobson, “Industrial Economics and Organization”.
3. P.Jochumzen, “Essentials of Macroeconomics”, Book.
4. Ken Heather, “The Economics of Industries and Firms”.
5. B.Allen, N.Dohenrty ,E.Mansfield, “Managerial Economics”.

PCS 361: Compiler Design (Pr)

B.Tech. Semester-VI (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

LIST OF EXCERCISES

1. Programming with different compiler writing tools like lex and yacc, or Flex and Bison for object and non-object oriented language.
2. Understanding to the file structure, the tokens in which data is to be parsed, the tree in which parsed data is to be stored with lex and yacc.
3. Compiling & running simple programs for specific problems (thermostat controller, finding the header files required for specific function used by programmers in program, designing a desk calculator, Implement an alternative grammars for infix expressions)
4. Write a grammar for complete s-expressions;
5. Programs relating to code generation, and register allocation: program to generate code for a specific assembler, program to identify specific control structures, inserting comments, identifying specific blocks for code partitioning.
6. Build a lexical analyzer and a syntactic analyzer for EBNF(Students are encouraged to use something different like ANTLR and JAVACC);
7. writing a simple HTML-to-TXT translator that reads from standard input text file and writes to standard output and write program that involves embellishing the parser so that it enforces some simple grammatical rules;
8. Introduction to an Object Oriented version of YACC, Concepts to learn multiple instances of same parser which can be used concurrently or in parallel.
9. Designing an **XML Parser,** Converting Legacy Data to XML using a Lexer/Parser Generator, Using a Lexer/Parser Generator as a Multipurpose XML Tool Builder.

PCS 362: ADHOC and Sensor Networks (Pr)

B.Tech. Semester-VI (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- Acquire the ability to design WLAN / LAN systems meeting out real time requirements.
- Ability to design routing and security protocols for ad hoc and sensor networks using NS3.
- Apply the basic concepts of wireless sensor network nodes and networks.
- Implementation of real time sensor network test bed using motes and Tiny OS programming.
- Develop mini projects on applications of sensor networks in health / agriculture / environment / social sectors.

LIST OF EXCERCISES

1. Write a program for room automation using Bluetooth.
2. Write a program to run Bluetooth as a Master.
3. Write a program to run Bluetooth as a Salve.
4. Write a program for how to check the location using embedded GPS kit.
5. To learning design concept of wireless coordinator, router and end nodes.
6. To design a many to one networks using WSN.
7. To Add/Remove an intelligent end node to coordinator.
8. To Add/Remove a non -intelligent end node to coordinator.
9. To receive / Send data or a voice calls in GSM mobile trainer kit.
10. To receive / Send data or a SMS in GSM mobile trainer kit.
11. To design a different topology using WSN.
12. Configuration of LAN, VLAN and WLAN using Switches, Router, Wi-Fi Access Point and PDA (Hardware)
13. Use appropriate simulation tools for the simulation of AODV / DSR routing algorithm.
14. Use appropriate simulation tools for the simulation of a security algorithm in ad hoc networks.
15. Simulation of Wireless Sensor Network using appropriate simulation framework.
16. Basics of Wireless Sensor Network programming using Tiny OS
17. Sensing data using WSN motes. (Hardware)

PCS 363: Network Security (Pr)

B.Tech. Semester-VI (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Understand the basic concepts of cryptographic and network security algorithms.
- Experiment and analyze important cryptographic algorithms.
- Experiment security algorithms with efficiently implement key exchange algorithm.
- Configure the mail agent, firewall and secure shell (SSH) for providing secure environment.

LIST OF EXCERCISES

1. Implementation of DES and IDEA Algorithms
2. Implementation of AES and Asymmetric RSA algorithm.
3. Implementation of Key Exchange using Diffie-Hellman Approach and Elliptic Curves.
4. Implementation of the hash code using SHA-1 and hash code using MD5.
5. Authentication using Digital Signature Algorithm - Configure a mail agent to support Digital Certificates, send a mail and verify the correctness of this system using the configured parameters.
6. Configure a firewall to block the following for 5 minutes and verify the correctness of this system using the configured parameters:
    - Two neighborhood IP addresses on your LAN
    - All ICMP requests
    - All TCP SYN Packets
7. Configure SSH (Secure Shell) and send/receive a file on this connection to verify the correctness of this system using the configured parameters.
8. Simulation of DSA using RSA and ECC
9. Simulation of Blind Signature
10. Simulation of Smartcard

PCS-364: Seminar

B.Tech. Semester–VI (Computer Science & Engg.)

L	T	P		
-	-	2	**Class Work**	**: 50 Marks**
			Total	**: 50 Marks**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Express themselves fluently and appropriately in social and professional contexts.
- Develop the sub-skills required for paper presentations and group discussions.
- Acquire the soft skills and interpersonal skills which will help them to excel in their workplace needed for these functions.

SEMINAR: Seminar presentation on the themes allotted:

Each student should collect materials from Books, Internet, Journals and Newspapers for his/her theme and prepare a short Seminar for 4 to 5 Pages. During the seminar session each student is expected to prepare and present a topic, for duration of about 15 to 20 minutes. It should be followed by a Viva Voce during which others should come forward to question, clarify, supplement or evaluate. The student is evaluated based on the presentation skill, concept and Query clarification. At the end of the semester, he / she can submit a report on his / her topic of seminar and marks are given based on the report. A Faculty is to be allotted and he / she will guide and monitor the progress of the student and maintain the attendance also. The seminar will be assessed by a committee appointed by the department.

Some of the themes like:

1. Cloning
2. Artificial satellites
3. Cyber Revolution
4. Space research
5. Nano Technology
6. Robotics
7. Artificial intelligence
8. Role of Fibre Optics
9. Industrial development and ecological issues
10. Recent trends in Automobiles
11. Hazards of E-waste
12. Mobile Jammer
13. Touch Screen Technology
14. 4G Technology
15. Tsunami Warning System
16. Blue Tooth Technology

TCS 471: Computer Graphics and Animation

B.Tech. Semester –VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOME

- Be aware of the evolution of computer graphics technology over the past decades
- Understand various graphics packages and standards
- Explain the algorithms that form the foundation of computer graphics
- Classify transformation techniques
- Interpret parallel and oblique projections and their applications
- Differentiate between object representation techniques

UNIT I: INTRODUCTION AND LINE GENERATION

Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Frame buffer and video controller, Points and lines, Line drawing algorithms, Circle generating algorithms, Midpoint circle generating algorithm, and parallel version of these algorithms.

UNIT II: TRANSFORMATIONS

Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing.

Windowing and Clipping: Viewing pipeline, Viewing transformations, 2-D Clipping algorithms- Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang-Barsky algorithm, Line clipping against non-rectangular clip windows; Polygon clipping –Sutherland-Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

UNIT III: THREE DIMENSIONAL

3-D geometric primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

UNIT IV: CURVES AND SURFACES

Quadric surfaces, Spheres, Ellipsoid, Blobby objects, Introductory concepts of Spline, B-spline and Bezier curves and surfaces.

Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method, A-buffer method, Scan line method, basic illumination models, Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.

UNIT V: COMPUTER ANIMATIONS

Conventional and computer assisted animation, design of animation sequences, interpolation, simple animation effects, animation languages (Key Frame System, Parameterized systems), motion specifications, methods of controlling animation.

TEXT BOOKS

1. Donald Hearn and M Pauline Baker, “Computer Graphics C Version”, Pearson Education.
2. Neuman & Sproull, “Principle of Interactive Computer Graphics”, McGraw-Hill International.

REFERENCES

1. Amarendra N. Sinha and Arun D. Udai, “Computer Graphics”, TMH.
2. Donald Hearn and M. Pauline Baker, “Computer Graphics with OpenGL”, Pearson Education.
3. Steven Harrington, “Computer Graphics: A Programming Approach”, MGH.
4. James D. Foley, A.V. Dam, S.K. Feiner and John F. Hughes, “Computer Graphics Principles and Practice” II Edition.

TCS 472: Computer Architecture

B.Tech. Semester–VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Identify the limitations of ILP and need for Dynamic Scheduling.
- Discuss the Hardware support issues related to multiprocessing and suggest solutions.
- Analyze the symmetric and distributed memory architecture and thread level applications.
- To study the Memory and I/O systems and their performance issues.
- Point out the salient features of different multi core architectures and how they exploit parallelism.

UNIT I: INSTRUCTION LEVEL PARALLELISM

Pipeline, Pipeline hazards, Pipeline performance, ILP - Concepts and challenges, Hardware and software approaches, Dynamic scheduling, Speculation, Compiler techniques for exposing ILP, Branch prediction.

UNIT II: HARDWARE SUPPORT

VLIW and EPIC, Advanced compiler support, Hardware support for exposing parallelism, Hardware versus software speculation mechanisms, IA64 and Pentium processors, Limits on ILP.

UNIT III: MULTIPROCESSORS AND THREAD LEVEL PARALLELISM

Symmetric and distributed shared memory architectures, Performance issues, Synchronization, Models of memory consistency, Snooping Protocol-Introduction to Multithreading and its various applications, Hyper threading.

UNIT IV: MEMORY AND I/O

Cache performance, Reducing cache miss penalty and miss rate, Cache optimization techniques, Reducing hit time, Main memory and performance, Memory technology, Types of storage devices , Buses, I/O performance measures, Designing an I/O system.

UNIT V: MULTI-CORE ARCHITECTURES

Software and hardware multithreading, SMT and CMP architectures, Design issues, Case studies, Intel Multi-core architecture, SUN architecture, heterogeneous multi-core processors - case study: IBM Cell Processor.

TEXT BOOK

1. Kai Hwang, Zhi Wei Xu, “Scalable Parallel Computing”, 3rd Edition, Tata McGraw-Hill, 2003.

REFERENCES

1. John L. Hennessey, David A. Patterson, “Computer Architecture A Quantitative Approach”, 4th Edition, Morgan Kaufmann, 2007.
2. David E. Culler, Jaswinder Pal Singh, “Parallel computer architecture: A Hardware/Software approach”, Morgan Kaufmann Publishers, 2011.

TCS 473: Advanced Database Management System

B.Tech. Semester –VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Understand about different database system architectures.
- Identify the various databases such as distributed, parallel and object oriented databases.
- Develop in-depth knowledge about web and intelligent database.
- Understand the data storage structure in emerging information systems.

UNIT I: DISTRIBUTED DATABASE DESIGN

Design strategies, Distribution design issues, Fragmentation, Allocation, Oracle DDB design, Distributed database system architecture, Date's rule for DDBS.

UNIT II: DATA REPLICATION & QUERY PROCESSING IN DDBS

Classification of replica control strategies, Consistency & Request ordering, The Gossip Architecture, Process groups & ISIS, Replication in Oracle, Query optimization in Centralized system, Objective of query processing, Query decomposition, Distributed query optimization algorithms, Query optimization in Oracle.

UNIT III: TRANSACTION PROCESSING & RECOVERY

Distributed data storage, Transaction property, distributed transactions, commit protocols, concurrency control in distributed database, availability, heterogeneous distributed databases, Distributed deadlock management, recovery concepts, recovery techniques based on deferred update & on immediate update shadow paging, The ARIES Recovery Algorithm, Recovery in multi-database systems, database backup and recovery from catastrophic failures, Reliability concept & measure, Site failure & network portioning, directory systems, Database recovery in Oracle.

UNIT IV: SECURITY MANAGEMENT & PL/SQL

Various aspect of database security, Basic model of database access control, TCSEC Policy identification, Security models, Identification-Authentication- Authorization, Statistical databases, Data encryption, Security in Oracle, JDBC, Purpose of PL/SQL, PL/SQL block, structure & type, PL/SQL syntax & programming.

UNIT V: DIFFERENT DATABASES

Parallel databases: Introduction, I/O parallelism. Interquery, intraquery, intraoperation, interoperation parallelism design of parallel systems. Client/Server DBS, Oracle DBMS, Distributed processing in Oracle, Oracle network protocols, Network administration in Oracle. Theory of OO databases, Multimedia databases, Real time databases.

TEXT BOOK

1. Silberschatz, Korth & Sudarshan, Database system concepts, 4th edition, MGH.

REFERENCE

1. Elmasri & Navathe, Fundamentals of Database Systems, 3rd edition, Pearson Education.
2. Ivan Bayross, Database Concepts & Systems, 2nd edition, SPD.
3. Rajesh Narang, Database Management Systems, PHI.
4. Rajesh Narang, An Introduction to database Systems, 7th edition, C.J. Date, Pearson Education.

ECS470: Big Data Analytics

B.Tech. Semester –VII (Computer Science &Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- Appreciate the fundamentals and describe what Big Data Analytics is.
- Understand the Big Data flow and apply necessary components to build a Big Data Analytics System.
- Identify and successfully apply appropriate techniques and tools to solve Big Data problems.
- Analyze the requirements for a Big Data Analytics System for departmental organizational requirements using Hadoop.
- Have an in-depth understanding and comparison of the Big Data ecosystem, specifically PIG, Hive.

UNIT I: INTRODUCTION TO BIG DATA

Types of digital data, Introduction to Big Data Platform, Challenges of Conventional Systems, Intelligent data analysis, Nature of Data, Analytic Processes and Tools, Analysis Vs Reporting, Modern Data Analytic Tools.

UNIT II: DATA ANALYSIS METHODS

Generalized Linear Models, Regression Modelling, The Bayesian Paradigm, Bayesian Inference, Bayesian Modeling, Bayesian Networks, Support Vector Machines, Analysis of Time Series, Linear Systems Analysis, Nonlinear Dynamics Basics.

UNIT III: NoSQL DATA MODEL

Introduction to NoSQL, aggregate data models, aggregates, key-value and document data models, relationships, Graph databases, schemaless databases, distribution models, master-slave replication, peer-peer replication, sharing and replication, Case Study: MongoDB.

UNIT IV: HADOOP ENVIRONMENT

Introduction, Components of Hadoop, Analyzing the Data with Hadoop Scaling out, Hadoop Streaming, Design of HDFS, Java interfaces to HDFS Basics, Developing a Map Reduce Application, How Map Reduce Works Anatomy of a Map Reduce Job run, Failures, Job Scheduling, Shuffle and Sort, Task execution, Map Reduce Types and Formats, Map Reduce Features.

UNIT V: FRAMEWORKS AND TOOLS

Pig: Execution Types, Pig Latin, User Defined Functions, Data processing Operators. Hive, Hive Shell, Services and Meta Store, Comparison with Traditional Data Stores, HiveQL, HiveQL data manipulation, HiveQL queries.

TEXT BOOKS

1. Paul Zikopoulos, Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGraw-Hill Osborne Media; 1st Edition, 2011; eBook: IBM Corporation 2012.
2. Seema Acharya, Subhashini Chellappan, “Big Data and Analytics”, Wiley Publication, 1st Edition, 2015.
3. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.

REFERENCES

1. Frank J. Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, Wiley and SAS Business Series, 2013.
2. P.J. Sadalage and M. Fowler, “NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", 1st Edition, Addison- Wesley Professional, 2012.
3. Tom White, "Hadoop: The Definitive Guide", 3rd Edition, O'Reilley Media Inc., 2012.

ECS 471: Statistical Modeling and Queuing Theory

B.Tech. Semester–VII (Computer Science &Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

On successful completion of this course, the student should be able to

- Have a fundamental knowledge of the basic probability concepts.
- Have a well-founded knowledge of standard distributions which can describe real life phenomena.
- Acquire skills in handling situations involving more than one random variable and functions of random variables.
- Understand the phenomena which evolve with respect to time in a probabilistic manner.
- Exposed the basic characteristic features of a queuing system and queuing models.

UNIT I: PROBABILITY MODELS:

Sample Space, Events, their algebra, graphical methods of representing events, Probability Axioms and their applications, Condition probability, Independence of Events, Bayes' Rule and Bernoulli Trials.

UNIT II: RANDOM VARIABLES, AND THEIR EVENT SPACES

Probability mass function, Distribution functions, some discrete distributions (Bernoulli, Binomial, Geometric, Poisson, uniform, Probability Generating Function, Discrete random vectors, Continuous random variables: Probability density function, some continuous distributions (Gamma, Normal), Exponential functions of random variables, jointly distributed random variables.

UNIT III: EXPECTATION

Expectation of functions of more than one random variable, Moments and transforms of some distributions (Uniform, Bernoulli, Binomial, Geometric, Poisson, Exponential, Gamma, Normal), Computation of mean time to failure.

UNIT IV: STOCHASTIC PROCESSES

Classification of stochastic processes, the Bernoulli process, renewal process, renewal model of program behavior.

UNIT V: MARKOV CHAINS

Computation of n-step transition probabilities, State classification and limiting distributions, Irreducible finite chains with aperiodic states, M/G/l queuing system, Discrete parameter Birth-Death processes, Analysis of program execution time. Continuous parameter Markov Chains, Birth-Death process with special cases, Non-Birth-Death Processes.

TEXT BOOKS

1. O.C. Ibe, “Fundamentals of Applied Probability and Random Processes”, Elsevier, 2nd Edition, 2014.
2. D. Gross and C.M. Harris, “Fundamentals of Queueing Theory”, Wiley Student Edition, 2004.

REFERENCES

1. T. Veerarajan, “Probability Statistics and Random Processes with Queueing theory and Queueing Networks”, Tata McGraw-Hill Education Private Limited, 3rd Edition, 2010.
2. H.A. Taha, “Operations Research”, Pearson Education, (Asia), 8th Edition, 2007.
3. K.S. Trivedi, “Probability and Statistics with Reliability, Queueing and Computer Science Applications”, John Wiley and Sons, 2nd Edition, 2002.

ECS 472: Mobile Computing

B.Tech. Semester –VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- Grasp the concepts and features of mobile computing technologies and applications.
- Have a good understanding of how the underlying wireless and mobile communication networks work, their technical features and what kind of applications they can support.
- Identify the important issues of developing mobile computing systems and applications.
- Organize the functionalities and components of mobile computing systems into different layers and apply various techniques for realizing the functionalities.

UNIT I: WIRELESS COMMUNICATION FUNDAMENTALS

Introduction, Wireless transmission, Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulations, Spread spectrum, Medium Access Control, Space Division Multiple Access, Frequency Division Multiple Access, Time Division Multiple Access, Code Division Multiple Access, Cellular Wireless Networks.

UNIT II: TELECOMMUNICATION SYSTEMS

GSM, System Architecture, Protocols, Connection Establishment, Frequency Allocation, Routing, Handover, Security, General packet radio service.

UNIT III: WIRELESS NETWORKS

Wireless LAN, IEEE 802.11 Standards, Architecture, Services, High Performance Radio LAN, Ad hoc Network, Bluetooth, ZigBee.

UNIT IV: NETWORK LAYER

Mobile IP, Dynamic Host Configuration Protocol, Routing, Destination Sequential Distance Vector, Dynamic Source Routing, Ad-hoc On-demand Distance Vector, Zone Routing Protocol, On-Demand Multicast Routing Protocol

UNIT V: TRANSPORT AND APPLICATION LAYERS

TCP over Wireless Networks, Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit / Fast Recovery ,Transmission/Timeout Freezing, Selective Retransmission, Transaction Oriented TCP, Wireless Application Protocol, Wireless Application Protocol Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session Protocol, Wireless Markup Language, WML Script, Wireless application environment, Wireless Transaction Application.

TEXT BOOK

1. Asoke K. Talukder, Hasan Ahmed, Roopa R. Yavagal, “Mobile Computing”, 2nd Edition, Tata McGraw-Hill, 2010.

REFERENCES

1. Jochen Schiller, “Mobile Communications”, 3rd Edition, Pearson Education, 2005.
2. William Stallings, “Wireless Communications and Networks”, 2nd Edition, Pearson Education, 2004.
3. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, 1st Edition, Pearson Education, 2003.
4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, 2nd Edition, Springer, 2003.

ECS 473: Emerging Trends & Technologies

B.Tech. Semester –VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- To provide adequate knowledge of technology management, management of R&D
- Able to understand the concept of intellectual property rights.
- Grasp the concepts and features of Strategic value of patents, trade secrets and licensing.
- Identify the important issues of Management Roles and Skills for New Technology.

UNIT I

Introduction to Technology Management, Business Strategy for New Technologies: Adding value, gaining competitive advantage, timing and capability development, Technology Forecasting: Techniques of Forecasting, Technology Forecasting-Relevance, Strategic alliance and Practicality, and Technology Transfer.

UNIT II

Management of Research, Development and Innovation: Technology Mapping, Comparison of type of R&D Projects and development approaches- Radical platform and Incremental Projects, Innovation process.

UNIT III

Management of Intellectual Property Rights: Strategic value of patents, trade secrets and licensing.

UNIT IV

Managing Scientists and Technologists: Identification, Recruitment, Retention, Team Work and Result orientation. Investment in Technology, Management Roles and Skills for New Technology.

UNIT V

Technology for Managerial Productivity and Effectiveness, Just-in-Time, Venture Capital & Technology Development, Practice Tasks: Technology Forecasting and Technology Mapping, Technology Strategy Development, Exercise on Just-in-time, Cases on Venture Capital.

BOOKS

1. Technology and Management, Cassell Educational Ltd., London
2. John Humbleton, Management of High Technology Research and Development, Elsevier.
3. Charles W.L. Hill/Gareth R. Jones, Strategic Management, Houghton Mifflin Co.

REFERENCES

1. S.A. Bergn, R&D Management, Basil Blackwell Inc.
2. Richard M. Burton & Borge Obel, Innovation and Entrepreneurship in Organisations, Elsevier.
3. Spyros Maksidakis & Steven C Wheelwright, Innovation and Entrepreneurship in Organisations, John Wiley & Sons.
4. C. Marle Crawford, New Product Management, Irwin, USA.
5. David Hutchin, Just-in-time, Gower Technical Press.
6. Tarek M. Khalil, Management of Technology, McGraw-Hill Book Co.
7. Daniel L. Babcock, Managing Engineering and Technology: PHI.

ECS 474: Cyber Forensics and Ethical Hacking

B.Tech. Semester –VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Understand the principles of Computer Forensics and Cyber Forensics
- Analyze the forensics activities in digital devices
- Explore Organizational implications on cyber security
- Learn and Summarize about various Ethical Hackers.
- Understand about various types of hacking

UNIT I: UNDERSTANDING CYBER FORENSICS

Introduction to Cyber forensics-Digital Forensics Science, Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensic Analysis of E-Mail – Digital Forensic Life Cycle, Network Forensics, Challenges, Forensics Auditing, Anti-forensics.

UNIT II: FORENSICS OF HAND-HELD DEVICES

Hand-Held Devices and Digital Forensics, Toolkits for Hand-Held Device Forensics, Forensics of iPods and Digital Music Devices, Techno Legal Challenges with Evidence from Hand-Held Devices, Organizational Guidelines on Cell Phone Forensics.

UNIT III: CYBERSECURITY: ORGANIZATIONAL IMPLICATIONS

Cost of Cybercrimes and IPR Issues - Web Threats for Organizations, Security and Privacy Implications from Cloud Computing, Protecting People's Privacy in the Organization, Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy, Incident Handling: An Essential Component of Cyber security, Media and Asset Protection, Importance of Endpoint Security in Organizations.

UNIT IV: INTRODUCTION TO ETHICAL HACKING

Introduction to Hacking, Penetration Testing-Legal and Ethical Considerations, Creating and Implementing a Test Plan, Social Engineering, Google Hacking, Foot printing.

UNIT V: ETHICAL HACKING TYPES

Web Server Attacks, Database Attacks-Password Cracking, Network Devices & Attacks, Wireless Network Attacks, Trojans and Backdoor Applications, OS Specific Attacks, Buffer Overflows, Denial of Service Attacks.

TEXT BOOKS

1. Nina Godbole, Sunit Belapure, “Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Wiley India (P) Ltd., 2011.
2. Whitaker, Newman, “Penetration Testing and Network Defense”, Cisco Press, Indianapolis, 2006.

REFERENCES

1. Nelson, Bill, Amelia Phillips, Frank Enfinger, Christopher Steuart, “Guide to Computer Forensics and Investigations”, 2nd Edition, Thompson Course Technology, Boston, 2006.
2. Mandia, Kevin, Prosise, Chris, Pepe, Matt, “Incident Response & Computer Forensics”, 2nd Edition, McGraw-Hill/Osborne, Emeryville, 2003.
3. Beebe, Nicole Lang, Jan Guynes Clark, “A Hierarchical, Objectives-Based Framework for the Digital Investigations Process”, Digital Investigation, 2005.

ECS 475: E-Commerce

B.Tech. Semester –VII (Computer Science &Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Comprehend the underlying economic mechanisms and driving forces of E-Commerce
- Understand the critical building blocks and network infrastructure of E-Commerce
- Realize the infrastructure and types of E-Commerce Services
- Recognize the availability of latest technologies of E- commerce in various domains.

UNIT I: ELECTRONIC COMMERCE

Overview, Definitions, Advantages & Disadvantages of E-Commerce, Threats of E-Commerce, Managerial Prospective, Rules & Regulations for Controlling E-Commerce, Cyber Laws.

Technologies: Relationship Between E-Commerce & Networking, Different Types of Networking for E-Commerce, internet, Intranet, EDI Systems

UNIT II: WIRELESS APPLICATION PROTOCOL

Definition, Hand Held Devices, Mobility & Commerce, Mobile Computing, Wireless Web, Web Security, Infrastructure Requirement for E-Commerce.

Business Models of E-commerce; Model Based on Transaction Type, Model Based on Transaction Party - B2B, B2C, C2B, C2C, E-Governance.

UNIT III: E-STRATEGY

Overview, Strategic Methods for developing E-Commerce. Four C's (Convergence, Collaborative Computing, Content Management & Call Centre).

Convergence: Technological Advances in Convergence, Types, Convergence and its implications, Convergence& Electronic Commerce.

Collaborative Computing: Collaborative product development, contract as per CAD, Simultaneous Collaboration, Security.

Content Management: Definition of content, Authoring Tools and Content Management, Content - partnership, repositories, convergence, providers, Web Traffic & Traffic management: Content Marketing.

UNIT IV: SUPPLY CHAIN MANAGEMENT

E-logistics, Supply Chain Portal, Supply Chain planning Tools (SCPTools), Supply Chain Execution (SCE), SCE - Framework, Internet's effect on Supply Chain Power.

E-Payment Mechanism; Payment through card system, E-Cheque, E-Cash, E-Payment Threats & Protections.

E-Marketing: Home - shopping, E-Marketing, Tele-marketing.

UNIT V: ELECTRONIC DATA INTERCHANGE (EDI)

Meaning, Benefits, Concepts, Application, EDI Model, protocols (UN EDI FACT / GTDI, ANSIX-12, Data Encryption (DES / RSA)

Risk of E-Commerce: Overview, Security for E-Commerce, Security Standards, Firewall, Cryptography, Key Management, Password Systems, Digital Certificates, Digital Signatures.

TEXT BOOK

1. Kalakotia, Whinston: Frontiers of Electronic Commerce, Pearson Education.

REFERENCES

1. Ward Hanson, "Principles of Internet Marketing," South-Western Publishing, 2000
2. Philip Evans and Thomas Wurster, "Blown to Bits: How the New Economics of Information Transforms Strategy," Harvard Business School Press, 2000.
3. E-commerce. MM Oka, EPH.

ECS 476: Modeling and Simulation

B.Tech. Semester–VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Explore the methods for modeling of systems using event simulation.
- Emphasis on modeling and on the use of simulation software.
- Apply the image processing techniques
- Simulate the Networks routing and analysis algorithms

UNIT I: INTRODUCTION TO SIMULATION

Introduction, Simulation terminologies, Application areas, Model classification, Types of Simulation, Steps in a simulation study, Concepts in discrete event simulation, Simulation examples.

UNIT II: MATHEMATICAL MODELS

Statistical Models: Concepts, Discrete distribution, Continuous distribution, Poisson process, Empirical distributions. Queuing models: Characteristics, Notation, Queuing systems, Markovian Models. Properties of random numbers, Generation of Pseudo Random numbers, Tests for random numbers. Random-variate Generation: Inverse transforms technique, Acceptance-rejection technique.

UNIT III: LOCAL AREA NETWORK SIMULATION

Operation and necessity of using private and public IP addresses for IPv4 addressing, IPv6 addressing scheme to satisfy addressing requirements in a LAN/WAN environment, IPv4 addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment, Technological requirements for running IPv6 in conjunction with IPv4 such as dual stack , IPv6 addresses

UNIT IV: DIGITAL IMAGE PROCESSING SIMULATOR

Images: Additive and Subtractive Primary Colours, Line dropout and Salt and Pepper noise removal, Image Differencing (subtraction), Linear Edge Enhancement, Supervised Classification.

UNIT V: NETWORK SIMULATOR

NS3, Introduction, Modeling the Network Elements, Simulating a Computer Network, Smart Pointers ,Representing Packets, Object Aggregation, Events, Compiling and Running the Simulation-Animating the Simulation, Analyzing the Results.

TEXT BOOKS

1. Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol, “Discrete-Event System Simulation”, 5th Edition, Pearson Education, 2010.
2. Geoffrey Gordon, “System Simulation”, 2nd Edition, Prentice Hall, 2006.
3. Modeling and Tools for Network Simulation, Wehrle, Klaus, Günes, Mesut, Gross, James (Eds.) 2010.
4. CCNA Routing and Switching Study Guide: Exam 100-101, 200-101, 200-120.

REFERENCES

1. Frank L. Severance, “System Modeling and Simulation: An Introduction”, 1st Edition, John Wiley & Sons, 2001.
2. Averill M. Law and W. David Kelton, “Simulation Modeling and Analysis”, 5th Edition, McGraw-Hill, 2014.
3. Online Book, Jerry Banks, “Handbook of Simulation: Principles, Methodology, Advances,

ECS 477: Microcontroller and Embedded systems

B.Tech. Semester–VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Describe architecture and operations of microcontroller 8051
- Develop assembly language programs for 8051 and its applications in the field of information technology using different types of interfacing
- Acquire knowledge on embedded systems basics and describe the architecture and operations of ARM processor
- Develop skills in writing small programs for ARM processor and its applications using different types of interfaces and with interrupt handling mechanism
- Understand the multiple process operating environments and use standard system call interfaces to monitor and control processes

UNIT I: MICROCONTROLLER

Architecture of 8051–8051 microcontroller hardware-I/O Pins Ports and circuits, External memory, Counters and Timers-Serial data Input/output-Interrupts, Basic Assembly language programming-Tools and techniques, Programming the 8051 Instruction set-Addressing modes

UNIT II: INTERFACING MICROCONTROLLER

LCD & Keyboard Interfacing, ADC, DAC & Sensor Interfacing, External Memory Interface, Stepper Motor and Waveform generation.

UNIT III: EMBEDDED COMPUTING

Challenges of Embedded Systems, Embedded system design process, Embedded processors, ARM processor, Architecture, Instruction sets and programming.

UNIT IV: MEMORY AND I/O MANAGEMENT

Programming Input and Output, Memory system mechanisms, Memory and I/O devices and interfacing, Interrupts handling.

UNIT V: PROCESSES AND OPERATING SYSTEMS

Multiple tasks and processes, Context switching, Scheduling policies, Inter process communication mechanisms, Performance issues.

TEXT BOOKS

1. Kenneth J. Ayala. The 8051 microcontroller, 3rd Edition, Cengage learning, 2010.
2. Wayne Wolf, “Computers as Components: Principles of Embedded Computer System Design”, Elsevier, 2011.

REFERENCES

1. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, 2nd Edition, Pearson Education, 2013.
2. Embedded Systems by Raj Kamal, TMH, 2006.
3. Steve Heath, “Embedded System Design”, Elsevier, 2005.

ECS 478: Digital Image Processing

B.Tech. Semester–VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- Understand the fundamentals of image processing.
- Implement the various image enhancement and image restoration techniques.
- Exemplify image analysis concepts: segmentation, edge detection and morphing
- Perform feature and object detection techniques.

UNIT I: INTRODUCTION AND FUNDAMENTALS

Introduction: Steps in Image Processing Systems, Image Acquisition, Sampling and Quantization, Pixel Relationships, Image operations Image Enhancement in Spatial Domain: Basic Gray Level Functions, Piecewise, Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations, Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening –The Laplacian.

UNIT II: IMAGE ENHANCEMENT IN FREQUENCY DOMAIN

Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters, Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters, Gaussian Low pass Filters; Sharpening Frequency Domain Filters, Gaussian High pass Filters; Homomorphic Filtering.

Image Restoration A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering, Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters, Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering, Band pass Filters; Minimum Mean-square Error Restoration.

UNIT III: SEGMENTATION AND EDGE DETECTION

Thresholding techniques, region growing methods, region splitting and merging, adaptive thresholding, threshold selection, global valley, histogram concavity, edge detection, template matching, gradient operators, circular operators, differential edge operators, Canny operator, Laplacian operator, active contours, object segmentation

UNIT IV: MORPHOLOGICAL IMAGE PROCESSING

Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms, Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

UNIT V: FEATURE EXTRACTION

Representation, Topological Attributes, Geometric Attributes

Description: Boundary-based Description, Region-based Description, Relationship.

Object Recognition: Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching

TEXT BOOK

1. Rafael C. Gonzalez and Richard E. Woods, “Digital Image Processing”, 3rd Edition, Pearson Education, 2009.

REFERENCES

1. John C. Russ, “The Image Processing Handbook”, 6th Edition, CRC Press, 2011.

2. S. Jayaraman, S. Esakkirajan, T. Veerakumar, “Digital Image Processing”, 1st Edition, Tata McGraw-Hill, 2009.
3. Rafael C. Gonzalez, Richard E. Woods and Steven L. Addins, “Digital Image Processing Using MATLAB”, 2nd Edition, Pearson Education, 2009.

ECS 479: Software Project Management

B.Tech. Semester–VII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

To introduce the concepts of software management, Disciplines and control.

- Produce the quality product without defects.
- Complete the task with better quality on time.
- Manage the people and control the defects.

UNIT I: BASIC CONCEPTS

Product, Process and Project, Definition, Components of Software Project Management(SPM), Challenges and Opportunities, Tools and Techniques, Managing Human Resource and Technical Resource, Costing and pricing of projects, Training and development, Project management technique, Product Life Cycle , Project Life Cycle Models.

UNIT II: FORMAT PROCESS MODELS AND THEIR USE

Definition and Format Model for a Process, ISO 9001 and CMM Models and their relevance to Project Management, Other Emerging Models like People CMM

UNIT III: UMBRELLA ACTIVITIES IN PROJECTS

Metrics, Methods and Tools for Metrics, Issues of Metrics in multiple Projects, Configuration Management, Software Quality Assurance, Quality Standards and Certifications, Process and Issues in obtaining Certifications, Risk issues in Software Development and Implementation, Identification of Risks , Resolving and Avoiding risks, Tools and Methods for Identifying Risk Management.

UNIT IV: INSTREAM ACTIVITIES IN PROJECTS

Project Initiation, Project Planning, Execution and Tracking, Project Wind up, Concept of Process, Project Database.

UNIT V: ENGINEERING AND ISSUES IN PROJECT MANAGEMENT

Phases: Requirements, Design, Development, Testing, Maintenance, Deployment, Engineering Activities and Management Issues in Each Phase, Special Considerations in Project Management for India and Geographical Distribution Issues.

TEXT BOOK

1. Royce and Walker, “Software Project Management”, 2nd Edition, Pearson Education, 2002.

REFERENCES

1. Bob Hughes and Mike Cotterell, “Software Project Management”, 5th Edition, Tata McGraw-Hill, 2011.
2. Kelker, S. A, “Software Project Management”, 2nd Edition, Prentice Hall, 2003.
3. Gopalaswamy Ramesh, "Managing Global Projects", 1st Reprint Edition, Tata McGraw Hill, 2006.
4. Robert K. Wysocki, “Executive's Guide to Project Management”, 2nd Edition, John Wiley &Sons, 2011.
5. Teresa and Luckey, Joseph Phillips, “Software Project Management for Dummies”, 3rdEdition, Wiley publishing Inc., 2006.

PCS 471: Computer Graphics and Animation (Pr)

B.Tech. Semester-VII (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

The experiments will be based on the following

LIST OF EXPERIMENTS

1. Explain Video display with neat and clean diagram:
   Cathode Ray Tube,
   Random scan display,
   Flat screen display,
   LED's Polarization.
2. Short Note on input devices-: Keyboard, joystick, wired glone, space ball, Trackball, Mouse , Image scanner, Touch Pen.
3. Implementation of line drawing algorithms
   DDA Algorithms
   Bresenham's Algorithms.
4. Implementation of circle drawing algorithms
   DDA Algorithms
   Bresenham's Algorithms.
5. Implementation of Polygon clipping against clipping indoor, using the Sutherland – Hodgenance polygon clipping algorithm.
6. Draw a hyperbola by general formula $x^2/a^2 - y^2/b^2 = 1$
7. Draw a force which is charged to a smile face after a few seconds using only circle and line function.
8. Draw a rational flag for India and it will wing after some seconds or continuously.
9. Draw a super ellipse.
10. Develop the ellipse by a program using general formula $x^n/a^n + y^n/b^n = 1$

PCS 473: Project-1

B.Tech. Semester-VII (Computer Science & Engineering)

L	T	P
-	-	4

Class Work	**: 50 Marks**
Exam.	**: 50 Marks**
Total	**: 100 Marks**

The object of Project I is to enable the student to take up investigative study in the broad field of *Computer Science & Engineering*, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:

- Survey and study of published literature on the assigned topic;
- Working out a preliminary approach to the Problem relating to the assigned topic
- Conducting preliminary Analysis/Modelling/Simulation/Experiment/Design/Feasibility
- Preparing a Written Report on the Study conducted for presentation to the Department
- Final Seminar, as oral Presentation before a Departtmental Committtee.

TCS 481: Distributed Computing

B.Tech. Semester –VIII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Acquire the theoretical and conceptual foundations of distributed computing.
- Conceptualize the ideas of distributed operating systems and its issues.
- Understand the issues involved in distributed resource environment
- Realize the importance of transaction and how to recovery the system from deadlocks.
- Explore the principles of fault tolerance and its protocols.

UNIT I: DISTRIBUTED ENVIRONMENT

Introduction, Various Paradigms in Distributed Applications, Remote Procedure Call, Remote Object Invocation, Message-Oriented Communication, Unicasting, Multicasting and Broadcasting, Group Communication.

UNIT II: DISTRIBUTED OPERATING SYSTEMS

Issues in Distributed Operating System, Threads in Distributed Systems, Clock Synchronization, Causal Ordering, Global States, Election Algorithms, Distributed Mutual Exclusion, Distributed Transactions, Distributed Deadlock, Agreement Protocols, Exploiting code bugs, Malware security management

UNIT III: DISTRIBUTED RESOURCE MANAGEMENT

Distributed Shared Memory, Data-Centric Consistency Models, Client-Centric Consistency Models, Ivy, Munin, Distributed Scheduling, Distributed File Systems, Sun NFS.

UNIT IV: DISTRIBUTED TRANSACTION PROCESSING

Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery, Overview of Replication And Distributed Multimedia Systems.

UNIT V: FAULT TOLERANCE AND CONSENSUS

Introduction to Fault Tolerance, Distributed Commit Protocols, Byzantine Fault Tolerance, Impossibilities in Fault Tolerance.

TEXT BOOKS

1. A.S. Tanenbaum, M. Van Steen, “Distributed Systems”, Pearson Education, 2007.
2. Mukesh Singhal, Niranjan G. Shivaratri “Advanced Concepts in Operating Systems”, McGraw-Hill Series in Computer Science, 2011.

REFERENCES

1. George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design”, 3rd Edition, Pearson Education Asia, 2002.
2. M.L. Liu, “Distributed Computing Principles and Applications”, Pearson Addison Wesley, 2004.
3. Andrew S. Tenenbaum, “Modern Operating system”, 3rd Edition, Pearson Addison Wesley, 2008.

TCS 482: Data Warehousing and Data Mining

B.Tech. Semester –VIII (Computer Science &Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Identify the issues in data mining applications
- Apply preprocessing methods for given raw data
- Apply classification algorithms
- Identify the clustering technique and analyze the data
- Use association rule mining to generate rules

UNIT I: DATA MINING

Introduction, Data, Types of Data, Data Mining Functionalities, Interestingness of Patterns, Classification of Data Mining Systems, Data Mining Task Primitives, Integration of a Data Mining System with a Data Warehouse, Issues.

UNIT II: DATA PREPROCESSING

Data Pre-processing, Data Cleaning, Data Integration and Transformation, Data Reduction: overview of data reduction strategies, Attributes subset selection, Regression and Log-Linear Models: Parametric data reduction, Histograms, Clustering, Sampling, Data Cube Aggregation, Data Transformation and Data Discretization.

UNIT III: CLASSIFICATION

Basic Concepts, Decision Tree induction, Bayes Classification Methods, Rule Based Classification, Model Evaluation and Selection, Techniques to improve Classification Accuracy, Classification: Advanced concepts, Bayesian Belief Networks, Classification by Back Propagation, Support Vector Machine, Classification using frequent Patterns.

UNIT IV: CLUSTER ANALYSIS

Cluster Analysis: Basic concepts and Methods, Cluster Analysis, Partitioning methods, Hierarchical methods, Density Based Methods, Grid Based Methods Evaluation of Clustering, Advanced Cluster Analysis: Probabilistic model based clustering, Clustering High Dimensional Data, Clustering Graph and Network Data.

UNIT V: ASSOCIATION RULE MINING

Association Rule Mining: Market Basket Analysis, Frequent pattern mining, A priori algorithm Generating Association rules from frequent items, Improving the efficiency of A priori algorithm, Mining Multilevel association rules, Multidimensional association rules, Constraint based association Mining.

TEXT BOOKS

1. Jiawei Han and Micheline Kamber, Jian Pei “Data Mining: Concepts and Techniques”, 3rdEdition, Elsevier, 2012.
2. Alex Berson and Stephen J. Smith, “Data Warehousing, Data Mining & OLAP”, Tata McGraw-Hill Edition, 10th Reprint, 2007.

REFERENCES

1. Margaret H. Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education, 2004.
2. David Hand, Heikki Mannila and Padhraic Smyth, “Principles of Data Mining”, Prentice Hall of India, 2004.

ECS 480: Cloud Computing

B.Tech. Semester –VIII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- To impart the knowledge of cloud computing and technologies, issues in cloud computing etc.
- Identify the architecture, infrastructure and delivery models of cloud computing
- Apply suitable virtualization concept.
- Choose the appropriate Programming Models and approach for Services.
- Address the core issues of cloud computing such as security, privacy and interoperability

UNIT I: FUNDAMENTALS

Vision, Definition, Reference Model, Characteristics and benefits, Historical Development: Distributed Computing, Service Oriented Computing, Web2.0, Web Services - Grid.

UNIT II: VIRTUALIZATION

Basics of Virtualization: Characteristics, Taxonomy of Virtualization Techniques, Hardware Level Virtualization, Operating System Level Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Case Study: XEN, VMware.

UNIT III: CLOUD ARCHITECTURE AND SERVICES

Cloud Architecture, Cloud Services: Infrastructure as a Service, Platform as a Service, Software as a Service, Types of Cloud: Private Cloud, Public Cloud, Hybrid Cloud, Community Cloud, Challenges, Cloud Applications.

UNIT IV: SECURITY IN THE CLOUD

Security Overview, Cloud Security Challenges and Risks, Software-as-a-Service Security, Security Governance, Risk Management, Security Monitoring, Security Architecture Design, Data Security, Application Security, Virtual Machine Security.

UNIT V: CLOUD PLATFORMS AND TOOLS

Amazon web services: Compute Services, Storage Services, Communication Services, Google App Engine: Architecture, Application Life Cycle, Cost Model, Microsoft Azure: Core Concepts, SQL Azure - Tool kits: CloudSim, Eucalyptus.

TEXT BOOK

1. Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, “Mastering Cloud Computing Foundations and Applications Programming”, 1st Edition, Morgan Kaufmann imprints in Elsevier, 2013.

REFERENCES

1. Kai Hwang, Geoffrey C Fox and Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, 1st Edition, Morgan Kaufmann Publishers, 2012.
2. John W. Rittinghouse and James F. Ransome, “Cloud Computing: Implementation, Management, and Security”, 1st Edition, CRC Press, 2010.
3. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud”, 1st Edition, O'Reilly Media Inc, 2009.
4. Anthony T. Velte, Toby J. Velte and Robert Elsenpeter, “Cloud Computing, A Practical Approach”, 1st Edition, McGraw Hill Osborne Media, 2009.

ECS 481: Bio-Inspired Computing

B.Tech. Semester–VIII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Acquire in-depth knowledge about the Bio inspired Computing and its applications.
- Understand the computational complexity of search heuristics using biologically inspired computing.
- Uncover the state-of-the-art of present technology.
- Survey relevant theoretical models, reconfigurable architectures and computational Intelligence techniques.

UNIT I: INTRODUCTION

Natural to Artificial Systems, Behavior of Social Insects: Foraging, Division of Labor, Cemetery Organization and Brood Sorting, Nest Building.

UNIT II: ANT COLONY OPTIMIZATION

Ant Behavior, Towards Artificial Ants, Ant Colony Optimization, Combinatorial Optimization, Meta-heuristic, Local Search, Tabu Search, Global Search.

UNIT III: APPLICATIONS

Ant Colony Optimization algorithms for NP-hard problems: Routing problems, Assignment problem Scheduling problem, Subset problem, Machine Learning Problem, ACO for Traveling Salesman problem , Extensions of Ant Systems, ACO theoretical considerations.

UNIT IV: SWARM INTELLIGENCE

Biological foundations of Swarm Intelligence, Swarm Intelligence in Optimization, Particle Swarms for dynamic optimization problems.

UNIT V: COMPUTING PARADIGMS

Biological Inspired computing to Natural Computing, Integration of Evolutionary Computation Components in Ant Colony Optimization, Particle Swarm Optimization based on Socio-cognition.

TEXT BOOKS

1. Marco Dorigo, Thomas Stutzle, “Ant Colony Optimization”, MIT Press, 2004.
2. Eric Bonabeau, Marco Dorigo, Guy Theraulaz, “Swarm Intelligence: From Natural to Artificial Systems”, Oxford University press, 1st Edition, 2000.
3. Leandro N. DeCastro, Fernando J. VonZuben, “Recent Developments in Biologically Inspired Computing”, Idea Group Inc., 2005.

REFERENCE

1. James Kennedy, James F. Kennedy, Russell C. Eberhart, “Swarm Intelligence”, Morgan Kaufmann, 1stEdition, 2001.

ECS 482: High Speed Networks

B.Tech. Semester–VIII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- To impart the knowledge of advanced and high-speed networks.
- Develop an in-depth understanding, in terms of architecture, protocols and applications, of major high-speed networking technologies.
- Apply queuing analysis to control the effect of the congestion in high-speed networks.
- Compare the various approaches of the Integrated and Differentiated Services.
- Discuss the protocols, which provide QoS support for Real Time Applications.

UNIT I: HIGH SPEED NETWORKS

Asynchronous transfer mode, ATM Protocol Architecture, ATM logical Connection, ATM Cell, ATM Service Categories, AAL, High Speed LANs, Fast Ethernet, Gigabit Ethernet, Fibre Channel, Wireless LAN's applications, requirements, Architecture of IEEE 802.11.

UNIT II: QUEUING ANALYSIS AND CONGESTION CONTROL

Single Server Queues, Multiserver Queues, Queues with Priorities, Networks of Queues, Effects of Congestion, Congestion Control, Traffic Management, Congestion Control in Packet Switching Networks, Frame Relay Congestion Control.

UNIT III: ATM CONGESTION CONTROL

Traffic and Congestion control in ATM, Requirements, Attributes, Traffic Management Frame work, Traffic Control, ABR traffic Management, ABR rate control, RM cell formats, ABR Capacity allocations, GFR traffic management.

UNIT IV: INTEGRATED AND DIFFERENTIATED SERVICES

Integrated Services Architecture, Approach, Components, Services, Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ, Random Early Detection, Differentiated Services.

UNIT V: PROTOCOLS FOR QOS SUPPORT

RSVP Goals and Characteristics, Data Flow, RSVP operations, Protocol Mechanisms, Multiprotocol Label Switching, Operations, Protocol details, RTP, Protocol Architecture, Data Transfer Protocol, RTCP.

TEXT BOOKS

1. William Stallings, "High-speed Networks and Internet", Pearson Education, 2nd Edition, 2002.
2. Jean Warland, Pravin Varaiya, "High-performance Communication Networks", Jean Harcourt Asia Private Limited, 2nd Edition, 2000.

REFERENCES

1. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.
2. Abhijit S. Pandya, Ercan Sen, "ATM Technology for Broadband Telecommunications Networks", CRC Press, 2004

ECS 483: Real Time System

B.Tech. Semester –VIII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Grasp a fundamental understanding of goals, components and evolution of real time systems
- Explain the concepts of real time scheduling
- Learn the scheduling policies of modern operating systems
- Understand the resource access control techniques in real time systems.
- Understand the concept of real time communication

UNIT I: INTRODUCTION

Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence, Constraints and Data Dependency.

UNIT II: REAL TIME SCHEDULING

Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

UNIT III: RESOURCES ACCESS CONTROL

Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority, Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple, Unit Resources, Controlling Concurrent Accesses to Data Objects.

UNIT IV: MULTIPROCESSOR SYSTEM ENVIRONMENT

Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints.

UNIT V: REAL TIME COMMUNICATION

Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real Time Protocols, Communication in Multicomputer System, An Overview of Real Time Operating Systems.

TEXT BOOKS

1. Real Time Systems by Jane W. S. Liu, Pearson Education Publication.
2. Real-Time Systems: Scheduling, Analysis, and Verification by Prof. Albert M. K. Cheng, John Wiley and Sons Publications.

ECS 484: Medical Imaging

B.Tech. Semester–VIII (Computer Science & Engg.)

L	T	P		
3	1	-	**Class Work**	**: 50 Marks**
			Exam.	**: 100 Marks**
			Total	**: 150 Marks**
			Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Acquire the knowledge of different methods and modalities used for medical imaging.
- Demonstrate imaging methods using advanced modalities.
- Synthesize knowledge and skills essential to the successful practice of diagnostic medical imaging.
- Understand the ionizing radiation related risks and radiation protection principles in imaging and utilize the problem solving process effectively.
- Implement methods to analyze medical images as part of a term project.

UNIT I: BASIC CONCEPTS

Introduction to Medical Imaging: The Modalities and Image Properties, Image Quality: Spatial Resolution, Convolution, Frequency Domain, Contrast, Physical mechanisms of Blurring, Medical Imaging Informatics.

UNIT II: DIAGNOSTIC RADIOLOGY

X-Ray Computed Tomography: Introduction-Rays detectors in CT- Imaging, Cardiac CT, Dual energy CT- Biological affects and safety. Ultrasound Imaging: Introduction, Physics of Acoustic waves, Generation and Detection of Ultrasound, Doppler Imaging-Biological effects and safety.

UNIT III: MAGNETIC RESONANCE IMAGING (MRI) & NUCLEAR IMAGING

MRI: Advanced Image Acquisition Methods, Artifacts, Spectroscopy, Quality Control, Siting, Bioeffects and Safety. Nuclear Imaging: Positron Emission Tomography and Dual Modality Imaging, SPECT/CT, PET/CT.

UNIT IV: MEDICAL IMAGE ANALYSIS AND VISUALIZATION

Introduction, Manual Analysis, Automated Analysis, Computational strategies for Automated Medical Image Analysis, Pixel Classification, Geometric model matching using a Transformation Matrix, Flexible Geometric Model Matching. Visualization for Diagnosis and Therapy: Introduction 2D Visualization, User Interaction, Intraoperative Navigation.

UNIT V: RADIATION BIOLOGY AND PROTECTION

Radiation Biology: Overview, Interaction of radiation with tissue, Whole body response to radiation: The acute radiation syndrome, Hereditary Effects of Radiation Exposure, Radiation Protection: Sources of exposure to ionizing radiation, Radiation detection equipment in radiation safety, Medical emergencies involving ionizing radiation.

TEXT BOOKS

1. Paul Suetens, “Fundamentals of Medical Imaging”, 2nd Edition, Cambridge University Press, UK, 2009.
2. Jerrold T. Bushberg, J. Anthony Seibert, Edwin M. Leidholdt, Jr. John M. Boone, “Essential Physics of Medical imaging”, 3rd Edition, Lippincott Williams & Wilkins, USA, 2012.

REFERENCES

1. Steve Webb, “The Physics of Medical Imaging”, Adam Hilger, Philadelphia, 2012.
2. Jerry L. Prince, Jonathan M. Links, “Medical Imaging Signals and Systems”, Pearson EI, 2006.

ECS 485: Network Congestion control and Avoidance

B.Tech. Semester –VIII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- In-depth understanding of congestion control and avoidance in networks.
- Identify congestion problems in Network Layer.
- Analyze the congestion control and flow control algorithm.
- Apply the congestion avoidance mechanism in network traffic problem.

UNIT I: CONGESTION CONTROL IN TCP

Internet Congestion Collapse, Resource Management Solution, Van Jacobson Congestion Control, Elements of Congestion Control, TCP Variants, Karns algorithm, Issues in TCP, TCP Congestion Control Concepts.

UNIT II: CONGESTION CONTROL IN NETWORK LAYER

Network Congestion, Routing algorithm, Packet queuing and service policy, Congestion Control Methods, Choke Packets, Multiprotocol routers, QoS, Concatenated virtual circuits, Tunneling, Packet Fragmentation.

UNIT III: CONGESTION CONTROL IN FRAME RELAY

Frame Relay Congestion Technique, Discard control, FECN, BECN, Frame Relay Traffic Shaping, Implicit Congestion Control, QoS in Frame relay, Frame Relay Virtual Circuits, FRAD techniques.

UNIT IV: CONGESTION AVOIDANCE FLOW CONTROL

End to end flow control in TCP, Slow Start, Fast retransmit, Fast Recovery, Additive Increase / Multiplicative Decrease.

UNIT V: CONGESTION AVOIDANCE MECHANISM

RED, REM, PI, Hop by Hop techniques, New Congestion Avoidance in TCP, ECN, Round Trip Time variance estimation, Dynamic window sizing on congestion, Combined Slow start and Congestion Avoidance algorithm.

TEXT BOOK

1. Michael Welzl, **"**Network Congestion Control: Managing Internet Traffic", John Wiley & Sons, May 2005.

REFERENCES

1. Pete Loshin, "TCP/IP Clearly explained", 4th Edition, Morgan Kauffmann Series in Networking, 2003.
2. Martin P. Clark, "Data Networks, IP and the Internet", John Wiley & Sons, 2003.
3. R. Srikant, "The Mathematics of Internet Congestion Control", Springer Publications, 2004.
4. Michael Welzl**,** "Scalable Performance Signalling and Congestion Avoidance", Kluwer Academic Publishers, 2003.

ECS 486: Fuzzy Logic Theory

B.Tech. Semester –VIII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- Understand the concept of fuzziness.
- Acquire adequate knowledge about fuzzy set theory.
- Have a good understanding of the techniques for classification and pattern recognition.
- Gain hands-on experience of using fuzzy logic.

UNIT I: CLASSICAL SETS AND FUZZY SETS

Classical Sets, Operations on Classical Sets, Properties of Classical (Crisp), Mapping of Classical Sets to functions Fuzzy Sets, Fuzzy Set Operations, -Properties of Fuzzy Sets, Alternative Fuzzy Set Operations

UNIT II: CLASSICAL RELATIONS AND FUZZY RELATIONS

Cartesian product, Crisp Relations, Cardinality of Crisp Relations, Operations on Crisp Relations, Properties of Crisp Relations, Composition. Fuzzy Relations, Cardinality of Fuzzy Relations, Operations on Fuzzy Relations, Properties of Fuzzy Relations, Fuzzy Cartesian product and Composition. Tolerance and Equivalence Relations Crisp Equivalence Relation, Crisp Tolerance Relation, Fuzzy Tolerance and Equivalence Relations, Value Assignments

UNIT III: MEMBERSHIP FUNCTIONS AND FUZZIFICATION

Features of the Membership Function, Various Forms, Fuzzification, Defuzzification to Crisp Sets λ-Cuts for Fuzzy Relations, Defuzzification to Scalars, Development of Membership Functions, Automated Methods for Fuzzy Systems

UNIT IV: FUZZY CLASSIFICATION

Classification by Equivalence Relations, Crisp Relations, Fuzzy Relations, Cluster Analysis, Cluster Validity-*c*-Means Clustering, Hard *c*-Means (HCM, Fuzzy *c*-Means (FCM), Fuzzy *c*-Means Algorithm-Classification Metric, Hardening the Fuzzy *c*-Partition -Similarity Relations from Clustering

UNIT V: FUZZY PATTERN RECOGNITION

Feature Analysis, Partitions of the Feature Space, Single, Sample Identification, Multifeature Pattern Recognition, Fuzzy Optimization, One-Dimensional Optimization, Fuzzy Cognitive Mapping, Concept Variables and Causal Relations, Fuzzy Cognitive Maps, Agent-Based Models

TEXT BOOK

1. Timothy J. Ross, “Fuzzy logic with Engineering Applications”, 3rd Edition, Wiley, 2010.

REFERENCES

1. S. N. Sivanandam, S. Sumathi and S. N. Deepa, “Introduction to Fuzzy Logic using MATLAB”, 1st Edition, Springer, 2007.
2. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, 1st Edition, Prentice-Hall of India, 2003.

ECS 487: Grid Computing

B.Tech. Semester –VIII (Computer Science & Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

UNIT I: CONCEPTS AND ARCHITECTURE

Introduction-Parallel and Distributed Computing, Cluster Computing, Grid Computing-Anatomy and Physiology of Grid-Review of Web Services, OGSA, WSRF.

UNIT II: GRID MONITORING

Grid Monitoring Architecture (GMA) , An Overview of Grid Monitoring Systems, Grid ICE, JAMM, MDS-Network Weather Service, R-GMA Other Monitoring Systems-Ganglia and GridMon.

UNIT III: GRID SECURITY AND RESOURCE MANAGEMENT

Grid Security-A Brief Security Primer-PKI-X509 Certificates, Grid Security-Grid Scheduling and Resource Management, Scheduling Paradigms, Working principles of Scheduling, A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

UNIT IV: DATA MANAGEMENT AND GRID PORTALS

Data Management-Categories and Origins of Structured Data-Data Management Challenges, Architectural Approaches, And Collective Data Management Services, Federation Services, Grid Portals-First-Generation Grid Portals, Second-Generation Grid Portals.

UNIT V: GRID MIDDLEWARE

List of globally available Middleware, Case Studies-Recent version of Globus Toolkit and GLite, Architecture, Components and Features.

TEXT BOOK

1. Maozhen Li, Mark Baker, “The Grid Core Technologies”, John Wiley & Sons, 2005.

REFERENCES

1. Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrastructure Morgan Kaufman – 2004.
2. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education 2004.
3. Fran Berman, Geoffrey Fox, Anthony J.G. Hey, “Grid Computing: Making the Global Infrastructure a reality”, John Wiley and sons, 2003.

ECS 488: Query & Transaction Processing

B.Tech. Semester –VIII (Computer Science &Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- Apply principles of query optimization to Object and object relational database.
- Design queries against deductive database.
- Understand concepts of multimedia database and design the image, text, audio and video database
- Construct XML databases.

UNIT I: OBJECT ORIENTED AND OBJECT RELATIONAL DATABASES

Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity and its implementation, Clustering, Equality and Object Reference, Architecture of Object Oriented and Object Relational databases, Persistent Programming Languages, Cache Coherence. Case Studies: Gemstone, O2, Object Store, SQL3, Oracle xxi, DB2.

UNIT II: DEDUCTIVE DATABASES

Data log and Recursion, Evaluation of Data log program, Recursive queries with negation. Parallel and Distributed Databases, Parallel architectures, shared nothing/shared disk/shared memory based architectures, Data partitioning, Intra-operator parallelism, pipelining. Distributed Data Storage, Fragmentation & Replication, Location and Fragment Transparency Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, and Parallel Query Evaluation.

UNIT III: ADVANCED TRANSACTION PROCESSING

Advanced transaction models: Save points, Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors, Shared disk systems.

UNIT IV: ACTIVE DATABASES AND REAL TIME DATABASES

Triggers in SQL, Event Constraint and Action, ECA Rules, Query Processing and Concurrency Control, Recursive query processing, Compensation and Databases Recovery, multi-level recovery.

UNIT V: IMAGE AND MULTIMEDIA DATABASES

Modeling and Storage of Image and Multimedia Data, Data Structures – R-tree, k-d tree, Quad trees, Content Based Retrieval: Color Histograms, Textures, etc., Image Features, Spatial and Topological Relationships, Multimedia Data Formats, Video Data Model, Audio & Handwritten Data, Geographic Information Systems (GIS). WEB Database Accessing Databases through WEB, WEB Servers, XML Databases, Commercial Systems, Oracle xxi, DB2.

TEXT BOOKS

1. Elmasri, “Fundamentals of Database Systems”, 4th Edition, Pearson Education
2. R. Ramakrishnan, “Database Management Systems”, 1998, McGraw Hill International Editions
3. Elmagarmid, A.K. “Database transaction models for advanced applications”,
4. Transaction Processing, Concepts and Techniques, J. Gray and A. Reuter, Morgan Kauffman.
5. S. Abiteboul, R. hull and V. Vianu, “Foundations of Databases”, 1995, Addison – Wesley Publishing Co., Reading Massachusetts

ECS 489: Soft Computing

B.Tech. Semester – VIII (Computer Science &Engg.)

L	T	P
3	1	0

Class Work	**: 50 Marks**
Exam.	**: 100 Marks**
Total	**: 150 Marks**
Duration of Exam	**: 3 Hrs.**

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems
- Implement neural networks to pattern classification and regression problems.
- Apply genetic algorithms to combinatorial optimization problems.
- Effectively use of existing software tools to solve real problems using a soft computing approach.

UNIT I: FUZZY SYSTEMS

Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Decision Making

UNIT II: ARTIFICIAL NEURAL NETWORKS

Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks, Unsupervised Learning Neural Networks

UNIT III: NEURO - FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems, Coactive Neuro-Fuzzy Modeling, Classification and Regression Trees, Data Clustering Algorithms, Rule base Structure Identification, ANFIS Applications using MATLAB.

UNIT IV: GENETIC ALGORITHMS

Evolutionary Computation, Genetic Algorithms, Terminologies and Operators of GA, Ant Colony Optimization, Particle Swarm Optimization, GATool using MATLAB.

UNIT V: APPLICATIONS

Fuzzy Classification, Fuzzy Pattern Recognition, Applications of Neural Networks: Bioinformatics, Knowledge Extraction, Security Systems, Natural Landmark Recognition Task, Applications of Genetic Algorithm: Machine Learning, Image Processing, Data Mining and Wireless Networks.

TEXT BOOK

1. S.N. Sivanandam, S.N. Deepa, “Principles of soft computing”, 1st edition, Wiley-India, 2007.

REFERENCES

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, 3rd Edition, Wiley, 2010.
2. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, 1st Edition, Prentice-Hall of India, 2003.
3. S.N. Sivanandam, S.N. Deepa, “Introduction to Genetic Algorithms”, 1st edition, Springer, 2007.
4. S. N. Sivanandam, S. Sumathi and S. N. Deepa, “Introduction to Fuzzy Logic using MATLAB”, 1st Edition, Springer, 2007.
5. Simon Haykin, “Neural Networks and Learning Machines”, 3rd Edition, Pearson Education, 2008.

PCS 481: Data Warehousing and Data Mining (Pr)

B.Tech. Semester-VIII (Computer Science & Engineering)

L	T	P
-	-	2

Class Work	**: 25 Marks**
Exam.	**: 25 Marks**
Total	**: 50 Marks**
Duration of Exam	**: 3 Hrs**

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- Acquire the basic knowledge of Data Mining
- To learn the specifics of some open source data mining software and carry out experiments on real-world data sets.
- Able to write program on various Clustering Algorithms.
- Able to understand and design the various classifiers.

LIST OF EXPERIMENTS

This laboratory course is a part of the course on "Data Mining". This course will give students an opportunity to learn the specifics of some open source data mining software and carry out experiments on real-world data sets. The students may be asked to do independent project work as a part of this laboratory course. In particular, the students are expected to

1. Learn to install open source data mining software such as Weka, XL Miner etc.
2. Do experiments with respect to
    a. Data preprocessing, attribute oriented analysis and visualization
    b. Mining association rules
    c. Classifier design: Naive Bayes Classifier, Rule based classifiers, Decision Trees and Perceptions (both for binary and multiclass Classification), Random Forests
    d. Evaluation of classifiers
    e. Clustering algorithms: k-means and k-medoids, hierarchical, CLARANS, BIRCH and DBSCAN
    f. Cluster evaluation
3. Extend the data mining algorithms implemented in open source data mining software
4. Propose, implement and test new data mining algorithms
5. Apply the new algorithms to some sample data sets such as KDD CUP data sets and compare them with some existing algorithms

PCS 482: Project-2

B.Tech. Semester-VIII (Computer Science & Engineering)

L	T	P		
-	-	6	**Class Work**	**: 100 Marks**
			Exam.	**: 200 Marks**
			Total	**: 300 Marks**

The object of Project II is to enable the student to extend further the investigative study taken up under *project 1*, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:

- In depth study of the topic assigned in the light of the Report prepared under Project 1.
- Review and finalization of the Approach to the Problem relating to the assigned topic.
- Preparing an *Action Plan* for conducting the investigation, including team work.
- Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed.
- Final development of product/process, testing, results, conclusions and future directions.
- Preparing a paper for Conference presentation/Publication in Journals, if possible.
- Preparing a Dissertation in the standard format for being evaluated by the Department.
- Final Seminar Presentation before a Departmental Committee.