BHARTI UNIVERSITY DURG (C.G.)

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SCHEMEOF EXAMINATION

&

SYLLABUS

Of

M.Tech in CSE

UNDER

FACULTY OF COMPUTER ENGG.

Session 2021-22

(Approved by Board of Studies)

Effective from NOV. 2021

BHARTI UNIVERSITY, DURG

Scheme of Teaching and Examination

M.Tech. (Computer Science & Engineering)

I st Semester

S.N.	Board of Study	Subject Code	Subject Name	Periods per week			Scheme of Exam			Total Marks
				L	T	P	Theory/Practical			
							ESE	CT	TA	
1	Computer Sc.& Engg.	**MT01111**	Advanced Operating System	3	1	-	70	10	20	100
2	Computer Sc.& Engg.	**MT01112**	Java Programmng and Applications	3	1	-	70	10	20	100
3	Computer Sc.& Engg.	**MT01113**	Advanced Computer Architecture	3	1	-	70	10	20	100
4	Computer Sc.& Engg.	**MT01114**	Advanced Computer Networks	3	1	-	70	10	20	100
5	Refer Table – I		Elective –I	3	1	-	70	10	20	100
6	Computer Sc.& Engg.	**MT01116**	Advanced Operating System Lab	-	-	3	70		30	100
7	Computer Sc.& Engg.	**MT01117**	Java Programming and Applications Lab	-	-	3	70		30	100
				15	**5**	**6**	**490**	**50**	**160**	**700**

L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Examination, CT- Class Test, TA- Teacher's Assessment Note: Duration of all theory papers will be of Three Hours.

Table – I			
Elective – I (MT01115)			
S.No.	**Board of Study**	**Code**	**Subject**
1	Computer Science Engineering	**MT01115(1)**	Advanced Digital Communication
2	Computer Science Engineering	**MT01115(2)**	Numerical Computing
3	Computer Science Engineering	**MT01115(3)**	System Simulation
4	Computer Science Engineering	**MT01115(4)**	Analysis and Design of Algorithms
5	Computer Science Engineering	**MT01115(5)**	Digital Signal Processing

Note (1) – $1/4^{th}$ of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a Particular academic session .

Note (2) – Choice of elective course once made for an examination cannot be changed in future examinations.

Semester: M.Tech. I **Branch: Computer Science & Engg.**

Subject: Advanced Operating System **Code: MT01111**

Total Theory Periods: 40 **Total Tutorial Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit – I

Operating System: Definition, Operating System as Resource Manager.

Types of Operating Systems*:* Simple Batch Processing, Multi-programmed Batch Processing, Time Sharing, Personal Computer systems, Parallel, Distributed and Real Time Operating Systems. Operating System Components, Services, Calls, System Programs, Operating System Structure, Virtual Machines, System Design and Implementation.

Process Management: Concepts, Scheduling, Operations, Co-operating processes, Inter-processCommunication.

Threads: Thread usage, threads in User Space, threads in Kernel, Hybrid Implementation, Scheduler Activation, Pop-up threads, Multithreading, CPU Scheduling: Basic Concepts, Scheduling Criteria, Algorithms, Multiple-processor Scheduling, Real Time Scheduling, and Algorithm Evaluation.

Unit - II

Process Synchronization: Critical Section Problem, Synchronization Hardware, Semaphores, Classical problem of synchronization, Critical Regions, Monitors.

Deadlock: Characteristics, Necessary Conditions, Prevention, Avoidance, Detection and Recovery.

Memory Management: Logical and Physical Address Space, Swapping

Contiguous Allocation: Single-partitioned, Multi-partitioned.

Non-contiguous Allocation: Paging, Segmentation, and Segmentation with Paging.

Virtual Memory: Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing,Demand Segmentation.

Unit - III

File and Directory System: File Concepts, Access Methods, Directory Structure, Protection, File system Structure, Allocation Methods, Free Space Management, Directory Implementation, Recovery. **Secondary Storage Management:** Disk Structure, Dedicated, Shared, Virtual, Sequential Access and Random Access Devices, Disk Scheduling, Disk Management, Swap-space Management, Disk Reliability, Stable Storage Management.

Protection and Security: Threats, Intruders, Accidental Data Loss, Cryptography, User Authentication, Attacks from inside the system, Attacks from outside the system, Protection Mechanism, Trusted Systems, Domain of Protection, Access Matrix, Programs Threats, System Threats.

Unit - IV

Distributed systems, topology network types, design strategies, Network operating structure, distributed operating system, remote services, and design issues. Distributed file system: naming and transparency, remote file access, Stateful v/s Stateless Service, File Replication.

Unit - V

Distributed co-ordinations: Event Ordering, Mutual Exclusion, Atomicity, Concurrency Control, Deadlock Handling, Election Algorithms, and Reaching Agreement,Case studies of UNIX and MS-DOS operating system.

Text Books:

1. Silberschatz and Galvin, "Operating System Concepts", Addison-Wesley publishing, Co., 1999.
2. A. S. Tanenbaum, “Modern Operating Systems”, Pearson Education.

References:

1. H.M. Dietel, “An Introduction to Operating System”, Pearson Education.
2. D. M. Dhamdhere, “Operating Systems – A Concept Based Approach”, Tata McGraw-Hill.
3. M. Singhal, N. G. Shivaratri, “Advanced Concepts in Operating Systems”, Tata McGraw -Hill.
4. William Stallings, “Operating Systems”, Pearson Education

Semester: M.Tech. I **Branch: Computer Science & Engg.**

Subject: Java Programming and Applications **Code: MT01112**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit-I

Introduction to Java

Importance and features of Java, Concepts of Java Virtual machine (JVM)

Keywords, Constants, Variables and data types, operators and expressions, Control statements, Conditional statements, loops and iterations. Class definition, adding variables and methods, creating objects, constructors, defining methods, calling methods, method overloading. Creating an array, one and two dimensional array, string array and methods String and String Buffer classes, Wrapper classes.

Unit-II Inheritance

Basic types, super classes, Multilevel hierarchy abstract and final classes, object class, Packages and interfaces, Access protection, extending Interfaces, Exception handling, Fundamental exception types,uncaught exception, throw, throws, final methods, creating own exceptions.

Unit-III

Multithreaded programming

Review of fundamentals, Java thread model, synchronization, messaging, thread class, Run able interface, inter thread communication, Monitors, Deadlock, Producer/ Consumer problems, Wait() and notify(), Performance issues.

Unit-IV Input/output

Basics, Streams, Byte and Character Streams, predefined streams, reading and writing from console and files, using Java packages.

Networking in Java

Networking fundamentals, Client/server model, Internet addresses, Sockets, networking classes and interfaces, using Java.net package, TCP/IP and data gram programming, HTTP protocol

and URLs

Unit-V

Event Handling

Different mechanism, the delegation event model, classes, Event Listener Interfaces, Adapter and Inner classes, Working with windows, graphics and text, using AWT controls, Layout managers and menus, handling Image, animation, sound and video Java Applet, Introduction to Swings, JDBC and Servlets.

Programming Graphical System

Text Book:

1.“Java –2 The Complete Reference” Patrick Naughton and Herbertz Schidt, second edition

References:

1. “Programming with Java” E. Balaguruswamy, Second edition, TMH
2. “HTML 4 Unleashed” Rick Dranell, Second edition, Tec media publication
3. “Dyanmic web publishing Unleashed” Shelley Powers, Second edition, Tec media

Semester: M.Tech. I **Branch: Computer Science & Engg.**

Subject: Advanced Computer Architecture **Code: MT01113**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit - I

Parallel Computer Models:

The state of computing, multiprocessors and multi computers, multivector and SIMD computers, architectural development tracks.

Program and Network Properties:

Conditions of parallelism, program partitioning and scheduling, program flow mechanisms. System Interconnect Architectures. Network properties and routing, static inte rconnection networks and dynamicinterconnection networks, MPI and PVM architecture.

Unit - II

Processors and Memory Hierarchy:

Advanced processor technology- CISC, RISC, Superscalar, Vector, VLIW and symbolic processors, Memory hierarchy technology, Virtual memory technology (Virtual memory models, TLB, paging and segmentation)

Unit - III

Bus, Cache and Shared Memory:

Cache memory organization, shared memory organization, sequential and weak consistency models.

Unit - IV

Pipelining and Super scalar techniques:

Linear Pipeline Processors, Nonlinear Pipeline processors, Instruction Pipeline Design, Arithmetic Pipeline Design

Unit- V

Parallel and Scalable Architecture:

Multiprocessors System Interconnects Cache Coherence and Synchronization Mechanisms, Vector Processing Principles, Multi-vector Multiprocessors and Data Flow Architecture.

Text Book:

1.Kai Hwang “Advanced Computer Architecture”, McGraw Hill.

References:

1. J.P.Hayes “Computer Architecture and Organization”, McGraw Hill.
2. Harvey G. Cragon, “Memory Systems and Pipelined Processors”, Narosa Publication.
3. V. Rajaranam & C.S.R. Murthy, “Parallel Computers”, PHI.
4. R. K. Ghose, Rajan Moona & Phalguni Gupta, “Foundation of Parallel Processing”, NarosaPublications.
5. Kai Hwang and Zu, “Scalable Parallel Computers Architecture”, McGraw Hill.
6. Stalling W., “Computer Organization & Architecture”, PHI.

Semester: M.Tech. I **Branch: Computer Science & Engg.**

Subject: Advanced Computer Networks **Code: MT01114**

Total Theory Periods: 40 **Total Tutorial Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be Conducted: 02

Unit -I

Introduction

Introduction to Network models-ISO-OSI, SNA, Appletalk and TCP/IP models. Fundamentals of digital communication, channel capacity, bit error rate, media characteristics, FDM,TDM,CDMA, statistical multiplexing, point to point and broadcast communication

Queuing Models

Poisson Process, Markov chain, M/M/1 Queue- delay and little's formula. M/M/S/K Queues – average queue length, delay and waiting times.M/G/1 Queues

Unit-II

Data link protocols

Stop and wait protocols and Sliding window protocols - - performance and efficiency. Verification of protocols using Finite State Machines. Multi access protocols – ALOHA and CSMA and its variations. IEEE models and protocols- 802.3,802.4,802.5 and DQDB. Ad hoc networks.

Network layer

Design issues for VC and datagram. Routing algorithms- Dijsktra's , Bellman-Ford, Flooding and broadcasting, link state routing, Flow and congestion control, internetworking, internet architecture andaddressing

Unit-III

Transport layer

Design issues, Connection management, Elements of TCP/IP protocol, Finite state machine model

Session and presentation layer

Dialog management, synchronization and session primitives, presentation concepts, cryptography – DES, DES chaining, AES, Public key methods, MD5. Secure Socket layer

Unit-IV

Application layer

SNMP, SMTP, RMON, DNS, email service, MIME and WWW

Unit-V

Distributed file systems: file service architecture, Sun network file system, Andrew file system.Distributed shared memory: Design and implementation, sequential consistency, ivy, Security: techniques, cryptographic algorithms, digital signatures

Text Books:

1. Andrew S. Tanenbaum " Computer Networks" by Pearson Education ,fourth edition.
2. Bertsekas and Gallagher " Data Networks" by Prentice hall, Second Edition

References:

1. William Stallings " Data and Computer Communication" , by Prentice hall, Seventh edition
2. William Stallings " Cryptography and Network security" by PHI, Third edition
3. Fred Halsall " Data Communications, Computer Networks and Open Systems" by Pearson Education ,Fourth edition
4. William Shay " Understanding data Communication and Networks" by Thomson press , Second edition
5. William Stallings " High speed Networks and Internets" by Pearson education, second edition
6. Leon- Garcia and Widjaja " Computer Networks" by TMH , Second edition

Semester: M.Tech. I **Branch: Computer Science & Engg.**

Subject: Advanced Digital Communication **Code: MT01115(1)**

Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

UNIT - I

Digital Modulation: PCM system, Channel Capacity, delta modulation Adaptive digital waveform codingschemes, Matched filter receiver Coherent Binary: PSK, FSK, QPSK, MSK, DPSK

UNIT - II

Source coding methods: Review of information theory, Huffman and L-Z encoding algorithm Rate distortion theory for optimum quantization, Scalar vector quantization.

UNIT - III

Advanced transmission methods: The signal space concept, Gram-Schmitt procedure, signal space representation of modulated signals, nonlinear modulation method with memory, Error probability and optimum receiver for AWGN channel.

UNIT - IV

Advance transmission methods: - Review of channel coding, convolution encoding and decoding, distance properties, viterbi algorithm and Fano algorithm Trellis coded modulation methods.

UNIT - V

Spread-spectrum methods:-Study of PN sequences, direct sequences methods, Frequency hop method, digital spread spectrum, slow and fast frequency hop, Performance analysis, synchronization methods for spread spectrum. Application of spread spectrum, CDMA.

Text Books:

1. Digital Communication: John G. Prokis (TMG)

2. Digital communication: Simon Haykin (WEP)

Reference Books:

1. Modern communication systems (Principles and application), Leon W. JI Shanmugh

Semester: M.Tech. I **Branch: Computer Science & Engg.**

Subject: Numerical Computing **Code: MT01115(2)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit - I

Computer arithmetic, binary system, octal and hexadecimal systems, floating point arithmetic, errors, machine computation, computer software , Solution of transcendental and polynomial equations, direct and iterative methods, bisection, Regula falsi, secant and Newton's method, Muller method, Chebyshev method, multipoint iteration method, order of iterative method and efficiency considerations, Polynomial equations, Birge-Vieta method, Bairstow method, Graeffe's root square method.

Unit - II

System of linear algebraic equations and Eigen value problems, Gaussian elimination and pivo ting, matrix inversion, triangular factorization, iterative methods, Eigen values and Eigen vectors,Power methods.

Interpolation and approximation, Lagrange's and Newton's interpolation, Hermite interpolation, spline interpolation, least square approxima tion, uniform approximation.

Unit - III

Numerical differentiation and integration, Simpson's rule, trapezoidal rule, Romberg integration, GaussLegendre integration method, double integration.

Unit - IV

Numerical solution of ordinary differential e quations, Euler method, Taylor series method, Runge-Kuttamethod, multistep methods, systems of differential equations, higher order ordinary

differential equations, boundary value problem.

Unit - V

Partial differential equations, difference methods, parabolic equations, one space dimension, convergence hyperbolic and elliptic equations.

Text Book :

1. V. Rajaraman, ”Computer Oriented Numerical Methods”, PHI, New Delhi.

References:

1. J.H. Mathews," Numerical Methods for Computer science, engineering and Mathematics", PHI

2. M K. Jain, S.R.K. Iyengar and R.K. Jain," Numerical Methods for Scientific and EnginerringComputation", Wiley Eastern Limited, New Delhi, 1985.

3. S.C. Chopra and R.P.Canale, ”Numerical Methods for Engineers”, McGraw-Hill, New York.

Semester: M.Tech. I Sem. **Branch: Computer Science & Engg.**

Subject: System Simulation **Code: MT01115(3)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit - I

System Models: The Concept of a System, System Environment, Stochastic Activities, Continuous and Discrete Systems, System Modeling, Types of Models, Principles used in Modeling.

System Studies: Subsystems, A Corporate Model, Types of System Study, System Analysis, SystemDesign, System Postulation.

System Simulation: The Technique of Simulation, The Monte Carlo Method, Comparison of Simulation and Analytical Methods, Typesof System Simulation, Numerical Computation Technique of Continuous Models, Numerical Computation Techniques for Discrete Models, Distributed Lag Models, Cobweb Models, The Process of Simulation.

Unit-II

Continuous System Simulation: Continuous System Mo dels, Differential Equations, Analog Computers, Analog Methods, Hybrid Computers, CSMP III, Hybrid Simulation, Feedback Systems, Simulation of an Autopilot.

System Dynamics: Exponential Growth Models, Exponential Decay Models, Logistic Curves,

Generalization of Growth Models, System Dynamics Diagrams, Multi Segment Models, Feedback in Socio-Economic Systems, A Biological Example, World Models, The Dynamo Language.

Probability concepts in Simulation: Stochastic variables, Discrete and continuous probability functions, numerical evaluation, random number generators, discrete distribution generation.

Unit-III

Introduction To GPSS: GPSS Programs, General Description, Action Times, Succession of Events, Choice of Paths, Simulation of a Manufacturing Shop, Facilities and Storages, Gathering Statistics, Conditional Transfers, Program Control Statements.

GPSS Examples: Priorities and Parameters, SNAs, Functions, Simulation of a Super Market, Transfer Modes, Logic Switches, Testing Conditions, GPSS Model of a Simple Telephone System, Set Operations.

Unit-IV

The Basic Nature of Simulation, When to Simulate ? Simulation of a Single Server Queue, Simulation of a Two Server Queue, Simulation of a More General Queue, Simulation of a PERT Network.

Unit-V

Simulation of a general Inventory System, Simulation of an Inventory Policy(P, Q), Simulation of an Inventory System with Buffer Stock, Simulation Languages.

Text Book :

1. Geoffrey Gordon, System simulation, Prentice Hall of India.
2. Narsingh Deo, System Simulation with Digital Computer, Prentice Hall of India (EEE)

References :

1. Kishore S.Trivedi, Probability and Statistics with reliability, Queuing and Computer Science Applications, Prentice Hall of India (EEE)
2. Jerry Banks, John S. Carson II, Barry L.Nelson, Discrete Event System Simulation, PrenticeHall of India (EEE) 2nd Ed.

Semester: M.Tech. I Sem. **Branch: Computer Science & Engg.**

Subject: Analysis and Design of Algorithms **Code: MT01115(4)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit -I

Algorithm development for problem solving, Analyzing efficiency of algorithm, Asymptotic growth rates. ADT specification and Design Techniques, Elementary ADTs-Lists, trees, Stacks and queues. Recursion and Induction Recursive procedures, Induction proofs, proving Correctness, recurrence relations, recursion trees.

Unit -II

Divide and Conquer technique of problem solving, sorting algorithms : Quicksort, Mergesort, Merging Sorted sequences, Lower brands for sorting, heap sort, shell sort, radix sort, Dynamic sets and searching : Array doubling, Red Black trees, hashing high, priority queues.

Unit -III

Graphs: Definitions and representations, traversal, DFS and BFS. DFS on undirected graphs. **Greedy algorithms:** Prim's algorithm, single source shortest paths, kruskal's minimal spanning trees. Transitive closure, APSP problem, computing transitive closure for matrix operations.

Unit- IV

Dynamic Programming: Sub problem, Graphs and their traversal, multiplying a sequence of matrices,optimal binary search tree construction.

Unit-V

String Matching: Knuth - Moore-Pratt Algorithm, Boyer- Moore Algorithm, P & N P, NP complete algorithms.

Text Book :

1. Sara Baase, Allean Van Gelder : "Computer Algorithms, Introduction to Design and Analysis, 3rd Edition, Pearson Education, Asia.

References :

1. Corman, Leiserson & Rivest : Introduction to Algorithms, PHI publication.
2. Aho, “Data Structures and Algorithms”, Pearson Education.
3. Aho, “Design & Analysis of Computer Algorithms”, Pearson Education.
4. Knuth : “The Art of Programming (Vol I to II), Pearson Education.
5. Mark Allen Weiss “Data Structures and Algorithm Analysis in C”, second edition, Pearson Education

Semester: M.Tech. I Sem. **Branch: Computer Science & Engg.**

Subject: Digital Signal Processing **Code: MT01115(5)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit - I

Discrete Signals and Systems: Basic elements of DSP, Classification of discrete time signals, signal representation, Operation on DTS, Classification of discrete time systems (DTS), Representation of arbitrary sequence, Impulse response and convolution sum, Solution of Difference equation using direct method, FIR and IIR systems, Stable and Unstable systems. Frequency response, Transfer function, correlation and Auto correlation.

The Z- Transforms: Z- Transform and ROC of finite and infinite duration sequence, stability and ROC, Properties of ZT, Inverse Z-Transforms (IZT), Solution of differential equation using ZT, Analysis of LTI system.

Unit - II

Frequency domain representation of Discrete signals: Discrete time Fourier transform (DTFT), Inverse DTFT, Properties of DTFT, Discrete Fourier Transform (DFT), Properties of DFT, IDFT, Twiddle factor, DFT & IDFT using matrix method, circular convolution, Analytical, Graphical and Matrix method for circular convolution, Fast convolution, Fast Fourier transform (FFT), Radix – 2 FFT, DIT-FFT, DIT-IFFT, DIF-FFT, Radix –2 DIF – IFFT, Composite radix FFT, Applications of FFT.

Unit - III

Implementation of discrete-time systems:

Block diagram and signal flow graph representation of IIR and FIR filters, Realization of IIR filters Direct –I, Direct- II, Cascade, Parallel, Ladder and Transposed Realization), Realization of FIR filters (Direct, Cascade and linear phase FIR structure). Design of digital

filter, specification of FIR filters, General consideration, design of FIR filters, Symmetric and antisymemmetric FIR filter, Design of FIR filter using Windows, Frequency sampling method, Hilbert Transformers.

Unit - IV

Filter Design Technique: Design of DTIIR filters. From continuous time filters, Introduction to analog filters for designing Digital filters (Butter worth and chebyshev fi lters), filters design using Impulse invariant, Bilinear Z transform, Matched Z-Transform and Approximation of derivatives methods, frequency transformation, Frequency Transformations, Design of IIR Filters in frequency Domain, Difference between FIR and IIR filters.

Unit - V

Real time DSP Systems: Real time DSP systems: DSP and its benefits, key DSP operations, Typical Real time DSP system, ADC process, Uniform and Nonuniform quantization and Encoding DAC Process, Signal recovery, sampling of low pass and Band pass signals, Digital signal processors, Evaluation boards for real time signal processing, TMS320C10 forget board, DSP application, Adaptive removal of ocular artifacts from human EEGs: Multirate Digital Signal Processing, Decimation by factor D,Interpolation by factor I, Filter and implementation for sampling rate conversion, multistage implementation of sampling rate convertion, sampling rate conversion of band pass signals, Application of Multirate signal processing.

Text Books:

1. Proakis J.G. and D.G. Manolakis, "Digital Signal Processing", Prentice Hall of India, New Delhi, 1999
2. Ifeachor Emmanuel C. and Barrie W. Jervis, "Digital Signal Processing A Practical Approach" PearsonEducation Ltd., Fifth Indian Reprint, 2005.

Reference Books:

1. Jonsson Jonny, "Digital Signal Processing", Tata Mc Graw Hill Publication.
3. Schafer R.W. and A.V. Oppehbein, "Digital Signal Processing", Prentice Hall of India, New Delhi, 1999

4. Kue R., “Introduction to Digital Signal Processing”, Mc Graw Hill, New York 1988.
5. Porat B., “A course in DSP John Wiley & Sons, Inc., New York, 1997.
6. Bregham E.O., “Fast Fourier Transform” IEEE Spectrum, 1969.
7. Bose N.K. “Digital Filters: Theory & Application” Elsevier, New York, 1995.
8. Hayes Manson H., “Digital Signal Processing”, Tata Mc Graw Hill publication.

Semester: M.Tech. I Sem. **Branch: Computer Science & Engg.**

Subject: Advanced Operating System Lab **Code: MT01116**

Total Practical Periods: 40

Total Marks in end Semester Exam. 70

Experiments to be Performed

- Write a program for the implementation of various CPU scheduling algorithms (FCFS, SJF, Priority).
- Write a program for the implementation of various page replacement algorithms (FIFO , Optimal, LRU).
- Write a program for the implementation of Readers Writers problem.
- Write a program for the implementation of Banker's algorithm.
- Write a program to simulate the concept of semaphores.
- Write a program to simulate the conce pt of inter process communication.
- Write a program for the implementation of various memory allocation algorithms (First fit, Best fit, Worst fit).
- Write a program for the implementation of various Disk scheduling algorithms (FCFS, SCAN, SSTF, C- SCAN).
- Write a program for the implementation of Producer-Consumer problem.
- Write a program for the implementation of Fork and V-fork of Unix operating system

Semester: M.Tech. I Sem. **Branch: Computer Science & Engg.**

Subject: Java Programming and Applications – Lab **Code: MT01117**

Total Practical Periods: 40

Total Marks in end Semester Exam. 70

Experiments to be Performed

- Write a program for matrix multiplication. Use InputStreamReader and Buffered Reader classesfor Input/Output.

- Write a program to create a user defined Exception when the user inputs the marks which exceed more than 100.

- Write a program to animate a string on Applet. Use the concept of Multithreading.

- Write a program to design a calculator using the AWT controls provided in Java.

- Write a program for Client Server communication using either UDP or TCP protocols. Use ServerSocket and Socket classes.

- Write a program to create some of the features of Notepad. Use Swings for designing this application.

- Create functions like multiply ,addition and subtraction respectively. Invoke these functions from remote system by using the concept of Remote Method Invocation in Java.

- Create a form containing fields name and password respectively, using applet as a container The input entered in these fields should be stored in the database .Use JDBC connectivity for implementing this program.

- Write a program to create a small portal which contains the registration form of students. Use Servlets and JDBC.
- Write a program create a bean component in Java for addition of two numbers

BHARTI UNIVERSITY, DURG

Scheme of Teaching and Examination

M. Tech (Computer Science & Engineering)

Semester II

S.N.	Board of Study	Subject Code	Subject Name	Periods per week			Scheme of Exam			Total Marks
							Theory/Practical			
				L	T	P	ESE	CT	TA	
1	Computer Sc. &Engg.	**MT01121**	A. I. and Applications	3	1	-	70	10	20	100
2	Computer Sc. &Engg.	**MT01122**	Advanced Database Management System	3	1	-	70	10	20	100
3	Computer Sc. &Engg.	**MT01123**	Software Engineering Techniques	3	1	-	70	10	20	100
4	Computer Sc. &Engg.	**MT01124**	Computer Graphics &Multimedia	3	1	-	70	10	20	100
5	Refer Table – II		Elective –II	3	1	-	70	10	20	100
6	Computer Sc. &Engg.	**MT01126**	Advanced Database Management System Lab	--	-	3	70		30	100
7	Computer Sc. &Engg.	**MT01127**	Computer Graphics &Multimedia Lab	-	-	3	70		30	100
TOTAL				**15**	**5**	**6**	**490**	**50**	**160**	**700**

L-Lecture, T- Tutorial, P - Practical, ESE- End Semester Examination, CT- Class Test, TA- Teacher's Assessment

Note : Duration of all theory papers will be of Three Hours.

Table – II			
Elective –II (MT01125)			
S.No.	**Board of Study**	**Code**	**Subject**
1	Computer Science Engineering	**MT01125(1)**	Neural Networks
2	Computer Science Engineering	**MT01125(2)**	Cryptography & Network Security
3	Computer Science Engineering	**MT01125(3)**	Distributed Computing
4	Computer Science Engineering	**MT01125(4)**	Cellular mobile Communication (Prerequisite Advanced Digital Communication)
5	Computer Science Engineering	**MT01125(5)**	Digital Image Processing (Prerequisite Digital Signal Processing)

Note (1) – $1/4^{th}$ of total strength of students subject to minimum of twenty students is required to offer an elective in the colle ge in a Particular academic session .

Note (2) – Choice of elective course once made for an examination cannot be changed in future examinations.

Semester: M.Tech. II Sem. **Branch: Com puter Science Engg.**

Subject: A.I. and Applications **Code: MT01121**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit-1 Introduction: Introduction to intelligent agents Problem solving:

Solving problems by searching : state space formulation, depth first and breadth first search, iterativedeepening

Unit-2 Intelligent search methods:

A* and its memory restricted variants

Production systems:

Design imp lementation and limitations, case studies

Unit-3 Game Playing:

Minimax, alpha-beta pruning

Knowledge and reasoning:

Propositional and first order logic, semantic networks, building a knowledge base, inference in first order logic, logical reasoning systems

Unit-4 Learning from observations:

Inductive learning, learning decision trees, computational learning theory, Explanation based learning

Unit-5 Applications:

Environmental Science, Robotics, Aerospace, Medical Science etc.

Text/Reference Books:

1. "AI, a modern approach" by Russel and Norvig, Pearson Education
2. "AI" by Rich and Knight, Tata McGraw Hill
3. "Neural Networks in Computer Intelligence" by KM Fu, McGraw Hill

Semester: M.Tech. II Sem. **Branch: Computer Science Engg.**

Subject: Advanced Database Management System **Code: MT01122**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit-I Relational Databases

Integrity Constraint revisited: Functional, Muiltivalued and Join Dependency, Template Algebraic, Inclusion and Generalized Functional Dependency, Chase Algorithms.

Query Processing and Optimization: Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Limitations of Relational Data Model, Nuill Values and Partial Information.

Unit-II Deductive Databases

Datalog and Recursion, Evaluation of Datalog program, Recursive queries with negation.

Objected Oriented and Object Relational Databases

Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases.

Case Studies: Gemstone, O2, Object Store, SQL3, Oracle xxi, DB2

Unit-III Parallel and Distributed Databases

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, Parallel Query Evaluation.

Unit-IV Advanced Transaction Processing

Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors.

Unit-V Active Database and Real Time Databases

Triggers in SQL, Event Constraint and Action : ECA Rules, Query Processing and Concurrency Control, Compensation and Databases Recovery

WEB Database

Accessing Databases through WEB, WEB Servers, XML Databases, Commercial Systems – Oracle xxi, DB2.

Data Warehousing

Data Warehousing Architecture, Multidimensional Data Model, Update Propagation OLAP Queries.

Text Books

1. Elmarsi, "Fundamentals of Database Systems", 4 th Edition, Pearson Education
2. R. Ramakrishnan, "Database Management Systems", 1998, McGraw Hill International Editions

References:

1. Date, "Introduction to Database System", 7th Edition
2. S. Abiteboul, R. hull and V. Vianu, "Foundations of Databases", 1995, Addison–Wesley Publishing Co., Reading Massachutts
3. W. Kim, "Modern Database Systems", 1995, ACM Press, Addision – Wesley,
4. D. Maier, "The Theory of Relational Databases", 1993, Computer Science Press, Rokville, Maryland

Semester: M.Tech. II Sem. **Branch: Computer Science & Engg.**

Subject: Software Engineering Techniques **Code: MT01123**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

UNIT – I Introduction to Software Engineering:

Introduction, Total Effort devoted to Software, Distribution of Effort, Project size Categories, Quality and Productivity Factors, Managerial Issues.

Planning a Software Project:

Goals and Requirements, Developing a Solution Strategy, The Phased Life-Cycle Model, Milestones, Documents, and Reviews, The Cost Model, The Prototype Life-Cycle Model, Successive Versions, Planning an Organizational Structure, Planning for Configuration Management and Quality Assurance, Planning for Independent Verification and Validation, Planning Phase-Dependent Tools and Techniques.

UNIT – II Software Cost Estimation:

Software Cost Factors, Software Cost Estimation Techniques, Expert Judgment, Delphi Cost Estimation, Work Breakdown Structure, Algorithmic Cost Models, Staffing Level Estimation, Estimating Software Maintenance Costs.

Software Requirements Definition:

The Software Requirements Specification, Formal Specification Techniques :

Relational Notations - Implicit Equations/Recurrence Relations/Agebraic Axioms/ Regular Expressions; State- Oriented Notations - Decision Tables/ Event Tables / Transition Tables /Finite-state Mechanisms/Petri Nets.

UNIT – III Software Design:

Fundamental Design Concepts, Modules and Modularization Criteria, Design Notations, Design Techniques, Detailed Design Considerations, Real-Time and Distributed System Design, Test Plans, Milestones, Walkthroughs, and Inspections, Design Guidelines.

UNIT – IV Implementation Issues:

Structured Coding Techniques, Coding Style, Standards and Guidelines, Documentation Guidelines.

Modern Programming Language Features:

Type Checking, User Defined Date Types, Data Abstraction, Scoping Rules, Exception Handling.

UNIT – V Verification and Validation Techniques:

Quality Assurance, Walkthroughs and Inspections, Unit Testing and Debugging, System Testing.

Software Maintenance:

Enhancing Maintainability during Development, Managerial Aspects of Software Maintenance, Configuration Management, Source-Code Metrics.

Text Books:

1. R. S. Pressman, "Software Engineering – A practitioner's approach", 5th ed., McGraw Hill Int. Ed., 2001
2. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International, 2001.
3. R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.

References:

1. P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.
2. Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, 1996.
3. James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons
4. Sommerville, "Software Engineering ", 6th ed. Pearson Education, 2002.

Semester: M.Tech. II Sem. **Branch: Computer Science & Engg.**

Subject: Computer Graphics & Multimedia **Code: MT01124**

Total Theory Periods: 40 **Total Tutorial Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit-1 Line Drawing and transformation:

Basic raster graphical algorithm for 2D primitives, Line drawing algorithm, 2D and 3D transformation

Clipping:

Window, Viewport, Clipping algorithm,

Unit-2 Curves and Surfaces:

Circle drawing algorithm, Ellipse drawing algorithm, Bezier curve, b-spline curve, surfaces, Solid modeling

Projection:

Parallel projection, Perspective projection , Computation of vanishing point

Visible surface determination:

Z-buffer algorithm, Scan line algorithm, Area subdivision algorithm, Raytracing algorithm

Unit-3 Shading:

Illumination mode, Specular reflection model, Shading models for curve surfaces, Radiosity method, Rendering, Recursive ray tracing, Texture mapping

Unit-4 Animation

3D animation, morphing, simulation of key frames, Procedural animation, Image Transformation – Translation and Rotation, Morphing, Motion Control , Key framing, Spline Driven Animation, Arc length parameterization.

Unit-5 Multimedia

Data Compression requirement , Information Theory based and frequency domain based

compression, Basic compression techniques: lossy & lossless compression, Huffman coding, LZW coding , run length coding, DCT, compression of multimedia data.

Text Books:

1. Foley - Computer Graphics Principles & Practice, 2nd ed. Pearson Education.
2. Hearn & Baker - Computer Graphics C version, 2 nd ed. Pearson Education.
3. Woo-Open GL Programming Language version1.2,3rd edition Pearson Education
4. Hill-Computer Graphics using open GL 2nd edition Pearson Education
5. Prabhat K.Andleigh, Kiran.Thakrar-Multimedia System Design, 3rd edition PHI

References:

1. Roger and Adams - Mathematical Element for Computer Graphics, 2nd ed., Tata McGraw Hill
2. Rogers – Procedural Element for Computer Graphics, 2 nd ed., Tata McGraw Hill.

Semester: M.Tech. II Sem. **Branch: Computer Science & Engg.**

Subject: Neural Networks **Code: MT01125(1)**

Total Theory Periods: 40 **Total Tutorial Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit-1 Introduction:

History, overview of biological Neuro-System, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning.

Unit-2 Supervised Learning and Neurodynamics:

Perceptron training rules, Delta, Back propagation training algorithm, Hopfield Networks, Associative Memories.

Unit-3 Unsupervised and Hybrid Learning:

Principal Component Analysis, Self-organizing Feature Maps, ART networks, LVQ,

Unit-4 Application:

Applications of Artificial Neural Networks to Function Approximation, Regression, Classification, Blind Source Separation, Time Series and Forecasting.

Unit-5 Radial-Basis function networks

Radial-Basis function (RBF) networks and their application in function interpolation, approximation and modeling probability distributions.

Recurrent networks

Hopfield networks.

Text Book:

1. Anderson J.A., “An Introduction to Neural Networks”, PHI, 1999.

References:

1. Haykin S., "Neural Networks-A Comprehensive Foundations", Prentice -Hall International, NewJersey, 1999.
2. Freeman J.A., D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison-Wesley, Reading, Mass, (1992).
3. Golden R.M., "Mathematical Methods for Neural Network Analysis and Design", MIT Press,Cambridge, MA, 1996.
4. Cherkassky V., F. Kulier, "Learning from Data-Concepts, Theory and Methods", John Wiley, NewYork, 1998.
5. Anderson J.A., E. Rosenfield, "Neurocomputing: Foundatiions of Research, MIT Press, Cambridge, MA, 1988.
6. Kohonen T., "Self-Organizing Maps", 2 nd Ed., Springer Verlag, Berlin, 1997.
7. Patterson D.W., "Artificial Neural Networks: Theory and Applications", Prentice Hall,

Semester: M.Tech. II Sem. **Branch: Computer Science & Engg.**

Subject: Cryptography & Network Security **Code: MT01125(2)**

Total Theory Periods: 40 **Total Tutorial Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit-1 Foundations of Cryptography and Security :

Ciphers and Secret Messages ,Security Attacks and Services , Mathematical Tools for Cryptography ,Substitutions and Permutations ,Modular Arithmetic, Euclid's Algorithm Finite Fields, Polynomial Arithmetic ,Discrete Logarithms

Unit-2 Conventional Symmetric Encryption Algorithms :

Theory of Block Cipher Design ,Feistel Cipher Network Structures ,DES and Triple DES Modes of Operation (ECB,CBC, OFB,CFB) ,Strength (or Not) of DES ,Modern Symmetric Encryption Algorithms ,IDEA, CAST, Blowfish, Twofish ,RC2, RC5, Rijndael (AES)

Unit-3 Key Distribution

Stream Ciphers and Pseudo Random Numbers :Pseudo random sequences ,Linear Congruential generators ,Cryptographic Generators ,Design of Stream Cipher, One Time Pad , Public Key cryptography .Prime Numbers and Testing for Primality ,Factoring Large Numbers ,RSA, Diffie-Hellman, ElGamal Key Exchange Algorithms ,Public-Key Cryptography Standards

Unit-4 Hashes and Message Digests :

Message Authentication ,MD5, SHA, RIPEMD, HMAC , Mid-term Exam , Digital Signatures, Certificates, User Authentication ,Digital Signature Standard (DSS and DSA). Security Handshake Pitfalls ,Elliptic Curve Cryptosystems , Authentication of Systems ,Kerberos V4 and V5 ,X.509 Authentication Service .

Unit-5 Electronic Mail Security :

Pretty Good Privacy (PGP) ,S/MIME, X.400 ,(3/30) IP and Web Security,IPSec and Virtual

Private Networks ,Secure Sockets and Transport Layer (SSL and TLS) Security .

Text Book:

1. Cryptography and Network Security, William Stallings.

Semester: M.Tech. II Sem. **Branch: Computer Science & Engg.**

Subject: Distributed Computing **Code: MT01125(3)**

Total Theory Periods: 40 **Total Tutorial Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit-1 Fundamentals of Distributed Computing:

Architectural models for distributed and mobile computing systems. Basic concepts in distributed computing such as clocks, message ordering, consistent global states, and consensus.

Unit-2 Basic Algorithms in Message:

Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Fault-Tolerant Consensus, Causality and Time. Message Passing: PVM and MPI.

Unit-3 Distributed Operating Systems:

OS and network operating systems, Distributed File systems. Middleware, client/server model for computing, common layer application protocols (RPC, RMI, streams), distributed processes, network naming, distributed synchronization and distributed object-based systems.

Unit-4 Simulation:

A Formal Model for Simulations, Broadcast and Multicast, Distributed Shared Memory, Fault-Tolerant Simulations of Read/Write Objects Simulating Synchrony, Improving the Fault Tolerance of Algorithms, Fault-Tolerant Clock Synchronization.

Distributed Environments:

Current systems and developments (DCE, CORBA, JAVA).

Unit-5 Advanced Topics:

Randomization, Wait-Free Simulations of Arbitrary Objects, Problems Solvable in Asynchronous Systems, Solving Consensus in Eventually Stable Systems, High Performance Computing-HPF, Distributed and mobile multimedia systems. Adaptability in Mobile Computing. Grid Computing and applications. Fault tolerant Computing Systems.

Text /Reference Books:

1. Hagit Attiya, Jennifer Welch, Distributed Computing: Fundamentals, Simulations, and

AdvancedTopics, 2nd Edition, March 2004

2. Mullendar S. Distributed Systems, 2nd Ed. Addison, Wesley 1994.
3. Tannenbaum, A. Distributed Operating Systems, Prentice Hall 1995.
4. Helal, Abdelsalam A. *et al.* Anytime, Anywhere Computing: Mobile Computing Concepts andTechnology, Kluwer Academic Publishers 1999.
5. George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems: Concepts and Design
6. *Third Edition* Addison-Wesley, Pearson Education, 2001.
7. Cay S Horstmann and Gary Cornell, Java 2 Vol I and II-Sun Micro Systems-2001

Semester: M.Tech. II Sem. **Branch: Computer Science & Engg.**

Subject: Cellular Mobile Communication

(Prerequisite Advanced Digital Communication) **Code: MT01125(4)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit-1 Wireless and Mobile Network Architecture:

Principle of Cellular Communication, Overview 1G, 2G, 2.5G and 3G and 4G technologies. GSM Architecture and Mobility management, hand off management, Network signalling. Mobile Computing fundamental challenges, Mobile Devices –PDA and mobile OS, PalmOs, Win CE and Symbian.

Unit-2 Mobile IP Protocol Architecture :

Mobile IP and IP v 6 and its application in mobile computing. Cellular Digital Packet Data CDPD, VOIP, GPRS Services, Wireless Local Loop-WLL system.

Unit-3 Wireless Application Protocol (WAP):

The Wireless Application Protocol application environment, wireless application protocol client software, hardware and websites, wireless application protocol gateways, implementing enterprise wireless application protocol strategy,

Unit-4 Wireless Markup Language:

An Introduction to Wireless Technologies, Markup Languages , An Introduction to XML, Fundamentals of WML., Writing and Formatting Text , Navigating Between Cards and Decks, Displaying Images, Tables, Using Variables, Acquiring User Input.

Wireless Markup Language Script:

An Introduction to WMLScript, WMLScript Control Structures, Events, Phone.com Extensions, Usability.

Unit-5 Application of Mobile computing:

ASP and Dynamic WAP Sites, XML and XSLT, Dynamic WML Generation with ASP and XSLT, Developing WAP Applications using Emulators.

Text/Reference Books:

1. Yi Bing Lin, "Wireless and Mobile Networks Architecture", John Wiley.
2. Wrox "The Beginning WML and WML Script", Wrox Publication
3. Tomasz Imielinski et.al, Mobile Computing, Kluwer Aca demic Press 1996.
4. Uwe Hansmann, Pervasive Computing Handbook. The Mobile World, IEE publication 2002

Semester: M.Tech. II Sem. **Branch: Computer Science & Engg.**

Subject: Digital Image Processing **Code:MT01125(5)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

UNIT - I

Digital image representation, elements of digital processing systems, sampling and quantization, simple image model, basic relationship between pixel and image geometry

UNIT - II

Image transforms ,introduction to Fourier transform, DFT, properties of 2D DFT, FFT, other separable image transform, DCT, DST, Walsh, Harr transforms

UNIT - III

Image enhancement: basic gray level transformation , histogram processing using arithmetic and logical operations, spatial filtering , smoothening and sharpening filters , smoothing and sharpening frequency domain filters.

UNIT - IV

Image compression-fundamentals , image compression models, information theory ,free compression , lossy compression, image compression standards.

UNIT - V

Image segmentation- detection of discontinuities, edge lending and boundary detection, region based segmentation.

representation and description: representation, boundary descriptor, regional descriptor.

Text Books:

1. Digital image procesing: r.c. gonzalez,r.e. wooden, 2nd edition Pearson

2. Fundament of DIP, A.K. Jain(PHI).

Semester: M.Tech. II Sem. **Branch: Computer Science & Engg.**

Subject: Advanced Database Management System – Lab **Code: MT01126**

Total Practical Periods: 40

Total Marks in end Semester Exam.: 70

Experiment to be performed

1. Introduction to Oracle9i.
2. Intoduction to DML commands.
3. Introduction to select command (including sub queries).
4. Consider the following table (ticket detail table):

Name of field	**Datatype**
Ticket_no	Number(5)
Name	Varchar2(20)
Sex	Char(5)
Age	Number(3)
Fare	Number(5,2)

Write a PL/SQL block to give the details of passengers from ticket_detail table. 5. Consider the following table(item)

Name of field	Datatype
Order_id	Number(4)
Item_id	Number(4)
Detail_price	Number(5)
Qty	Number(5)
Prod_id	Number(4)

Write a PL/SQL block(using cursor), which will select only those rows where Order_id is zero from the item table.

1. Write a PL/SQL block(using cursor) that will select only those values from the item table where Item_idis 3000 and calculate total to be price*auantity and print the value of the same. If a value is not to be found then an appropriate message should be displayed.)

2. Create a transparent audit system for a table Client Master. The system must keep track of records that are being deleted or updated. The functionality being when a record is deleted or modified the original record details and the date of operation are stored in table audit_client,then the delete or updateis allowed to go through.

Client_master table

Field name	Datatype(size)	Attributes
Client_no	Varchar2(6)	Primary key/first letter must start with 'C'
Name	Varchar2(20)	Not null
Address1 Address2	Varchar2(30) Varchar2(30)	
City	Varchar2(15)	
State	Varchar2(15)	
Pincode	Number(6)	
Bal_due	Number(10,2)	

Audit_client table

Field name	Datatype (size)	Attributes
Client_no	Varchar2(6)	
Name	Varchar2(20)	
Bal_due	Number(10,2)	
Operation	Varchar2(8)	
Userid	Varchar2(20)	
Odate	date	

3. Write a PL/SQL code block that will accept

i. an Account_id, the type of transaction ,the amount involved and whether the amount to be debited to or credited to an account number.

ii. the balance in accounts table for the corresponding account number is updated.

iii. before the update is fired, the record is viewed in the 'for update nowait mode' so that a lock can be acquired on the record to be updated and no other user has access to the same record till the transaction is completed.

Field name	Datatype
Account_id	Varchar2(6)
Name	Varchar2(30)
Bal	Number(20)

4. Write a procedure to process a select statement to pass values from database columns to the local variables, the columns or expressions must be associated with local variables.

5. Introduction to privileged commands.

Semester: M.Tech. II Sem. **Branch: Computer Science & Engg.**

Subject: Computer Graphic Multimedia – Lab **Code: MT01127**

Total Practical Periods: 40

Total Marks in end Semester Exam.: 70

Experiment to be performed

1. Write a program for scaling a triangle.
2. Write a program for drawing a smooth shaded rectangle.
3. Write a program for implementing a sphere using lighting model.
4. Write a program for displaying a stroked font.
5. Write a program for texture mapped check board.
6. Write a program for drawing Bezier curve using four control points.
7. Write a program for drawing a shaded Bezier surface using a mesh.
8. Write a program for implementing a transformed cube.
9. Write a program for implementing planetary system.
10. Write a program for implementing a pick square

BHARTI UNIVERSITY, DURG

M.Tech (Computer Science & Engineering)

III Semester

Scheme of Teaching and Examination

S.N.	Board of Study	Subject Code	Subject Name	Periods per week			Scheme of Exam			Total Marks
				L	T	P	Theory/Practical			
							ESE	CT	TA	
1	Computer Sc. Engg	**MT01131**	Data Warehousing &Data Mining	3	1	-	70	10	20	100
2	Refer Table –III		Elective –III	3	1	-	70	10	20	100
3	Computer Sc. Engg	**MT01133**	Preliminary work onDissertation	-	-	28	140	-	60	200
4	Computer Sc. Engg	**MT01134**	Seminar based on Dissertation	-	-	3	-	-	100	100
Total				**6**	**2**	**31**	**280**	**20**	**200**	**500**

L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Examination, CT- Class Test, TA- Teacher'sAssessment

Table – III			
Elective –III(MT0132)			
S.No.	**Board of Study**	**Code**	**Subject**
1	Computer Science Engineering	**MT01132(1)**	Embedded Systems
2	Computer Science Engineering	**MT01132(2)**	Object Oriented Software Engineering
3	Computer Science Engineering	**MT01132(3)**	Enterprise Resource Planning
4	Computer Science Engineering	**MT01132(4)**	Mobile Computing
5	Computer Science Engineering	**MT01132(5)**	Multimedia and Wireless Technology

Note (1) – $1/4^{th}$ of total strength of students subject to minimum of twenty students is required to offer anelective in the college in a Particular academic session .

Note (2) – Choice of elective course once made for an examination cannot be changed in future examinations.

Semester: M.Tech. III Sem. **Branch: Computer Science & Engg.**

Subject: Data Warehousing & Data Mining **Code: MT01131**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam. 70

Minimum number of class tests to be conducted: 02

Unit – I Data Warehousing:

Introduction to Data Warehousing: Evolution of Data Warehousing, Data Warehousing concepts, Benefits of Data Warehousing, Comparison of OLTP and Data Warehousing, Problems of Data Warehousing.

Data Warehousing Architecture

Architecture: Operational Data and Data store, Load Manager, Warehouse Manager, Query Manager, Detailed Data, Lightly and Highly summarized Data, Archive/Backup Data, Meta-Data, architecture model, 2-tier, 3-tier and 4-tier data warehouse, End user Access tools.

Unit – II Data Warehousing Tools and Technology

Tools and Technologies: Extraction, cleaning and Transformation tools, Data Warehouse DBMS, Data Warehouse Meta-Data, Administration and management tools, operational vs. information systems.

OLAP & DSS support in data warehouse.

Unit-3 Types of Data Warehouses & Data Warehouse Design

Host based, single stage, LAN based, Multistage, stationary distributed & virtual data-warehouses. Data warehousing Design: Designing Data warehouse Database, Database Design Methodology for Data Warehouses, Data Warehousing design Using Oracle.

Unit-4 Data Mining

Basic Data Mining tasks, Knowledge discovery in databases, Issues, OLTP systems, Fuzzy sets and Fuzzy logic, Information Retrieval, Dimensional Modeling, OLAP, Web search engines, Data Mining Techniques

Unit-5 Classification

Statistical based algorithms, Distance based algorithms

Clustering

Minimum Spanning tree, K-means clustering, Nearest neighbor algorithm

Association Rules

Large items sets, Basic Algorithms

Web Mining

Text Books:

1. "Building the Data Warehouse", W.H.Inmon, 3rd Edition, John Wiley & Sons.
2. "Developing the Data Warehouse", W.H.Inmon, C.Kelly, John Wiley & Sons.
3. Thomas Connoly, Carolyn Begg-"Database Systems-A practical approach to Design, Implementation andmanagement" 3rd Edition Pearson Education
4. "Data Mining- Introductory and Advanced Topics", Margaret H. Dunham, Pearson Education

References:

1. W.H.Inmon, C.L.Gassey, "Managing the Data Warehouse", John Wiley & Sons.
2. Fayyad, Usama M. et. al., "Advances in knowledge discovery & Data Mining", MIT Press.
3. Arun K. Pujari, Data Mining Techniques , University press (India) Pvt. Ltd. ,Hyderabad

Semester: M.Tech. III Sem. **Branch: Computer Science & Engg.**

Subject: Embedded Systems **Code: MT01132(1)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam. 70

Minimum number of class tests to be conducted: 02

Unit – I Software and hardware aspects of Embedded system

The concepts of embedded system design, Embedded microcontroller cores, embedded memories, examples of embedded systems.

Technological aspects of embedded system: interfacing between analog and digital blocks, signal conditioning, Digital signal processing, subsystem interfacing, interfacing with external systems, user interfacing, Design tradeoffs due to process compatibility, Thermal consideration etc.

Software aspects of embedded systems: real time programming languages and operating systems.

Unit- II

Introduction, CPU architecture, registers, instruction sets addressing modes Loop timing, timers, Interrupts, Interrupt timing, I/o Expansion, I2C Bus Operation Serial EEPROM, Analog to digital converter, UART Baud Rate-Data Handling-Initialisation, Special Features - serial Programming-Parallel Slave Port.

Unit-III

Motorola MC68H11 Family Architecture Registers, Addressing modes Programs. Interfacing methods parallel I/o interface, Parallel Port interfaces, Memory Interfacing, High Speed I/o Interfacing, Interrupts- interrupt service routine-features of interrupts-Interrupt vector and Priority, timing generation and measurements, Input capture, Output compare, Frequency Measurement, Serial I/o devices RS.232, RS.485. Analog Interfacing, Applications. ARM processors.

Unit-IV Embedded system development

Embedded system evolution trends. Round - Robin, robin with Interrupts, function-One-Scheduling Architecture, Algorithms. Introduction to-assembler-compiler-cross compilers and

Integrated Development Environment (IDE). Object Oriented Interfacing, Recursion, Debugging strategies, Simulators.

Unit-V RTOS & its overview:

Real Time Operating System: Task and Task States, tasks and data, semaphores and shared Data Operating system Services-Message queues-Timer Function-Events-Memory Management, Interrupt Routines in an RTOS environment, basic design Using RTOS.

Text Books:

1. David E Simon, " An embedded software primer ", Pearson education Asia, 2001.
2. John B Peat man " Design with Microcontroller ", Pearson education Asia, 1998.
3. Jonartthan W. Valvano Brooks/cole " Embedded Micro computer Systems. Real time Interfacing", Thomson learning 2001.

References:

1. Burns, Alan and Wellings, Andy, " Real-Time Systems and Programming Languages", SecondEdition. Harlow: Addison-Wesley-Longman, 1997.
2. Raymond J.A. Bhur and Donald L.Bialey, " An Introduction to real time systems: Design tonetworking with C/C++ ", Prentice Hall Inc. New Jersey, 1999.
3. Grehan Moore, and Cyliax, " Real time Programming: A guide to 32 Bit Embedded

Semester: M.Tech. III Sem. **Branch: Computer Science & Engg.**

Subject: Object Oriented Software Engineering **Code: MT01132(2)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam. 70

Minimum number of class tests to be conducted: 02

Unit-1 Introduction to Software Engineering:

Software Engineering Development, Software Life Cycle Models, Standards for developing life cycle models.

Unit-2 Object Methodology & Requirement Elicitation:

Introduction to Object Oriented Methodology, Overview of Requirements Elicitation, and Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation

Unit-3 Architecture:

Model Architecture, Requirements Model, Analysis Model, Design Model, Implementation Model, Test Model

Modeling with UML:

Basic Building Blocks of UML, A Conceptual Model of UML, Basic Structural Modeling, UML Diagrams

Unit-4 System Analysis:

Analysis Model, Dynamic Modeling & Testing

System Design:

Design concepts & activities, Design models, Block design, Testing

Unit-5 Component Based Computing

Fundamentals: Definition and nature of components, components and interfaces, Interfaces as contracts, the benefits of components.

Basic Techniques: component design and assembly, Relationship with the client-server model and with patterns, Use of objects and object lifecycle services, use of object brokers

Text/Reference Books:

1. Stephen R. Scach, "Classical & Object Oriented Software Engineering with UML and Java",McGraw Hill, 1999.
2. Ivar Jacobson, Magnus Christerson, et. al. "Object Oriented Software Engineering: A use CaseDriven approach" Addison wisely, 1992

Semester: **M.Tech. III Sem.** **Branch: Computer Science & Engg**

Subject: Enterprise Resource Planning **Code: MT01132(3)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit-1 Introduction to ERP:

Evolution, What is ERP? Reasons for the growth of ERP market, the advantages of ERP; Enterprise – An overview: Integrated Management Information, Business Modeling, Integrated Data Model.

Unit-2 ERP & Related Technologies:

BPR, MIS, DSS, EIS, Data Warehousing, Data Mining, OLAP, SCM; ERP – A Manufacturing Perspective: MRP, BOM, MRP- II, DRP, JIT and Kanban , CAD/CAM, PDM , MTO, MTS, ATO, ETO, CTO

Unit-3 ERP Modules:

Finance, Plant Maintenance, Quality Management, Materials Management; Benefits of ERP.

ERP Markets:

SAP AG, Baan Company, Oracle Corporation, PeopleSoft, JD Edwards, SSA , QAD.

Unit-4 ERP Implementation Lifecycle:

Pre-evaluation screening, Package evaluation, Project planning phase, Gap Analysis, Reengineering, Configuration, Training, Testing, Going Live, Post implementation; Vendors, Consultants and Users.

Unit-5 Future Directions in ERP:

New Markets, New channels, Faster implementation methodologies, Business models and BAPIs, convergence on windows NT, Application platforms, New Business Segments, Web Enabling, Market Snapshots.

ERP case studies

Text Books:

1. Enterprise Resource Planning, Alexis Leon, Tata McGraw Hill.
2. Enterprise Resource Planning Concepts & Practice, 2nd Edition, Vinod Kumar Garg, N.K.VenkitaKrishan.

References:

1. Concepts in ERP, Vikas Publication, Thomson , Monk & Brady.

Semester: M.Tech. III Sem. **Branch: Computer Science Engg.**

Subject: Mobile Computing **Code: MT01132(4)**

Total Theory Periods: 40 **Total Tut Periods: 12**

Total Marks in end Semester Exam. 70

Minimum number of class tests to be conducted: 02

Unit-1

Issues in Mobile Computing, Overview of wireless Telephony, IEEE 802.11 & Blue Tooth, Wireless Multiple access protocols, channel Allocation in cellular systems.

Unit-2

Data Management Issues, data replication for mobile computers, adaptive Clustering for Mobile Wireless networks.

Unit-3

Distributed location Management, pointer forwarding strategies, Energy Efficient Indexing on air, Energy Indexing for wireless broadcast data, Mobile IP, TCP Over wireless.

Unit-4

Mobile Agents Computing, Security and fault tolerance, transaction processing in Mobile computing environment.

Unit-5

Ad hoc network, Routing Protocol, Global State Routing (GSR), Dynamic State Routing (DSR), Fisheye State Routing (FSR), Ad hoc On-Demand Distance Vector (AODV), Destination Sequenced Distance – Vector Routing (DSDV).

Text Books:

1. Mobile Communication by Jochen Schiller, Prentice Hall

Semester: M.Tech. III Sem. **Branch: Computer Science Engg.**

Subject: Multimedia and Wireless Technology **Code: MT01132(5)**

Total Theory Periods: 40 **Total Tutor Periods: 12**

Total Marks in end Semester Exam.: 70

Minimum number of class tests to be conducted: 02

Unit -1 Multimedia Applications and Quality of Service (QoS)

Multimedia Applications, Applications, Main Protocols, Quality of Service Fundamentals, Introduction QoS Parameters, Multimedia Application Requirements, QoS Services, Realization of QoS Services, QoS Mechanisms Introduction, Classification, Channel Access Mechanism, Packet Scheduling Mechanisms, Traffic Policing ,Mechanism, Resource Reservation Signaling Mechanisms, Admission Control

Unit -2 Multimedia Coding Techniques for Wireless Networks

Introduction ,Digital Multimedia and the Need for Compression ,Standardization Activities Basics of Compression, Entropy, Entropy Reduction and ,Entropy Coding , General Compression Scheme , Understanding Speech Characteristics ,Speech Generation and Perception ,Digital Speech ,Speech Modeling and Linear Prediction, General Aspects of Speech Compression ,Three Types of Speech Compressors , Waveform Compression ,Open-Loop Vocoders: Analysis – Synthesis Coders Closed Loop Coders: Analysis by Synthesis Coding ,Speech Coding Standards ,Understanding Video Characteristics

Unit -3 Multimedia Transport Protocols for Wireless Networks

Introduction ,Networked Multimedia-based Services ,Time Relations in Multimedia ,Non-Real-time and Real-time Multimedia Services , CBR vs. VBR Encoding for Video ,Transmission of VBR Content Over Constant, Rate Channels ,Classification of Real-time Services, One-Way Streaming , Media on Demand (MoD) Delivery ,Conversational Communication ,Adaptation at the Video Encoding Level ,Non-adaptive Encoding , Adaptive Encoding ,Scalable/Layered Encoding ,Quality of Service Issues for Real-time Multimedia Services , Bandwidth Availability , Delay and Jitter , Recovering Losses

Unit-4 Multimedia Control Protocols for Wireless Networks

Introduction ,A Premier on the Control Plane of Existing Multimedia Standards , ITU Protocols for Videoconferencing on Packet-switched Networks ,IETF Multimedia Internetworking Protocols , Control Protocols for Wireless Networks,Protocol for Describing Multimedia Sessions: SDP , The Syntax of SDP Messages , SDP Examples ,Control Protocols for Media Streaming , RSTP Operation ,RTSP Messages, RTSP Methods ,Session Setup: The Session Initiation Protocol (SIP) , Components , SIP Messages , Addresses , Address Resolution , Session Setup , Session Termination and Cancellation ,Advanced SIP Features for Wireless Networks

Unit-5 Wireless Multimedia Personal Area Networks

Introduction ,Multimedia Information Representation , Bluetooth1 (IEEE 802.15.1) ,The Bluetooth1 Protocol Stack , Physical Layer Details ,Description of Bluetooth1 Links and Packets , Link Manager , Secret Discovery and Connection Establishment , TXOP Limit vs. Medium Accessing,Bluetooth1 Security

Application Areas ,Coexistence with Wireless LANs (IEEE 802.15.2) , Overview of 802.11 Standard , 802.11b and Bluetooth1 Interference Basics ,Coexistence Framework,High-Rate WPANs (IEEE 802.15.3) , Physical Layer ,Network Architecture Basics , Piconet Formation and Maintenance

Text Books:

1) Multimedia Wireless By Ali,Kohen, Willey Eastern

Scheme of teaching and examination

M. Tech. (Computer Science & Engineering)

Fourth Semester.

S.N.	Board of Study	Subject Code	Subject Name	Periods per week			Scheme of Exam			Total Marks
				L	T	P	Theory/Practical			
							ESE	CT	TA	
1	Computer Sc. & Engg.	**MT01141**	Major Project+ Seminar	6		34	350		150	500
Total				**6**	**-**	**34**	**350**		**150**	**500**

L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Examination, CT- Class Test, TA- Teacher's Assessment

Scheme of marks Allotment

Semester	Total Marks	Grand Total
I	700	2400
II	700	
III	500	
IV	500	