Department of Computer Science & Engineering
MATS University
Aarang, Raipur (C.G.)

Syllabus Scheme of B. Tech.
VI Semester

S. No.	Code	Subject	Periods per Week			Scheme of Marks		Total Credit
			L	T	P	ESE	IM	
1.	BT620	Advanced Computer Network	4	0	-	70	30	4
2.	BT621	Compiler Design	4	0	-	70	30	4
3.	BT622	Operation Research	3	0	-	70	30	3
4.	BT623	Software Engineering & Project Management	3	0	-	70	30	3
5.	BT624	Computer Graphics	4	0	-	70	30	4
6.	**BT625x**	**Professional Elective – I**	3	0	-	70	30	3
7.	BT626	Computer Network Lab	-	-	2	30	20	1
8.	BT627	Software Engineering & Project Management Lab	-	-	2	30	20	1
9.	BT628	Computer Graphics Lab	-	-	2	30	20	1
10.	BT629	Minor Project	-	-	3	30	20	2
		Total	**21**	**0**	**9**	**540**	**260**	**26**

L – Lecture, T – Tutorial, ESE – End Semester Examination, P – Practical, IM – Internal Marks

Professional Elective – I

Subject Code	Subject Name
BT6251	Digital Signal Processing
BT6252	Object Oriented Database Management System
BT6253	Distributed Operating System
BT6254	Multimedia & Virtual Reality
BT6255	Software Testing

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ADVANCED COMPUTER NETWORK (BT620)

Course Objective:

1. To study advanced background on computer networking topics.
2. To learn about high speed networks.
3. To get idea of congestion control in networks.
4. To study integrated and differentiated services.

UNIT – I HIGH SPEED NETWORKS

Frame Relay Networks, Asynchronous transfer mode, ATM Protocol Architecture, ATM Logical Connection, ATM Cell, ATM Service Categories, AAL, High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fiber Channel, and Wireless LAN.

UNIT – II CONGESTION AND TRAFFIC MANAGEMENT

Queuing Analysis, Queuing Models, Single Server Queues, Effects of Congestion, Congestion Control, Traffic Management, Congestion Control in Packet Switching Networks, Frame Relay Congestion Control.

UNIT – III TCP AND ATM CONGESTION CONTROL

TCP Flow control, TCP Congestion Control, Retransmission, Timer Management, Exponential RTO back off, KARN's Algorithm, Window Management, Performance of TCP over ATM, 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 Service Architecture, Approach, Components, Services Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ, Random Early Detection, Differentiated Services.

UNIT – V PROTOCOLS FOR QoS SUPPORT

RSVP, Goals & Characteristics, Data Flow, RSVP Operations, Protocol Mechanisms, Multiprotocol Label Switching, Operations, Label Stacking, Protocol Details, RTP, Protocol Architecture, Data Transfer Protocol, RTCP.

Text Book:

1. High Speed Networks and Internet, William Stallings, Pearson Education, Second Edition, 2002.

Reference Books:

1. High Performance Communication Networks, Warland & Pravin Varaiya, Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. MPLS and VPN Architecture,Irvan Pepelnjk, Jim Guichard and Jeff Apcar, Cisco Press, Volume 1 and 2, 2003.

Course Outcome:

After completion of the course study, students will be able to

1. Explain advanced networking topics.
2. Implement congestion control while deploying a network.
3. Explain integrated and differentiated services.

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COMPILER DESIGN (BT 621)

Course Objective:

1. To understand the fundamental principles of Compiler Design.
2. To provide the concepts required for building compilers.

UNIT – I INTRODUCTION

Introduction to Compiler, Translators, Interpreter, Cousins of Compiler, Single and Multi-Pass Compilers, Phases of Compilers, Compiler Construction Tools, Bootstrapping, Cross Compilers Lexical Analyzer: Role of Lexical Analyzer, Specification of Tokens, Recognition of Tokens, Regular Expression, Finite Automata, Regular Expression to Finite Automata Transition Diagrams, Tool for Lexical Analyzer LEX. Context Free Grammars (CFG), Simplification of CFGs, Ambiguity, Left Factoring, Left Recursion.

UNIT – II SYNTAX ANALYSIS AND PARSING TECHNIQUES

Introduction to Parsing Techniques, Bottom-Up Parsing and Top Down Parsing, Top Down Parsing: Recursive Descent Parsing, Predicative Parsing ,Bottom Up Parsing : Operator Precedence Parsing, LR Parsers, Construction of SLR, Canonical LR and LALR Parsing Tables, Construction of SLR Parse Tables For Ambiguous Grammar, The Parser Generator Tools – YACC, Error Recovery in Top Down and Bottom Up Parsing.

UNIT – III SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION

Syntax Directed Definitions, Synthesized and Inherited Attributes, Dependency Graph, Construction of Syntax Trees, Bottom Up and Top Down Evaluation of Attributes, S-Attributed And L-Attributed Definitions, Postfix Notation, Three Address Codes, Quadruples, Triples And Indirect Triples, Translation of Assignment Statements, Control Flow, Boolean Expression, Case Statements And Procedure Calls.

UNIT – IV TYPE CHEKING AND RUNTIME ENVIRONMENTS

Introduction, Simple Type Checker, Type Conversions, Overloading of Functions and Operators, Source Language Issues, Storage Organization, Storage Allocation Strategies, Parameter Passing, Symbol Tables, Dynamic Storage Allocation Techniques,

UNIT – V CODE OPTIMIZATION & CODE GENERATION

Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Loop Optimization, Global Data Flow Analysis, Loop Invariant Computations, DAG Representation of Basic Blocks, Peephole Optimization, Issue in the Design of Code Generator, Register Allocation, The Target Machine, and Simple Code Generator.

Text Books:

1. Compilers-Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi and Ullman J.D.,Addison Wesley.
2. Principle of Compiler Design, Alfred V. Aho, and J.D. Ullman, Narosa Publication.

Reference Books:

1. Compiler design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
3. Compiler Design-Principles and Practice by Kenneth C. Louden

Course Outcome:

After completion of the course study, students will be able to

1. Have knowledge of the underlying machine architecture.
2. Design a compiler.

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OPERATION RESEARCH (BT622)

Course Objective:

1. To introduce quantitative methods and techniques for effective decisions making, model formulation and applications used in solving business decision problems.
2. To evaluate the computational performance through optimization techniques.
3. To learn about network management.

UNIT – I LINEAR PROGRAMMING

LP formulations, Graphical method for solving LP with 2 variables, Simplex method, Application of simplex method for maximization and minimization of LP problems, Artificial variable technique for finding the initial basic feasible solution, The Big-M method, Degeneracy in simplex method, Duality theory in LP, Dual simplex method.

UNIT – II TRANSPORTATION MODEL

North-West comer rule, Least cost method, Vogel's Approximation method, Modi Method, Assignment problem, Dynamic Programming: Basic concepts, Bellman's optimality principle, Dynamic programming approach in decision making, Optimal subdivision problem.

UNIT – III INVENTORY MODELS

Introduction to the inventory problem, Deterministic models, The classical EOQ (Economic order quantity) model, Purchasing model with no shortage, Manufacturing model with no shortage, purchasing model with shortage, Manufacturing model with shortage, Inventory models with probabilistic demand.

UNIT – IV SEQUENCING AND QUEUING THEORY

Sequencing problem, Johnson's algorithm for processing N-jobs through 2 machine problem, N-jobs through 3 machine problems, 2-job through N machine by graphical method, Characteristics of queuing system, Steady state M/M/1, M/M/1K and M/M/C queuing models.

UNIT – V CPM AND PERT

Arrow network, Time estimation: Earliest expected time, Latest allowable occurrence time and slack, Critical path, Probability of meeting scheduled date of completion of project, Calculation on CPM network, Various floats for activities, Critical Path, Updating project, Operation time cost trade off curve & project time cost trade off curve, Selection of schedule based on cost analysis.

Text Books:

1. Operation Research-2ed, Panneerselvam, Prentice Hall of India
2. Operation Research: An Introduction – 8rd,Hamdy a.Taha, Prentice Hall of India

Reference Books:

1. Introduction to Operation Research- A Computer Oriented algorithmic approach, Gillett B.E, McGraw Hill.
2. Operations Research, Kanti Swarup, Gupta, P.K.,Man Mohan, Sultan Chand & Sons.
3. Quantitative Techniques in Managemental, Vohra N. D., TMH.
4. Linear& Integer Programming, Zoints S., Prentice Hall.

Course Outcome:

After completion of the course study, students will be able to

1. To identify and develop operational research models from the real world.
2. To solve optimization problems by the use of mathematical models and tools.
3. Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management engineering.

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SOFTWARE ENGINEERING & PROJECT MANAGEMENT (BT623)

Course Objective:

1. To introduce concept of software project
2. To learn the different software processes & their uses.
3. To understand good coding practices, documentation, contracts, regression tests and daily builds.
4. To study ethical and professional issues and its concern to software engineers.
5. To understand how Software Engineering & Project Management is concerned with theories, methods and tools for professional software development.

UNIT – I SOFTWARE PROCESS

Introduction: S/W Engineering Paradigm, Life Models: Water Fall, Incremental, Spiral, WINWIN Spiral, Evolutionary, Prototyping, Object Oriented System, Computer Based System, Verification, Validation, Life Cycle Process, Development Process, System Engineering Hierarchy.

UNIT – II SOFTWARE REQUIREMENTS

Functional and Non-functional, User System Requirement, Engineering process, Feasibility studies: Requirements, Elicitation, Validation and Management, Software prototyping: Prototyping in the software Process, Rapid prototyping techniques, User interface prototyping, S/W document. Analysis and modeling: Data, Functional and Behavioral models structured analysis and data dictionary.

UNIT – III DESIGN CONCEPTS AND PRINCIPLES

Design Process and Concepts: Modular Design, Design Heuristic, Design Model and Document, Architectural Design, Software Architecture Data Design, Architectural Design Transform and Transaction Marring, User Interface Design, User Interface Design Principles Acquisitions System, Monitoring and Control System. SCM: Need for SCM, Version Control, Introduction to SCM Process, Software Configuration Items.

UNIT – IV TESTING & MAINTENANCE

Taxonomy of Software Testing: Levels, Test Activities, Types of S/W Testing: Black Box Testing, Testing Boundary Condition, Structural Testing: Test Coverage Criteria Based on Data Flow Mechanisms, Regression Testing: Testing in the large S/W, Testing Strategies, Strategic Approach and Issue, Unit Testing, Integration Testing, Validation Testing, System Testing and Debugging.

UNIT – V SOFTWARE PROJECT MANAGEMENT

Measures and Measurements: S/W Complexity And Science Measure, Size Measure, Data And Logic Structure Measure, Information Flow Measure, Software Cost Estimation, Function Oriented Model, COCOMO Model, Delphi Method, Defining a Task Network, Scheduling Earned Value Analysis, Error Tracking, Software Changes, Program Evolution Dynamics Software Maintenance, Architectural Evolution, Taxonomy Of CASE Tools.

Text Books:

1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition. McGrawHill International Edition, 2005.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.

Reference Books:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008.
3. Fundamentals of Software Engineering, Rajib Mall,PHI, 2005.
4. Software Engineering, Principles and Practices,Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

Course Outcome:

After completion of the course study, students will be able to

1. Select and implement different software development process models.
2. Extract and analyze software requirements specifications for different projects.
3. Define the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.
4. Apply different testing and debugging techniques and analyze their effectiveness.
5. Analyze software risks and risk management strategies.

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COMPUTER GRAPHICS (BT624)

Course Objective:

1. To learn basic principles of Computer Graphics.
2. To learn how various objects can be created by using Computer Graphics.
3. To study color and shading in created computer objects.
4. To study basics of animation.

UNIT – I OVERVIEW OF GRAPHICS SYSTEM

Introduction, Video display devices, Input devices, Raster scan & Random scan system, Line-Circle-Ellipse generating algorithms, Filled area primitives, 2-D & 3-D transformation, Clipping: Point Clipping, Line Clipping: 2-D Cyrus Beck line clipping, Liang Barsky line clipping, Cohen Sutherland, Polygon clipping: Sutherland Hodgeman & Weiler-Atherton polygon clipping.

UNIT – II CURVES & SURFACES

Conics-Parametric forms for Circle, Ellipse, Parabola, Bezier Curves-Need for cubic parametric curves C^0, C^1, and C^2 continuity, Generation though Bernstein polynomials, Condition for smooth joining of 2 segments, Convex Hull property, B-Spline Curves: Knot vectors-uniform and open uniform curves, Uniform, Periodic B-splines, Open, Uniform B-splines, Non-uniform, rational B-splines, Beta splines, Subdividing curves, Drawing curves using forward differences.

UNIT – III PROJECTIONS & HIDDEN SURFACE REMOVAL

3-D Transformation for right handed co-ordinate system (Z-axis towards viewer), Parallel projection on xy-plane (including oblique view), Perspective projection-1, 2, and 3 Vanishing points, Handling points at infinity, Reconstruction of 3-D images. Hidden Surface Removal: Back face removal, Floating Horizon method for curved objects, Z-Buffer or depth buffer algorithm, Painter's algorithm (Depth sorting method), Binary Space Partitioning trees, Scanline algorithm, Warnock's algorithm.

UNIT – IV SHADING & COLOR ISSUES

Illumination model for Diffused & Specular reflection, Computing reflection vector, Gouraud and Phong shading, Band Illusion, Lateral inhibition, Texture mapping & their characteristics, Parametric Texture mapping, 2D Texture mapping and Bump mapping, Handling shadows, Radiosity: Lambert's Law, Basic element, Recapitulation, Modeling transparency, Visualization of data sets, Volume rendering, Color issues: Additive, Subtractive primaries, Wavelength spectrum, JCM color. .

UNIT – V FRACTALS & ANIMATION

Fractals: Self similar fractals, fractal dimension, Generation of Terrain-random midpoint displacement, Grammar based models, Self-squaring fractals. Soild Modeling: Generation through sweep techniques, Constructive solid geometry, B representations, Octrees, Ray Tracing & their Theory, Animation: In-between using rotation and translation, Procedural animation, Image Transformation: Translation and rotation, Morphing, Motion Control (Key framing), Spline Driven animation, Arc length parameterization, Velocity curves, Euler angles and use of quaternion.

Text Books:

1. Computer graphics, Hearn and Baker, PHI
2. Computer Graphics, Foley, PE-LPE,

Reference Books:

1. Procedural Elements of Computer graphics, Rogers, McGraw Hill
2. Computer graphics, Harringtons S., McGraw Hill.
3. Computer Graphics , Schaum's Outline, McGraw Hill.

Course Outcome:

After completion of the course study, students will be able to

1. Describe the general software architecture of programs that use 2D/3D computer graphics.
2. Discuss hardware system architecture for computer graphics.
3. Use the underlying algorithms, mathematical concepts, supporting computer graphics.

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COMPUTER NETWORK LAB (BT626)

1. Introduction to Local Area Network with its cables, connectors and topologies.
2. Installation of Switch, Hub their cascading and network mapping.
3. Installation of UTP, Co-axial cable, Cross cable, parallel cable NIC and LAN card.
4. Case Study of Ethernet (10 base 5,10 base 2,10 base T)
5. Installation and working of Net meeting and Remote Desktop.
6. Installation and working with Telnet (Terminal Network).
7. Installation and working with FTP (File Transfer Protocol).
8. Installation and Computers via serial or Parallel ports and enable the computers to share disk and printer port.
9. To connect two Personal Computer with Telephone line.
10. Installation of Modem and Proxy Server.
11. Working with Null Modem.
12. Installation of Windows 2003 server/ Windows 200 server.
13. Configuration of DHCP.
14. Introduction to Server administration.

Recommended Book:

Computer Network and internet by Dougles E. Comer (Pearson Education)

List of Software required:

Windows 2003 server/ Windows 2000 server.

List of Hardware required:

LAN Trainer Kit LAN Card Cable, Connectors, HUB, Switch, Crimping Tools.

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SOFTWARE ENGINEERING & PROJECT MANAGEMENT LAB (BT627)

1. Phases in software development: project, overview, need, coverage of topics.
2. To assign the requirement engineering tasks.
3. To perform the system analysis: Requirement analysis, SRS.
4. To perform the function oriented diagram: DFD and Structured chart.
5. To perform the user's view analysis: use case diagram.
6. To draw the structural view diagram: class diagram, object diagram.
7. To draw the behavioral view diagram: Sequence diagram, Collaboration diagram.
8. To draw the behavioral view diagram: State-chart diagram, Activity diagram.
9. To draw the implementation view diagram: Component diagram.
10. To draw the environmental view diagram: Deployment diagram.
11. To perform various testing using the testing tool unit testing, integration testing.

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COMPUTER GRAPHICS LAB (BT628)

1. Write a program to draw a line using DDA algorithm.
2. Write a program to draw the line using Bresenham's algorithm
3. Write a program to draw the circle using Bresenham's algorithm.
4. Write a program to draw the circle using Mid Point algorithm.
5. Write a program to draw ellipse using Mid Point algorithm.
6. Write a program for translation of a line.
7. Write a program for rotation of a triangle.
8. Write a program for scaling of a rectangle.
9. Write a program for shearing of a rectangle.
10. Write a program to implement Boundary Fill algorithm.
11. Write a program to implement Flood Fill algorithm.
12. Write a program to implement Bezier curve having four control points.
13. Write a program to implement Cohen Sutherland line clipping algorithm.
14. Write a program to implement Liang Barsky line clipping algorithm.
15. Write a program to implement face of a cartoon.

References:

1. Computer Graphics, Schaum Outlines, McGraw Hill.
2. Computer Graphics & Multimedia, G. S. Baluja –Dhanpat Rai & CO.
3. Computer Graphics, Donald Hearn & M Pauline Baker-Pearson Pvt. Ltd.

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MINOR PROJECT (BT629)

Allocation of project:

1. Information regarding broad area must be made available to the students well in advance .
2. Information must cover following parameters.
   i. **Broad Area**: Subject or expertise/application area.
   ii. **Required skills**: Knowledge of subject(s), software, tools & other characteristics.
   iii. **Type of project**: Hardware, Software, Design, Survey, Study Based etc.
   iv. **Guide Available**: Name of Guide (S) from Department & Institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HoD) concern.
5. One project group must contain maximum three students.

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However printing and binding would be as per the conventional format.
3. Evaluation will be based on live demonstration / presentation and Viva.
4. Final submission of project is expected as:
   i. One copy to the Institution central library,
   ii. One copy to the department.

External Evaluation:

External assessment of project would be like conduction of practical exams of University, and must be executed as per the norms of practical exams.

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DIGITAL SIGNAL PROCESSING (BT6251)

Course Objective:

1. To introduce the fundamental concepts and applications of digital signal processing.
2. To study analysis and synthesis algorithms and systems that process discrete time signals, with emphasis on realization and implementation.

UNIT – I DISCRETE-TIME SIGNALS

Signal Classifications, Frequency Domain Representation, Time Domain Representation, and Representation of sequences by Fourier transform, Properties of Fourier transform, Discrete Time Random Signals, Energy and Power Theorems.

UNIT – II SAMPLING OF TIME SIGNALS

Sampling theorem and its application, Frequency Domain Representation of Sampling and Reconstruction of Band Limited Signal from its Samples, Discrete Time Processing of Continuous Time Signals, changing the sampling rate using Discrete Time Processing.

UNIT – III Z-TRANSFORM

Introduction: Properties of the Region of Convergence, Properties of the Z-Transform, Inversion of the Z-Transform, Applications of Z-Transform.

UNIT – IV BASICS OF DIGITAL FILTERS

Classification, Properties, Time Invariant system, Finite Impulse Response (FIR) system, Infinite Impulse Response (IIR) system, fundamentals of digital filtering, various types of digital filters, design techniques of digital filters: Window technique for FIR, Bi-linear transformation and backward difference methods for IIR filter design, Analysis of finite word length effects in DSP, DSP algorithm implementation consideration, Applications of DSP.

UNIT – V DISCRETE AND FAST FOURIER TRANSFORM

DFT and FFT: Discrete Fourier transforms properties of DFT, Circular convolution, Linear convolution using DFT, Fast Fourier transform: Radix 2 FFT algorithm, Decimation in time, Decimation in frequency, Bit reversal.

Text Books:

1. Digital Signal Processing, Proakis and Manolakis, Pearson.
2. Digital Signal Processing, S. Salivahanan, A. Vallavaraj and C. Gnanapriya, TMH.

Reference Books:

1. Digital Signal Processing, Alon V. Oppenhelm, Ronald W. Schafer, PHI.
2. Digital Signal processing , Sanjit K. Mitra, TMH.

Course Outcome:

After completion of the course study, students will be able to

1. Describe and analyze discrete time signals in the time domain and frequency domain.
2. Apply digital signal processing techniques to analyze & design discrete time signals and systems.
3. Design and apply digital filters

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OBJECT ORIENTED DATABASE MANAGEMENT SYSTEM (BT6252)

Course Objective:

1. To discuss the requirements for advanced database features in database applications.
2. To study the concept of Parallel and Distributed Database.
3. To understand the enhanced data models for advanced applications of DBMS.
4. To examine the concepts of various emerging database technologies.

UNIT – I THE EXTENDED ENTITY- RELATIONSHIP MODEL AND OBJECT MODEL

The ER Model Revisited, Motivation for Complex Data Types, User Defined Abstract Data Types and Structured Types, Subclasses, Super Classes, Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization And Generalization, Relationship, Types of degree higher than Two.

UNIT – II OBJECT ORIENTED DATABASES

Overview of Object-Oriented Concepts, Object Identity, Object Structure, and Type Constructors, Encapsulation of Operations, Methods, and Persistence, Type Hierarchies and Inheritance, Type extents and Queries, Complex objects; Database schema design for OODBMS; OQL, Persistent programming languages; OODBMS architecture and Storage Issues; Transactions and Concurrency Control, Example of ODBMS.

UNIT – III OBJECT RELATIONAL AND EXTENDED RELATIONAL DATABASES

Database Design for an ORDBMS – Nested Relations and Collections; Storage and Access methods, Query Processing and Optimization; An overview of SQL3, Implementation issues for extended type; Systems Comparison of RDBMS, OODBMS, and ORDBMS.

UNIT – IV PARALLEL AND DISTRIBUTED DATABASE AND CLIENT SERVER ARCHITECTURE

Architectures for Parallel Databases, Parallel Query Evaluation; Parallelizing Individual Operations, Sorting, Joins; Distributed Database Concepts, Data Fragmentation, Replication, and Allocation Techniques for Distributed Database Design; Query Processing in Distributed Databases; Concurrency Control and Recovery in Distributed Databases, An Overview of Client-Server Architecture.

UNIT – V DATABASES ON THE WEB AND SEMI STRUCTURED DATA

Web Interfaces to the Web, Overview of XML; Structure of XML Data, Document Schema, Querying XML Data; Storage of XML Data, XML Applications; Semi Structured Data Model, Implementation Issues, Indexes for Text Data, Enhanced Data Models for Advanced Applications: Active Database Concepts, Temporal Database Concepts, Spatial Databases, Concepts And Architecture; Deductive Databases And Query Processing; Mobile Databases, Geographic Information Systems.

Text Books:

1. Object Oriented Interfaces and Databases, Rajesh Narang, Prentice Hall of India.
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw-Hill.

Reference Books:

1. Fundamentals of Database Systems, Elmasri and Navathe, Pearson Education.
2. Database System Concepts, Korth, Silberchatz, Sudarshan, McGraw-Hill.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the needs and concepts of object-oriented database, spatial database, web database, data warehousing and data mining.
2. Analyze, design and evaluate the construct of various advanced databases topics such as Object Oriented, Object Relational, Semi Structured, Unstructured and Distributed Databases.
3. Implement practical solutions to complex database problems using OO/OR database, spatial database, data warehousing and data mining approaches.

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DISTRIBUTED OPERATING SYSTEM (BT6253)

Course Objective:

1. To give basics of Distributed Operating System.
2. To study the communication in distributed system.
3. To learn about inter-process communication in distributed environment.
4. To have concepts of distributed shared memory and distributed file systems.

UNIT – I INTRODUCTION

Distributed Operating System: Concepts and Definition, Goals, Examples of Distributed Operating Systems, Hardware Concepts, Software Concepts, Architectural Model of Distributed System, and Design Issues.

UNIT – II COMMUNICATION IN DISTRIBUTED SYSTEM

Communication in Distributed Systems, Computer Network & Layered Protocols, Message Passing and Related Issues, Synchronization, Client Server Model & its Implementation, Remote Procedure call, Group communication, Case Studies: SUN RPC.

UNIT – III PROCESS MANAGEMENT & SYNCHRONIZATION

Process and Processors in Distributed System Threads, System Models, Processors Allocation, Scheduling in Distributed System, Fault Tolerance, Real Time Distributed System, Synchronization in Distributed System, Clock Synchronization, Mutual Exclusion, Election algorithms, Atomic transactions, Deadlocks in Distributed Systems.

UNIT – IV DISTRIBUTED SHARED MEMORY

Introduction, General Architecture of DSM Systems, Design and Implementation Issues of DSM, Granularity, Structure of Shared Memory Space, Consistency Models, Replacement Strategy, and Thrashing.

UNIT – V DISTRIBUTED FILE SYSTEMS

Distributed File Systems, Distributed File System Design, Distributed File System Implementation, Trends in Distributed File System.

Text Books:

1. Distributed Operating Systems, A. S. Tanenbaum, Pearson.
2. Distributed Operating Systems Concepts and Design, Pradeep K. Sinha, PHI.

Reference Books:

1. Advanced Concepts in Operating Systems, M. Singhal and N. G. Shivaratna, McGraw-Hill.
2. Distributed Systems: Concepts ad Design, George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair, Pearson Education.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the concepts of Distributed System (Hardware, Software, and Operating System).
2. Summarize the major security issues associated with distributed systems along with the system security techniques.
3. Apply standard design principles in the construction of Distributed Operating Systems.

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MULTIMEDIA AND VIRTUAL REALITY (BT6254)

Course Objective:

1. To study the fundamental concept of multimedia and virtual reality.
2. To study issues and problems in the representation, manipulation, and delivery of multimedia content.
3. To understand the concepts of multimedia components.
4. To study application areas of Multimedia & Virtual Reality System.

UNIT –I INTRODUCTION

Concept of Multimedia, Media & Data Stream, Properties of Multimedia System, Data Stream Characteristics of Continuous Media, Multimedia Applications, Hardware and Software Requirements, Multimedia Products & its Evolution.

UNIT – II COMPONENTS OF MULTIMEDIA

Text, Basic Sound Concepts, MIDI, Speech, Basic Concept of Images, Graphics Format, Overview of Image Processing, Basic Concepts of Video & Animation, Conventional System, Transmission, Enhanced System, High Definition System, Computer Based Animation, Design & Authoring Tools, Categories of Authority Tools, Types of products.

UNIT – III DATA COMPRESSION

Coding Requirement, Source, Entropy, Hybrid Coding, JPEG, MPEG, Text Compression using Static Huffmann Technique, Dynamic Huffmann Technique, and Statistical Coding Techniques.

UNIT – IV OPTICAL STORAGE MEDIA

Videodisk and other WORMS, Compact Disk Digital Audio, Advantage of CD-DA Frames tracks blocks of CD-DA, CD-ROM, CD-Rom based developments, Principles of CDWO, Prospects of CD Technologies.

UNIT – V VIRTUAL REALITY

Introduction, Virtual Reality Systems, Related Technologies: Tele-operation & Augmented Reality System, VRML Programming, Domain Dependent Application like Medical, Visualization Visibility Computation Time Critical Rendering.

Text Books:

1. Multimedia System Design, Andleigh and Thakarar , PHI
2. Multimedia Technology & Application, David Hillman, Galgotia Publications.

Reference Books:

1. Multimedia Computing Communication and Application, Steinmetz, Pearson Edn.
2. Virtual Reality Systems, John Vince, Pearson Education.
3. Fundamentals of Computer Graphics and Multimedia, D.P. Mukherjee, PHI

Course Outcome:

After completion of the course study, students will be able to

1. Explain fundamental video, audio, image, text processing techniques.
2. Perform text compression, audio compression, image compression, and video compression.
3. Explain the basic techniques in designing video transmission systems.
4. Explain the technologies related to virtual reality and application of virtual reality system.
5. Do VRML programming.

Department of Computer Science & Engineering
MATS University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.

SOFTWARE TESTING (BT6255)

Course Objective:

1. To study software testing objectives, process, criteria, strategies, and methods.
2. To study various software testing issues and solutions in software unit, integration, regression, and system testing.
3. To learn planning of a test project, design test cases, conduction of testing operations, generation of a test report.
4. To understand automation testing process, its problems and solutions.
5. To study about software quality assurance.

UNIT – I INTRODUCTION

Quality Revolution, Software Quality, Role of Testing, Objectives of Testing, Concept of Complete Testing, Central Issue of Testing, Sources of Information for Test Case selection, Test Planning and Design, Monitoring and Measuring Test Execution, Test Tools and Automation, Test Team Organization and Management.

UNIT – II TESTING THEORY

Basic Concepts of Testing Theory, Theory of Good Enough and Gerhart, Theory of Weyuker and Ostrand, Theory of Gourlay, Adequacy of Testing, Limitations of Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Debugging.

UNIT – IIII CONTROL FLOW AND DATA FLOW TESTING

Outline of Control Flow Testing, Control Flow Graph, Paths in Control Flow Graphs, Path Selection Criteria, Data Flow Testing criteria, Comparison of Data Flow and Test Selection Criteria, Domain Error, Testing of Domain Errors.

UNIT – IV SYSTEM DESIGN AND CONCEPTS

System Test design, Test design Factors, Requirement Identification, Test Objective Identification, Structure of a System Test Plan, Assumptions, Test Approach, Test Suite Structure, Types of Acceptance Testing.

UNIT – V SOFTWARE QUALITY

Five Views of Software Quality, Quality Control, Quality assurance, Cost of quality, Software Quality Assurance, SQA Plan, ISO 9000, Capability Maturity Model, McCall's Quality Factors.

Text Books:

1. Software Testing and Quality Assurance, Kshirasagar Naik, John Wiley & Sons.
2. Effective Methods for Software Testing, William Perry, John Wiley & Sons.

Reference Books:

1. Testing Computer Software, Cem Kaner and Jack Falk, Wiley.
2. Software Testing Ron Patton, SAMS Publications.

Course Outcome:

After completion of the course study, students will be able to

1. Design and conduct software testing for a software project.
2. Identify software testing problems, and solve the problems by designing and selecting software test models, criteria, strategies, and relevant methods.
3. Use software testing methods and modern software testing tools for their software projects.