

ANNA UNIVERSITY TIRUCHIRAPPALLI
TIRUCHIRAPPALLI – 620 024

Regulations 2009

Curriculum

MASTER OF COMPUTER APPLICATIONS (MCA)

SEMESTER I

S. No.	Subject Code	Subject	L	T	P	C
Theory						
1	CA5101	Mathematical Foundations of Computer Science	3	1	0	4
2	CA5102	Data Structures and Algorithms	3	0	0	3
3	CA5103	Problem Solving and Programming Techniques	3	0	0	3
4	CA5104	Computer Organization And Architecture	3	0	0	3
5	CA5105	Database Management Systems	3	0	0	3
Practical						
6	CA5106	Data Structures Laboratory	0	0	3	2
7	CA5107	Programming Laboratory	0	0	3	2
8	CA5108	Database Management Systems Laboratory	0	0	3	2
Total						22

SEMESTER II

S. No.	Subject Code	Subject	L	T	P	C
Theory						
1	CA5151	Object Oriented Programming	3	0	0	3
2	CA5152	Computer Networks	3	0	0	3
3	CA5153	Operating Systems	3	0	0	3
4	CA5154	Software Engineering	3	0	0	3
5	CA5155	Graphics and Multimedia Technologies	3	0	0	3
Practical						
6	CA5156	Object Oriented Programming Laboratory	0	0	3	2
7	CA5157	Operating Systems Laboratory	0	0	3	2
8	CA5158	Graphics and Multimedia Laboratory	0	0	3	2
Total						21

SEMESTER III

S. No.	Subject Code	Subject	L	T	P	C
Theory						
1	CA5201	Accounting and Financial Management	3	1	0	4
2	CA5202	Object Oriented Analysis and Design	3	0	0	3
3	CA5203	Microprocessors and its Applications	3	0	0	3
4	CA5204	Java Technologies	3	0	0	3
5	E1****	Elective I	3	0	0	3
Practical						
6	CA5205	Case Tools Laboratory	0	0	3	2
7	CA5206	Microprocessors Laboratory	0	0	3	2
8	CA5207	Java Programming Laboratory	0	0	3	2
Total						22

SEMESTER IV

S. No.	Subject Code	Subject	L	T	P	C
Theory						
1	CA5251	Resource Management Techniques	3	1	0	4
2	CA5252	Internet Programming	3	0	0	3
3	CA5253	Unix and Network Programming	3	0	0	3
4	CA5254	Organizational Behavior	3	0	0	3
5	E2****	Elective II	3	0	0	3
Practical						
6	CA5255	Internet Programming Laboratory	0	0	3	2
7	CA5256	Communication Skills Development Laboratory	0	0	3	2
8	CA5257	Unix and Network Programming Laboratory	0	0	3	2
Total						22

SEMESTER V

S. No.	Subject Code	Subject	L	T	P	C
Theory						
1	CA5301	.NET Technologies	3	0	0	3
2	CA5302	Mobile Computing	3	0	0	3
3	CA5303	Software Project Management	3	0	0	3
4	E3****	Elective III	3	0	0	3
5	E4****	Elective IV	3	0	0	3
Practical						
6	CA5304	.NET Technologies Laboratory	0	0	3	2
7	CA5305	Mobile Computing Laboratory	0	0	3	2
8	CA5306	Software Development and Testing Laboratory	0	0	3	2
Total						21

SEMESTER VI

S.No	Subject Code	Subject	L	T	P	C
1	CA5351	Project Work	0	0	24	12

ELECTIVE I (III SEMESTER)

S. No.	Subject Code	Subject	L	T	P	C
Theory						
1	CA5221	Advanced Databases	3	0	0	3
2	CA5222	Data Warehousing and Mining	3	0	0	3
3	CA5223	Database Tuning	3	0	0	3
4	CA5224	Emerging Trends in Computing	3	0	0	3
5	CA5225	TCP/IP Protocol Suite	3	0	0	3

**ELECTIVE II
(IV SEMESTER)**

S. No.	Subject Code	Subject	L	T	P	C
Theory						
1	CA5271	Web Graphics	3	0	0	3
2	CA5272	Wireless Networks	3	0	0	3
3	CA5273	Network Storage Management	3	0	0	3
4	CA5274	Fundamentals of Pervasive Computing	3	0	0	3
5	CA5275	Real Time and Embedded Systems	3	0	0	3
6	CA5276	Open Source Technologies	3	0	0	3

**ELECTIVE III and IV
(V SEMESTER)**

S. No.	Subject Code	Subject	L	T	P	C
Theory						
1	CA5321	Information Security	3	0	0	3
2	CA5322	Software Testing	3	0	0	3
3	CA5323	Agent Technologies	3	0	0	3
4	CA5324	Unix Internals	3	0	0	3
5	CA5325	Mobile Commerce	3	0	0	3
6	CA5326	Distributed Objects	3	0	0	3
7	CA5327	Service Oriented Architecture	3	0	0	3
8	CA5328	Semantic Web	3	0	0	3
9	CA5329	Aspect Oriented Programming	3	0	0	3
10	CA5330	Cyber Crime	3	0	0	3
11	CA5331	Software Quality Assurance	3	0	0	3

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Regulations 2009

Syllabus

MASTER OF COMPUTER APPLICATIONS (MCA)

SEMESTER I

CA5101 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

	L	T	P	C
UNIT I MATRIX ALGEBRA	3	1	0	4
Matrices – Rank of Matrix – Solving System of Equations – Eigen Values and Eigen Vectors – Inverse of a Matrix – Cayley Hamilton Theorem				9
UNIT II BASIC SET				9
Basic Definitions – Venn Diagrams and set operations – Laws of set theory – Principle of Inclusion and Exclusion – Partitions – Permutation and Combination – Relations – Properties of relations – Matrices of relations – Closure operations on relations – Functions – Injective – Surjective and Bijective functions - Induction				
UNIT III MATHEMATICAL LOGIC				9
Propositions and logical operators – Truth table – Propositions generated by set – Equivalence and Implication – Basic laws – Some more connectives – Functionally complete set of connectives – Normal forms – Proofs in Propositional calculus – Predicate calculus				
UNIT IV GRAPHS AND TREES				9
Graphs – Types of Graphs – Connectedness – Euler Graphs – Hamiltonian Graphs – Trees - Undirected graphs – Directed graphs – Spanning trees – Algorithm for finding shortest spanning trees.				
UNIT V LATTICES				9
Partial order relation – Posets – Hasse diagram – Lattices – Special Lattices – Boolean algebra.				

L:45 T:15 Total: 60

TEXT BOOK

1. Trembley and Manohar R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw Hill, 2008.

REFERENCES

1. Narasingh Deo, “Graph Theory with Applications to Engineering and computer science”, Prentice Hall of India, New Delhi, 2007.
2. Kenneth H. Rusen “Discrete Mathematics and its Applications”, Sixth Edition, Tata McGraw Hill, 2007.

CA5103 PROBLEM SOLVING AND PROGRAMMING TECHNIQUES

L	T	P	C
3	0	0	3

UNIT I	PROBLEM SOLVING AND ALGORITHMS	9
The Problem Solving Aspect – Top Down Design – Implementation of Algorithms – Program Verification – Efficiency of Algorithms – Analysis of Algorithms – Exchanging the values – Counting – Factorial Computation – SINE Computation – Base Conversion		
UNIT II	PROBLEM SOLVING TECHNIQUES	9
Factoring Methods – Array Techniques – Merging – Sorting – Searching		
UNIT III	FUNDAMENTALS OF C LANGUAGE	9
Overview of C – Constants – Variables and Data Types – Operators and Expressions – Managing Input/Output Operations – Formatted I/O – Decision Making – Branching – IF – Nested IF – Switch – Goto – Looping Statements		
UNIT IV	ARRAYS - FUNCTIONS - STRUCTURES AND UNIONS	9
Arrays – Dynamic and multi dimensional arrays – Character arrays and Strings – String handling Functions – User defined Functions – Categories of Functions – Recursion – Structures and Unions – Array of Structures – Structures and Functions		
UNIT V	POINTERS AND FILE MANAGEMENT	9
Pointers – Declaration – Accessing a variable – Character Strings – Pointers to Functions and Structures – File Management in C – Dynamic Memory Allocation – Linked Lists – Preprocessors		

Total: 45

TEXT BOOKS

1. R.G. Dromey, “How to Solve it by Computer”, Prentice Hall,2008.
2. Harrey M.Deitel and Paul J.Deitel, “C How to Program”, Fourth Edition, Prentice Hall, 2004.

REFERENCES

1. Maureen Sprankle, “Problem Solving and Programming Concepts”, Seventh Edition, Pearson Education, 2007.
2. Brian W.Kernighan and Dennis Ritchie, “C Programming Language”, Prentice Hall of India, 2007.

CA5104 COMPUTER ORGANITATION AND ARCHITECTURE

L T P C
3 0 0 3

UNIT I	BASIC STRUCTURE OF COMPUTERS	9
Functional units – Basic operational concepts – Bus structures – Performance and Metrics – Instruction and instruction sequencing – Hardware – Software Interface – Addressing modes – Instruction Set – RISC – CISC – ALU design – Fixed point and floating point operation.		
UNIT II	BASIC PROCESSING UNIT	9
Fundamental Concepts – Execution of a complete instruction – Hard wired control – Micro programmed control – Nano Programming – Multi cycle Implementation.		
UNIT III	PIPELINING	9
Basic concepts – Data hazards – Instruction Hazards – Influence on Instruction Sets – Data Path and control consideration – Super scalar Operation – Performance Consideration – Exception Handling.		
UNIT IV	MEMORY SYSTEM	9
Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Performance consideration – Virtual memory – Memory Management requirements – Secondary Storage.		
UNIT V	I/O ORGANIZATION	9
Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB)		
		Total: 45

TEXT BOOK

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, Tata McGraw Hill, 2002.

REFERENCES

1. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware / Software interface”, Fourth Edition, Morgan Kaufman, 2004.
2. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Seventh Edition, Pearson Education, 2006.
3. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.
4. V.P. Heuring, H.F. Jordan, “Computer System Design and Architecture”, Second Edition, Addison Wesley, 2004.

CA5105 DATABASE MANAGEMENT SYSTEMS

L T P C
3 0 0 3

UNIT I FUNDAMENTALS

9

Database Systems vs. File Systems – View of Data – Data Models – Database Languages – Transaction Management – Database Systems Structure – History of Database Systems – Database Systems Applications – Entity Relationship Model

UNIT II RELATIONAL DATABASES

9

The Relation - Keys - Constraints - Relational Algebra and Calculus – Queries -SQL – Basic Structure – Set Operations – Complex Queries – Joined Queries – DDL – Embedded SQL – Dynamic SQL –Other SQL Functions – Query by Example – Integrity and Security of searching – Relational Database Design.

UNIT III DATA STORAGE AND INDEXING

9

Storage & File Structure – Disks – RAID – File Organization – Indexing & Hashing – B+ TREE – B Tree – Static Hashing – Dynamic Hashing – Multiple Key Access

UNIT IV QUERY EVALUATION & OPTIMIZATION

9

Query Processing – Selection Operation – Sorting – Join Operation – Evaluation of Expressions – Query Optimization

UNIT V TRANSACTION MANAGEMENT

9

Transaction Concept – Static Implementation – Concurrency Control – Protocols – Deadlock Handling – Recovery Systems – Recovery with Concurrent Transactions – Shadow Paging – Buffer Management – Case Studies – Oracle – Microsoft SQL Server

Total: 45

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudharsan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006.
2. C.J Date, A. Kannan and S. Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.

REFERENCES

1. Raghu Ramakrishnan and Johannesgerhrke, “DataBase Management Systems”, Third Edition, McGraw Hill, 2003.
2. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Pearson Education, 2004

CA5106 DATA STRUCTURES LABORATORY

L	T	P	C
0	0	3	2

1. Implementation of all the data structures specified in Data Structures theory subject.
2. Implement applications like conversion of arithmetic expressions from infix to postfix and evaluation of Postfix expressions.
3. Implementation of Linked Dictionary.
4. Implementation of Searching using Binary Search trees.
5. Implementation of Quick sort algorithm.
6. Implementation of Merge sort algorithm.
7. Implementation of Graph search algorithms.
8. Implementation of Minimal spanning tree algorithms.
9. Implementation of Shortest path algorithm.
10. Implementation of Heap structure.

Total : 45

CA5107 PROGRAMMING LABORATORY

L	T	P	C
0	0	3	2

1. Display the following:
(i) Floyd's triangle (ii) Pascal Triangle
2. Generate the following series of numbers:
(i) Armstrong numbers between 1 to 100
(ii) Prime numbers between 1 to 50
(iii) Fibonacci series up to N numbers
3. Manipulate the strings with following operations
(i) Concatenating two strings (ii) Reversing the string (iii) Finding the substring
(iv) Replacing a string (v) Finding length of the string
4. Find the summation of the following series:
(i) Sine (ii) Cosine (iii) Exponential
5. Create the sales report for M sales person and N products using two dimensional arrays
6. Simulate the following Banking operations using functions
(i) Deposit (ii) Withdrawal (iii) Balance Enquiry
7. Implement using recursion
(i) Find the solution of Towers of Hanoi problem using recursion.
(ii) Fibonacci number generation.
(iii) Factorial of a number.
8. Generate Student mark sheets using structures
9. Create a collection of books using arrays of structures and do the following:
(i) Search a book with title and author name (ii) Sorts the books on title.

Total: 45

CA5108 DATABASE MANAGEMENT SYSTEMS LABORATORY

L	T	P	C
0	0	3	2

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views – partitions and locks for a particular DB.
5. Write PL/SQL procedure for an application using exception handling.
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back end tool (make use of ER Diagram and DFD).
11. Develop an application using Menus
12. Importing / Exporting Data
13. Reports Creations Typical Applications – Banking – Electricity Billing
Library Operation – Pay roll – Insurance – Inventory – etc.

Total: 45

SEMESTER II

CA5151 OBJECT ORIENTED PROGRAMMING

L	T	P	C
3	0	0	3

UNIT I FUNDAMENTALS 9

Object Oriented Programming concepts – Encapsulation – Programming Elements – Program Structure – Enumeration Types — Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call-by-Reference – Assertions – Standard template library.

UNIT II IMPLEMENTING ADTS AND ENCAPSULATION 9

Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Hiding and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – Reference semantics – Implementation of simple ADTs.

UNIT III POLYMORPHISM 9

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – List – List Iterators.

UNIT IV TEMPLATES 9

Template Class – Function Templates – Class Templates – Parameterizing – STL – Algorithms – Function Adaptors.

UNIT IV INHERITANCE 9

Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run-Time Type Identifications –Exceptions – Handlers – Standard Exceptions.

Total: 45

TEXT BOOK

1. Ira Pohl, “Object – Oriented Programming Using C++”, Second Edition, Pearson Education, 2004.

REFERENCES

1. Stanley B.Lippman, Josee Lajoie,Barbara.E.Mov “C++ Primer”, Fourth Edition, Pearson Education.
2. Kamthane, “Object Oriented Programming with ANSI and Turbo C++”, Person Education, 2002.
3. Bhave, “Object Oriented Programming with C++”, Pearson Education, 2004.

CA5152 COMPUTER NETWORKS

L T P C
3 0 0 3

UNIT I DATA COMMUNICATIONS FUNDAMENTALS 9
Communication model – Data communications networking – Data transmission
Concepts and terminology – Transmission media – Data encoding – Data link Control.

UNIT II NETWORK FUNDAMENTALS 9
Protocol architecture – Protocols – OSI – TCP/IP – LAN architecture – Topologies –
MAC – Ethernet – Fast Ethernet – Token ring – FDDI – Wireless LANS – Bridges.

UNIT III NETWORK LAYER 9
Network layer – Switching concepts – Circuit switching networks – Packet Switching –
Routing – Congestion control – X.25 – Internetworking concepts and X.25 architectural
models – IP – Unreliable connectionless delivery – Datagrams – Routing IP datagram –
ICMP.

UNIT IV TRANSPORT LAYER 9
Transport layer – Reliable delivery service – Congestion control – Connection
establishment – Flow control – Transmission control protocol – User datagram
protocol.

UNIT V NETWORK SECURITY AND APPLICATIONS 9
Cryptographic Algorithms – DES – RSA – MD5 – Security Mechanisms – Fire Walls –
Name Service – Traditional Applications – SMTP – HTTP – Multimedia Application –
RTP – RTCP – SCTP.

Total: 45

TEXT BOOK

1. Larry L. Peterson & Bruce S. Davie, “Computer Networks – A Systems Approach”, Fourth Edition, Harcourt Asia / Morgan Kaufmann, 2007.

REFERENCES

1. William Stallings, “Data and Computer Communications”, Eighth Edition, Pearson Education, 2007.
2. James F.Kurose and Keith W.Ross, “Computer Networking – A Top Down Approach Featuring the Internet”, Third Edition, Addison Wesley Publishing Company, 2006.

CA5153 OPERATING SYSTEMS

L T P C
3 0 0 3

UNIT I	FUNDAMENTALS	7
Definition of OS – Mainframe System – Desktop Systems – Multi processor System – Distributed – Clustered – Real time Systems – Handheld Systems – Operating System Structure – System Components – Services – System Calls – System Programs – System Design and Implementation		
UNIT II	PROCESS MANAGEMENT	8
Concepts – Process Scheduling – Operations on Processes – Co-operating Processes – Inter Process Communication – CPU Scheduling – Scheduling Concepts – Criteria – Scheduling Algorithms – Multiprocessor Scheduling – Real time Scheduling		
UNIT III	PROCESS SYNCHRONIZATION	10
Critical Section – Synchronization Hardware – Semaphores – Problems of Synchronization – Critical Regions – Monitors – Deadlocks – Characterization – Handling Deadlocks – Deadlock Prevention – Avoidance – Detection – Deadlock Recovery		
UNIT IV	MEMORY MANAGEMENT	10
Storage Hierarchy – Storage Management Strategies – Contiguous-Non Contiguous Storage Allocation – Single User – Fixed Partition – Variable Partition – Swapping – Virtual Memory – Basic Concepts – Multilevel Organization – Block Mapping – Paging – Segmentation – Page Replacement Methods – Locality – Working Sets		
UNIT V	I/O AND FILE SYSTEMS	10
Disk Scheduling – File Concepts – File System Structure – Access Methods – Directory Structure – Protection – Directory Implementation – Allocation Methods – Free Space Management – Case Study: Linux System		

Total: 45

TEXT BOOKS

1. Silberschatz and Galvin, “Operating System Concepts”, Seventh Edition, John Wiley & Sons, Inc., 2004.
2. Milankovic M, “Operating System Concepts and Design”, Second Edition, Tata McGraw Hill, 2008.

REFERENCES

1. P.C. Bhatt, “An Introduction to Operating Systems - Concepts and Practice”, Prentice Hall Of India, 2004.
2. H. M. Deitel, “An Introduction to Operating Systems”, Third Edition, Pearson Education, 2007.
3. Willam-Stalling, “Operating System”, Sixth Edition, Pearson Education, 2003.

CA5154 SOFTWARE ENGINEERING

L T P C
3 0 0 3

UNIT I FUNDAMENTALS	9
A Generic View of Process – Process Models – The Waterfall Model – Incremental Model – Evolutionary Model – Specialized Model – The Unified Process–Agile Process – Agile Models – Software Cost Estimation – Planning – Risk Analysis – Software Project Scheduling.	
UNIT II REQUIREMENT ANALYSIS	9
System Engineering Hierarchy – System Modeling – Requirements Engineering: Tasks- Initiating the Process – Eliciting Requirements – Developing Use Cases- Negotiating Requirements-Validating Requirements – Building the Analysis Models – Concepts.	
UNIT III SOFTWARE DESIGN	9
Design Concepts – Design Models – Pattern Based Design – Architectural Design – Component Level Design – Component – Class Based And Conventional Components Design – User Interface – Analysis And Design.	
UNIT IV SOFTWARE TESTING	9
Software Testing – Strategies – Conventional - Object Oriented – Validation Testing – Criteria – Alpha – Beta Testing- System Testing – Recovery – Security – Stress – Performance – Testing Tactics – Testing Fundamentals – Black Box – While Box – Basis Path – Control Structure.	
UNIT V SCM AND QUALITY ASSURANCE	9
Software Configuration And Management – Features – SCM Process – Software Quality Concepts – Quality Assurance – Software Review–Technical Reviews – Formal Approach To Software Quality Assurance – Reliability – Quality Standards – Software Quality Assurance Plan.	

Total: 45

TEXT BOOKS

1. Roger Pressman.S., “Software Engineering: A Practitioner's Approach”, Sixth Edition, Mcgraw Hill, 2008.
2. Jalote Pankaj, “An Integrated Approach to Software Engineering”, Third Edition, Narosa Book Distributors Pvt Ltd, 2005.

REFERENCES

1. P. Fleeger, “Software Engineering”, Prentice Hall, 1999.
2. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli, “Fundamentals of Software Engineering”, Prentice Hall Of India, 1991.
3. I. Sommerville, “Software Engineering”, Eighth Edition, Pearson Education, 2006.

UNIT I	GRAPHICS FUNDAMENTALS	9
I/O devices – I/O Primitives – DDA – Bresenham technique – Circle drawing algorithms – Interactive input methods.		
UNIT II	2D GRAPHICS	9
2D Transformations – Window Viewport mapping – Clipping algorithms – polygons – Splines – Bezier curves – Basis.		
UNIT III	3D GRAPHICS	9
3D concepts – Representations – Projections – Hidden surface - line removal – Visualization and rendering – Color models – Texture mapping.		
UNIT IV	OVERVIEW OF MULTIMEDIA	9
Multimedia Hardware & Software – Components of multimedia – Text - Image – Graphics – Audio – Video – Animation – Authoring – Multimedia Project development.		
UNIT V	MULTIMEDIA SYSTEMS AND APPLICATIONS	9
Multimedia Communication Systems – Database Systems – Synchronization issues – Presentation requirements – Applications – Video conferencing – Virtual reality – Interactive Video – Media on Demand.		

Total: 45 hrs.

TEXT BOOK

1. Ralf Steinmetz, Klara Nahrstedt, “Multimedia Computing, Communications & Applications”, Pearson Education, 2008.

REFERENCES

1. Donald Hearn, M. Pauline Baker, “Computer Graphics – C Version”, Second Edition, Pearson Education, 2008.
2. Tay Vaughan, “Multimedia Making It Work”, Seventh Edition, Tata McGraw Hill, 2006.
3. J. D. Foley, A. VanDam, S. K. Feiner, J. F. Hughes, “Computer Graphics Principles and Practice”, Addison and Wesley Publications, 2002.
4. Drew, “Fundamentals of Multimedia”, Prentice Hall of India, 2008 .

CA5156 OBJECT ORIENTED PROGRAMMING LABORATORY

L	T	P	C
0	0	3	2

1. Recursive functions.
2. File handling operations using structures.
3. Simple Classes for understanding objects, Member functions and constructors, handling constants in a class and constant objects.
4. String class implementation.
5. Dynamic memory allocation.
6. Iterator applications.
7. Static members in class and an application.
8. Operator overloading including unary operators, new and delete.
9. Function overloading – templates.
10. Inheritance issues.
11. File handling (text and objects)

Total: 45

CA5157 OPERATING SYSTEM LABORATORY

L	T	P	C
0	0	3	2

1. Implement the following CPU scheduling Algorithms
2. Implement the Mutual Exclusion Problem Using Dekker's Algorithm
3. Implement Inter Process Communication Problem (Producer-Consumer/Reader-Writer Problem) Using Semaphores
4. Implement Bset fit-First Fit Algorithm for Memory Management
5. Implement Memory Allocation with Pages
6. Implement FIFO page Replacement Algorithm
7. Implement LRU page Replacement Algorithm
8. Implement the creation of Shared memory Segment
9. Implement File Locking
10. Implement Banker's algorithm

Total: 45

CA5158 GRAPHICS AND MULTIMEDIA LABORATORY

L T P C
0 0 3 2

1. Implementation of DDA algorithm
2. Implementation of Bresenham's algorithms.
a) Line b) Circle c) Ellipse.
3. 2D Transformations:
a) Translation
b) Rotation
c) Scaling
d) Reflection
e) Shearing of Objects
4. Cohen-Sutherland 2D clipping and windowing.
5. 3D Transformations:
a) Translation
b) Rotation
c) Scaling
6. To implement text compression algorithm.
7. To implement image compression algorithm.
8. Animation using any Animation software.
9. Basic operations on image using any image editing software.
10. Examples using PHOTOSHOP, FLASH, and MAYA.

Total: 45 hrs.

SEMESTER III

CA5201 ACCOUNTING AND FINANCIAL MANAGEMENT

L T P C
3 1 0 4

UNIT I FINANCIAL ACCOUNTING 9

Concepts and Conventions – Books of Accounts – Preparation of Journals – Ledger – Trial Balance – Profit and Loss Account and Balance sheet – simple problems – An outline of Accounts of Non-Profit making organizations.

UNIT II MANAGEMENT ACCOUNTING 9

Concepts – Funds flow Statement – Cash flow statement – Financial statement Analysis – Marginal Costing – Capital Budgeting – Standard Costing.

UNIT III GOALS AND FUNCTIONS OF FINANCIAL MANAGEMENT 9

Finance function – Scope of Financial Management – Organisation of the finance function – Various sources of Finance – Risk and Return – Determinants of Dividend Policy – Leverage – Risk analysis in capital budgeting – Weighted average cost.

UNIT IV WORKING CAPITAL MANAGEMENT 9

Factors affecting working capital – Inventory management – simple problems – Receivables Management – cash Budget Preparation – working capital Estimation.

UNIT V TALLY 9.0 (ACCOUNTING PACKAGE) 9

Importance of Tally – Creation of company – Alteration – Group creation – Gateway of Company – Leger creation – Bank account – Cash payment – Cash Receipt – Journal entry – Profit and loss account – Balance sheet – Function keys and short cut keys.

L:45 T:15 Total: 60

TEXT BOOK

1. Pandey I.M, “Financial Management” Nineth Edition, Vikas Publishing, 2005

REFERENCES

1. Pandey I.M., “Management Accounting” Third Revised Edition Vikas Publishing, 2000.
2. Sharma R.K and Shashi V.K.Gupta, “Management Accounting Principles of Practice”, Kalyani Publishers, 2008
3. Gupta R.L and V.K.Gupta, “Financial Accounting”, Sultan Chand & Sons, 2001.
4. Dr. S.N. Maheshwari, “Elements of Financial Management”, Sultan Chand & Sons, 2002.

CA5202 OBJECT ORIENTED ANALYSIS AND DESIGN

L T P C
3 0 0 3

UNIT I FUNDAMENTALS 9

An Overview of Object Oriented Systems Development – Object Basics – Object Oriented Systems Development Life Cycle.

UNIT II OBJECT ORIENTED METHODOLOGIES 9

Rumbaugh Methodology – Booch Methodology – Jacobson Methodology – Patterns – Frameworks – Unified Approach – Unified Modeling Language – Use case – class diagram – Interactive Diagram – Package Diagram – Collaboration Diagram – State Diagram – Activity Diagram.

UNIT III OBJECT ORIENTED ANALYSIS 9

Identifying use cases - Object Analysis - Classification – Identifying Object relationships - Attributes and Methods.

UNIT IV OBJECT ORIENTED DESIGN 9

Design axioms - Designing Classes – Access Layer - Object Storage - Object Interoperability.

UNIT V SOFTWARE QUALITY AND USABILITY 9

Designing Interface Objects – Software Quality Assurance – System Usability - Measuring User Satisfaction.

Total: 45 hrs.

TEXT BOOKS

1. Ali Bahrami, “Object Oriented Systems Development”, Tata McGraw Hill, 1999.
2. Martin Fowler, “UML Distilled”, Third Edition, Pearson Education, 2002.

REFERENCES

1. Stephen R. Schach, “Introduction to Object Oriented Analysis and Design”, Tata McGraw Hill, 2003.
2. James Rumbaugh, Ivar Jacobson, Grady Booch, “The Unified Modeling Language Reference Manual”, Second Edition with c/d, Addison Wesley, 1999.
3. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, “UML Toolkit”, OMG Press Wiley Publishing Inc., 2004.

CA5203 MICROPROCESSORS AND ITS APPLICATIONS

L	T	P	C
3	0	0	3

UNIT I	THE 8086 PROCESSOR - SOFTWARE ASPECTS	9
Evolution of Microprocessors - 8086 architecture – Addressing modes- Instruction set and assembler directives – Assembly language programming – Interrupts and interrupt service routines.		
UNIT II	8086 SYSTEM DESIGN	9
8086 signals description – Basic configurations - System bus timing – System design using 8086 – Minimum mode /Maximum modes 8086 system and timings.		
UNIT III	INTERFACING CONCEPTS	9
Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt Controller – DMA controller – Programming and applications.		
UNIT IV	ADVANCED PROCESSORS	9
Intel 80286 – Internal Architectural – Register Organization – Internal Block Diagram – Modes of operation – Real Address Mode – Protected Virtual Address Mode – Privilege – Protection - Architectural features and Register Organization of i386, i486 and Pentium processors.		
UNIT V	BUILDING SYSTEMS	9
Bus Concepts – Bus Standards –The Peripheral Component Interconnect (PCI) Bus – Universal Serial Bus (USB) – Platform Architectures – Simple Applications.		
Total: 45		

TEXT BOOK

1. A. K. Ray & K. M. Bhurchandi, “Advanced Microprocessors and Peripherals- Architectures, Programming and Interfacing”, Second Edition, Tata McGraw Hill, 2002 reprint.

REFERENCES

1. Barry B. Brey, “The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium IV, Architecture, Programming & Interfacing”, Eighth Edition, Pearson Education, 2007.
2. Yu-cheng Liu, Glenn A. Gibson, “Microcomputer systems: The 8086/8088 Family Architecture, Programming and Design”, PHI, 2003.
3. Peter Abel, “IBM PC Assembly language and programming”, Fifth Edition, Prentice Hall of India, 2000.

CA5205 CASE TOOLS LABORATORY

L T P C
0 0 3 2

Develop software for an application using typical Case Tool, following Software Engineering methodology as given below:

1. **Problem Statement** Thorough study of the problem – Identify project scope, Objectives and infrastructure.
2. **Business modeling and requirements specification:** The specification language Unified Modeling Language (UML), will be used.
3. **UML** - Use work products – data dictionary, use case diagrams and activity diagrams, build and test, class diagrams, sequence diagrams, collaboration diagrams and add interface to class diagrams.
4. **Software Implementation** Coding - Use tools for automatic code generation from system specifications.
5. **Change Management** –Program, Data and Documentation management
6. **Software Testing** - Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.
7. **Software Documentation and Reverse Engineering** - Apply Reverse Engineering approach and compare with the forward engineering approach. Prepare documents and reports

Total: 45 hrs.

CA5206 MICROPROCESSORS LABORATORY

L T P C
0 0 3 2

1. Assembly Language Programming with 8086 to perform arithmetic Manipulation.
2. Assembly Language Programming with 8086 to perform string Manipulation.
3. Study of DOS and BIOS function calls for keyboard and monitor interface.
4. File manipulation.
5. Write a program to Perform Power on Self Test.
6. Write an assembly language program to interface Programmable Peripheral Interface.
7. Write an assembly language program to interface Programmable Timer.
8. Write an assembly language program to interface Programmable Communication Interface.
9. Write a program for floppy disk trouble shooting.
10. Write a program for printer trouble shooting.

Total: 45

CA5207 JAVA PROGRAMMING LABORATORY

L T P C
0 0 3 2

1. Implementation of Streaming Models – Stream Customization.
2. Byte Code Interpretation Program – Applications.
3. Threading – Synchronization of Threads And Applications.
4. JNI Applications.
5. Socket Programming.
6. Implementation of UDP Datagrams, SMTP Client, FTP Application.
7. RMI With Call Back – Implementation Of RMI – IIOP Using CORBA Concepts And Using IDL.
8. JDBC Applications – Data Retrieval – Storing Multimedia Data And Retrieval – Three – Tier Applications Using Servlets.
9. Session Management using servlets.
10. Mobile Application Development using J2ME.

Total: 45 hrs.

CA5252 INTERNET PROGRAMMING

L T P C
3 0 0 3

UNIT I WEB SCRIPTING 8

HTML – CSS - DHTML – Java Script – Functions – Events – DOM – AJAX .

UNIT II WEB SERVER 9

Web Server Functions - Web Security – Fire Wall – Proxy Servers – Virtual Directories – MIME - HTTP Headers – Deployment using web servers

UNIT III SERVER SIDE TECHNOLOGIES 10

.ASP - Handling Request, Response – Session Management – Server side Includes - JSP – Scriptlets – Custom Tag Library – Include and Forward – Struts.

UNIT IV XML AND WEB SERVICES 9

XML – DTD - Schema – DOM – SAX – XSLT – Xpath – XQuery – SOA – Web Services – SOAP – UDDI – WSDL – Web Service Composition - BPEL .

UNIT V WEB SERVICE DEVELOPMENT 9

Enterprise Java web services - JAX-RPC – JAXP – Publishing and Discovery using JAXR – JAXM – .NET Web Service – Interoperability. .

Total: 45 hrs.

TEXT BOOKS

1. Deitel & Deitel, “ Internet & World Wide Web How to Program”, Pearson Education India, Third Edition , 2004.
2. Ron Schmelzer et al., “XML and Web Services”, Pearson Education, 2002.

REFERNCES

1. Deitel & Deitel, “XML How to Program”, Pearson Education, 2001.
2. Negrino and Smith, “Javascript for the World Wide Web”, 5th Edition, Peachpit Press, 2003.
3. Keith Ballinger, “.NET Web Services Architecture and Implementation”, Pearson Education, 2003.

UNIT I INTRODUCTION AND FILE SYSTEM 9

Overview of UNIX OS – File I/O – File Descriptors – File Sharing – Files and Directories – File Types – File Access Permissions – File Systems – Symbolic Links – Basic Commands – Network Commands – Standard I/O Library – Streams and File Objects – Buffering – System Data Files and Information – Password File – Group File – Login Accounting – System Identification.

UNIT II PROCESSES 9

Environment of a UNIX process – Process termination – Command Line Arguments – Process control – Process identifiers – Process relationships terminal logins – Signals – Threads.

UNIT III INTER PROCESS COMMUNICATION 9

Fundamentals – Message Passing (SVR4) – Pipes – FIFO – Message Queues – Synchronization(SVR4) – Mutexes – Condition Variables – Read – Write Locks – File Locking – Record Locking – Semaphores – Shared memory(SVR4).

UNIT IV SOCKET PROGRAMMING 9

Introduction – Transport Layer – Socket Introduction – Socket Address Structures – Socket Function – TCP Sockets – UDP Sockets – I/O Multiplexing – TCP Echo client server – UDP Echo client server – TCP Multi client Server – Multiplexed TCP server.

UNIT V ADVANCED SOCKET PROGRAMMING 9

Debugging techniques – Raw Sockets – Socket Options – DNS – Name Address Conversion – Threaded Server – Ping – Trace Root – FTP.

Total: 45 hrs**TEXT BOOKS**

1. . W. Richard Stevens, “Unix Network Programming, Volume 1: The Sockets Networking API”, Third Edition Pearson Education, 2007.
- 2.. William Stallings, “SNMP, SNMPv2, SNMPv3 and RMON 1 and 2”, Third Edition, Addison Wesley, 1999.

REFERENCES

1. D.E. Comer, “Internetworking with TCP/IP Vol - III”, (BSD Sockets Version), Pearson Education, 2008.
2. W. Richard Stevens, “Advanced Programming in the UNIX® Environment”, Second Edition, Pearson Education, 2008

UNIT I INTRODUCTION TO ORGANIZATIONAL BEHAVIOUR 9

Definition, Need and Importance of Organizational Behaviour – Contributing Discipline to the Organizational Behaviour – Field-Challenges and Opportunities for Organizational Behaviour - Organizational Behaviour Models.

THE INDIVIDUAL FOUNDATIONS OF INDIVIDUAL BEHAVIOUR

Ability - Intellectual, Physical Abilities and the Ability to Job Fit. **Learning** - Types of Learners - the Learning Process - Learning Theories - Classical Conditioning, Operant Conditioning and Social Learning - Organizational Behaviour Modification.

UNIT II VALUES, ATTITUDES AND JOB SATISFACTION 9

Values – Importance, Types of Values, Values Across Culture **Attitudes** – Types – Cognitive Dissonance Theory – Self Perception Theory - Affective Components – Attitude Survey – Attitude and Work Diversity. **Job Satisfaction** – Relationship between Job Satisfaction and Absenteeism and Turnover.

PERSONALITY AND PERCEPTION

Personality and Emotions – Types – Personality Determinants – Theories. Perceptions - Importance -Factors Influencing Perception - Interpersonal Perception.

UNIT III GROUP BEHAVIOUR 9

Work group - Defining and Classifying Groups – Reason for Joining Groups - Stages of Group Development - Five Stages Model - Group Structure – Roles, Norms, Status, Group Size and the Degree of Group Cohesiveness - Group Decision Making Techniques. Work Teams – Types – The Key Components making up Effective Teams - Context, Composition, Work Design and Process - Team and Quality Management - Group Dynamics.

UNIT IV POWER AND POLITICS 9

Power - Definition – Bases – Dependency: the Key to Power - Power Tactics-Power in Groups - Politics – Definition the Reality of Politics Factor Contributing – Employee Responses to Organizational Politics.

UNIT V CONFLICT, NEGOTIATION AND ORGANIZATIONAL CULTURE 9

Conflict - Definition – Functional and Dysfunctional Conflict – Conflict Process – Conflict Resolution Technique. Negotiation – Definition - Approaches to Negotiations – The Negotiation Process - Third Party Negotiation. Organizational Culture – Learning Culture of Employees - Creating an Ethical Organizational Culture – Creating a Customer Responsive Culture.

Total: 45 hrs.

TEXT BOOK

1. Stephen P. Robbins, Timothy A Judge and Seema Sanghi, “Organization Behavior”, twelfth Edition, Pearson Education , 2007. [Indian Adapted Edition]

REFERENCES

1. Fred Luthans, “Organizational Behavior”, 11th Edition, Tata McGraw -Hill Publishing Company Ltd., 2007.
2. Hellriegel and Slocum, “Fundamentals of Organization Behavior”, 1st Edition, Cengage Learning India Pvt. Ltd., 2007.
3. Hitt, Miller, Colella, “Organizational Behavior: A Strategic Approach”, 1st Edition, Wiley India Pvt.Ltd., 2006.
4. Debra L.Nelson & James Campell quick, “Organization Behavior”, 5th Edition, Cengage Learning India Pvt. Ltd., 2007.

CA5255 INTERNET PROGRAMMING LABORATORY

L T P C
0 0 3 2

1. Develop a Simple Web Site with following Features
 - * Drop down menus
 - * Hotspot Links
 - * CSS
2. Develop a simple AJAX applications
3. Design a Web application in ASP to demonstrate the following using IIS server
 - * Session and Cookie management
 - * Server side Includes
4. Design a Web application in JSP to demonstrate the following using tomcat server
 - * Include and Forward
 - * Use Bean Tag
5. Create a Custom Tag Library and use the Tags in JSP pages.
6. Create XML Document to store catalog of books and validate using DTD and Schema.
7. Develop a student information system to insert, update, delete and search information using DOM and SAX
8. Develop an application to display catalog information in tabular format using XSLT
9. Develop a Simple Web Service using JAX-RPC
10. Develop a Simple Web Service using .NET
11. Implement Web Service Interoperability

Total 45 hrs.

WRITTEN COMMUNICATION

1. Remedial English Subject – verb agreement – concord – tense forms – auxiliary verbs different ways of rewriting sentences.
2. Scientific Style Clarity – simplicity – exactness – brevity – unity – coherence – objectivity.
3. Formal and Informal Writing.

ORAL COMMUNICATION

1. Stress and Intonation
2. Delivery Techniques – The extemporaneous speech and the manuscript speech – The physical aspects of speech – audience interaction.
3. The Use of Visual Aids Criteria of visual aids (visibility – clarity – simplicity – control) – The tools of visual presentation (chalk board, chart, overhead projector and so on).
4. Practice in Oral Communication
 - (a) Short speeches
 - (b) Group discussion – as participant and as moderator.
 - (c) Mock press conference
 - (d) Seminar
 - (e) Mock interview
 - (f) Speech based on a situation
 - (g) Extemporaneous speechPractice will also be given in conducting a meeting - welcoming a gathering - presiding over a function and proposing a vote of thanks.

Total: 45 hrs.

CA5257 UNIX AND NETWORK PROGRAMMING LABORATORY

L T P C
0 0 3 2

1. Program using basic network commands.
2. program using system calls: Create, Open , Read , Write , Close , Stat , fstst, lseek.
3. Program to implement inter process communication using Pipes.
4. Program to perform inter process communication using message queues.
5. Program to perform inter process communication using shared memory.
6. Program to perform synchronization using semaphores.
7. Socket Programming
 - a. TCP chat Application.
 - b. UDP Sockets Application.
 - c. Multi client chat server using fork()
 - d. Multithreaded chat server
8. Application to Hand SIGCHLD signals
9. Simulation of ARP/RARP.
10. Simulation of Sliding Window Protocol.
11. Simulation Of Routing Protocols.
12. Developing PING application
13. Program using URL class to download WebPages.

Total: 45 hrs.

ELECTIVE I

CA5221 ADVANCED DATABASES

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UNIT I DISTRIBUTED DATABASES 5

Distributed Databases Vs Conventional Databases – Architecture – Fragmentation – Query Processing – Transaction Processing – Concurrency Control – Recovery.

UNIT II OBJECT ORIENTED DATABASES 10

Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence – Query Languages - Transaction - Concurrency – Multi Version Locks - Recovery.

UNIT III EMERGING SYSTEMS 10

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases.

UNIT IV DATABASE DESIGN ISSUES 10

ER Model - Normalization - Security - Integrity - Consistency - Database Tuning - Optimization and Research Issues – Design of Temporal Databases – Spatial Databases.

UNIT V CURRENT ISSUES 10

Rules - Knowledge Bases - Active And Deductive Databases - Parallel Databases – Multimedia Databases – Image Databases – Text Database

Total: 45 hrs

TEXT BOOKS

1. R. Elmasri, S.B. Navathe, “Fundamentals Of Database Systems”, Pearson Education, 2004.
2. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Fourth Edition, Tata Mcgraw Hill, 2002.

REFERENCES

1. Elisa Bertino, Barbara Catania, Gian Piero Zarri, “Intelligent Database Systems”, Addison-Wesley, 2001.
2. Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, R.T.Snodgrass, V.S.Subrahmanian, “Advanced Database Systems”, Morgan Kaufman, 1997.
3. N.Tamer Ozsu, Patrick Valduriez, “Principles Of Distributed Database Systems”, Prentice Hall International Inc., 1999.
4. C.S.R Prabhu, “Object-Oriented Database Systems”, Prentice Hall Of India, 1998.
5. Abdullah Uz Tansel Et Al, “Temporal Databases: Theory, Design And Principles”, Benjamin Cummings Publishers, 1993.
6. Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, Mcgraw Hill, Third Edition 2004.

UNIT I DATA WAREHOUSING 10

Data Warehousing Components – Building a Data warehouse – Mapping the Data Warehouse to Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools – Metadata.

UNIT II BUSINESS ANALYSIS 8

Reporting and Query Tools and Applications – Tool Categories – Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and Internet.

UNIT III DATA MINING 8

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

UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION 11

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction – Basic Concepts – Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

UNIT V CLUSTERING, APPLICATIONS AND TRENDS IN DATAMINING 8

Cluster Analysis – Types of Data – Categorization of Major Clustering Methods - K-means – Partitioning Methods – Hierarchical Methods – Density-Based Methods – Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data – Constraint Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

TOTAL : 45 hrs.**TEXT BOOKS**

1. Alex Berson and Stephen J. Smith, “ Data Warehousing, Data Mining & OLAP”, Tata McGraw Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, 2007.

REFERENCES

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “ Introduction To Data Mining”, Pearson Education, 2007.
2. K. P. Soman, Shyam Diwakar and V. Ajay, “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
4. Soumendra Mohanty, “Data Warehousing Design, Development and Best Practices”, Tata McGraw Hill Edition, 2006.

CA5223 DATABASE TUNING

L T P C
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UNIT I FUNDAMENTALS OF TUNING

8

Review of Relational Databases – Relational Algebra – Locking and Concurrency Control – Correctness Consideration – Lock Tuning – Logging and the Recovery Subsystem – Principles of Recovery – Tuning the Recovery Subsystem – Operating Systems Considerations – Hardware Tuning

UNIT II INDEX TUNING

8

Types of Queries – Data Structures – B tree – B⁺ Tree – Hash Structures – Bit Map Indexes – Clustering Indexes – Non Clustering Indexes – Composite Indexes – Hot Tables – Comparison of Indexing and Hashing Techniques

UNIT III QUERY OPTIMIZATION

10

Techniques – Tuning Relational Systems – Normalization – Tuning Denormalization – Clustering Two Tables – Aggregate Maintenance – Record Layout – Query Tuning – Triggers – Client Server Mechanisms – Objects, Application Tools and Performance – Tuning the Application Interface – Bulk Loading Data – Accessing Multiple Databases

UNIT IV TROUBLESHOOTING

10

Query Plan Explainers – Performance Monitors – Event Monitors – Finding “Suspicious” Queries – Analyzing a Query’s Access Plan – Profiling a Query Execution – DBMS Subsystems

UNIT V CASE STUDIES

9

Transaction Chopping – Time Series Databases – Understanding Access Plans – Configuration Parameters: Oracle; SQL Server; DB2UDB – Distributed Database – Implementation

Total: 45 hrs

TEXT BOOK

1. Dennis Shasha and Philippe Bonnet “Database Tuning, Principles, Experiments, and Troubleshooting Techniques”, Morgan Kaufmann, An Imprint of Elsevier, 2003.

REFERENCES

1. Thomas Connolly and Carlolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2003.
2. M.Tamer Ozsu, Patrick Valduriez and S.Sridhar “Principles of Distributed Database Systems”, Pearson Education, 2007.

UNIT I FUNDAMENTALS OF GRID COMPUTING 9

The Grid – Past, Present and Future – Applications of Grid Computing Organizations and their Roles.

UNIT II GRID COMPUTING ARCHITURE 9

Grid Computing Anatomy – Next Generation of Grid Computing Initiatives – Merging the Grid Services Architecture with Web Services Architecture.

UNIT III GRID COMPUTING TECHNOLOGIES 9

OGSA – Sample Use Cases that drive OGSA Platform Components – OGSI and WSRF– OGSA Basic Services – Security Standards for Grid Computing -. High Level Grid Services .

UNIT IV FUNDAMENTALS OF CLOUD COMPUTING 9

Fundamentals – Short history of cloud computing – Cloud Architecture – Cloud Storage – Cloud Service – Pros and Cons of cloud computing – Benefits from cloud computing.

UNIT V CLOUD SERVICES 9

Need for Web-Based Application – The cloud Service Development – Cloud Service Development Types – Cloud Service development tools.

Total : 45 hrs.

TEXT BOOKS

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education -2004.
2. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que, 2008.

REFERENCES

1. Fran Berman, Geoffrey Fox, Anthony J. G. Hey, “Grid Computing : Making the Global Infrastructure a reality”, John Wiley & sons, 2003.
2. hmar Abbas, “Grid Computing:A Practical Guide to technology and Application Charles River media, 2003.

CA5225 TCP/IP PROTOCOL SUITE

L T P C
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UNIT I FUNDAMENTALS 10

Standards – Internet – History – OSI model – Protocol suite – Addressing – Transmission media – Local Area and Wide Area Networks – Switching – Connecting devices – IP addressing

UNIT II INTERNET PROTOCOL 10

Subnetting – Supernetting – IP packets – Delivery – Routing – Routing model – Routing table – Datagram – Fragmentation – Checksum – IP Design – ARP – RARP – Internet control message protocol – Internet group management protocol

UNIT III TRANSMISSION CONTROL PROTOCOL 8

User Datagram protocol – UDP operation – Use – UDP design – TCP services – Flow control – Error control – TCP operation and design – Connection – Transition diagram – Congestion control

UNIT IV APPLICATION LAYER AND CLIENT SERVER MODEL 8

Concurrency – BOOTP – DHCP – Domain name system – Name space – Distribution – Resolution – Messages – Telnet – Rlogin – Network Virtual Terminal – Character Set – Controlling the server – Remote login

UNIT V APPLICATION PROTOCOLS 9

File Transfer Protocol – Connections – Communication – Simple Mail Transfer Protocol – Simple Network Management Protocol – Hyper Text Transfer Protocol – Transaction – Request and Response messages

Total: 45 hrs

TEXT BOOK

1. Behrouz A. Forouzan, “TCP/IP Protocol Suite”, Third Edition Tata McGraw Hill, 2007.

REFERENCE

1. Douglas E. Comer, David L. Stevens, “Internetworking with TCP/IP - Volume I - II and III”, Fifth Edition, Prentice Hall of India, 2006.

ELECTIVE II

CA5271 WEB GRAPHICS

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UNIT I FUNDAMENTALS 9

HTML coding – Basic web graphics – Web page design and site building – Image maps – Adding multimedia to the web

UNIT II PAINT SHOP PRO/PHOTOSHOP 9

Introduction – Image Basics – File Formats – GIF – JPEG – Color Palette – Layers – Creating new Images – Brushes – Grids – Scaling Images – Moving and Merging Layers – Tool Palette – Screen capturing – Grey styling – Using style Palette – Animation

UNIT III IMAGE HANDLING 9

Scanning Images – Adding Text to the images – Designing icons – Creating background images – Color models – Color depths – Color calibration – Creating gradients – Oil paint effect

UNIT IV MULTIMEDIA 9

Creating clippings – Animations with sound effects – Adding audio or Video – Windows Media Player ActiveX Control – Agent control – Embedding VRML in a web page – Real Player ActiveX control

UNIT V APPLICATIONS 9

Creating web site with a particular theme using all the utilities – Graphics – Animations and Interaction

Total: 45 hrs

TEXT BOOKS

1. Richard Schrand, “Photoshop 6 Visual Jumpstrat” BpB, 2001.
2. James L. Mohles, “Flash 5.0 Graphics, Animation & Interactivity”, Shroff/Thomson Learning, 2001

REFERENCES

1. Deitel, “Internet and World Wide Web How to program”, Pearson Education, 2008.
2. Robert Reinhardt and Jon Warren Lentz, “Flash 5 Bible”, Idg Books India Pvt Ltd, 2002.

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UNIT I AD HOC NETWORKS

Characteristics and Applications of Ad hoc Networks, Routing – Need for routing and routing classifications, Table Driven Routing Protocols, Source Initiated On-Demand Routing Protocols,, Hybrid Protocols – Zone Routing, Fisheye Routing, LANMAR for MANET with group mobility, Location Added Routing, Distance Routing Effects, Microdiscovery and Power Aware Routing

UNIT II SENSOR NETWORKS**9**

Wireless Sensor Networks, DARPA Efforts, Classification, Fundamentals of MAC, Flat routing – Directed Diffusion, SPIN, COGUR, Hierarchical Routing, Cluster base routing, Scalable Coordination, LEACH, TEEN, APTEEN and Adapting to the dynamic nature of Wireless Sensor Networks.

**UNIT III WIRELESS BROADBAND NETWORKS TECHNOLOGY
VERVIEW, PLATFORMS AND STANDARDS****9**

Wireless broadband fundamentals and Fixed Wireless Broadband Systems, Platforms-Enhanced Copper, Fibre Optic and HFC, 3G Cellular, Satellites, ATM and Relay Technologies, HiperLAN2 Standard, Global 3G CDMA Standard, CDMA Harmonization G3G Proposal for Protocol Layers

UNIT IV MANAGING WIRELESS NETWORKS AND TESTING**9**

Managing Wireless Broadband Operations Management of LMDS Systems and their Application, Principles of operations Management, LMDS Versus Other Access technologies, Applications, Testing Wireless Satellite Networks and Fixed Wireless Broadband Networks

UNIT V ADVANCED WIRELESS NETWORKS**9**

Wireless. Broadband Network Applications: Teleservices Model and Adaptive QoS Parameters, Modeling of Wireless. Broadband Applications, Multicomponent Model, Residential High speed Internet Wireless Broadband Satellite Systems, Next Generation Wireless Broadband Networks – 3G, Harmonized 3G, 3G CDMA, Smart Phones and 3G Evolution

TOTAL : 45**TEXT BOOKS**

1. Joh R. Vacca, “Wireless Broadband Networks Handbook 3G, LMDS and Wireless Internet” Tata McGraw-Hill, 2001.
2. D.P. Agrawal and Qing-An zeng, “Introduction to Wireless and Mobile Systems” Thomson Learning, 2003.

REFERENCES

1. Martyn Mallick, Mobile and Wireless Design Essentials, Wiley, 2003
- Kavesh Pahlavan and Prashant Krishnamurty - “Principles of Wireless Networks – A unified Approach, Pearson Education, 2002

UNIT I INTRODUCTION TO STORAGE TECHNOLOGY 9

Concepts of storage networking – Business applications defined for Storage – Sources of Data and states of data creation – Data center requirements and evolution – Managing complexity – I/O and the five pillars of technology – Storage infrastructure – Evolution of storage – Information lifecycle management.

UNIT II STORAGE SYSTEMS ARCHITECTURE 9

Storage architectures – Device overviews – Peripheral connectivity – Components and concepts – Magnetic disk storage – Disk systems – Disk arrays – RAID storage arrays – Magnetic tape storage – Physical vs.Logical disk organization – Caching properties and algorithms connectivity options – Differences in bus and network architectures.

UNIT III INTRODUCTION TO NETWORK STORAGE 10

Putting storage on the Network – The NAS Hardware – Software architecture – Network connectivity – NAS as a storage system – NAS connectivity options – Connectivity protocols – Management principles – Storage Area Networks: Architecture – Hardware devices – Host bus adaptors – Connectivity – Content Addressable Storage (CAS): Elements – Connectivity options – Standards and Management principles – Hybrid storage solutions overview.

UNIT IV INTRODUCTION TO INFORMATION AVAILABILITY 9

Business continuity and disaster recovery basics:Local business continuity techniques – Remote business continuity techniques – Storage design and implementations of the Business continuity plan – Managing availability – Disaster recovery principles & techniques.

UNIT V MANAGING AND STORAGE VIRTUALIZATION 9

Managing Availability: Availability metrics – Implementing the plan – Finding the holes – Maintaining serviceability capacity planning – Management tools – Overview information security virtualization – Different virtualization – Technologies and processes including file and block level virtualization.

Total: 42 hrs.**TEXT BOOK**

1. Robert Spalding,” Storage Networks: The Complete Reference” Tata McGraw Hill Publishing Company, New Delhi, 2003.

REFERENCES

1. Gerald J Kowalski and Mark T Mayburk,” Information storage and Retrieval Systems”, Springer International Edition, New Delhi, 2006.
2. Ulf Troppens, Rainer Erkens and Wolfgang Muller “Storage Networks Explained” Wiley & Sons, USA, 2004.
3. Marc Farley Osborne,” Building Storage Networks”, Tata McGraw Hill Publishing Company, New Delhi,2000.

CA5274 FUNDAMENTALS OF PERVASIVE COMPUTING

L T P C

3 0 0 3

UNIT I PERVASIVE ARCHITECTURE 9

Local Area Networks – Wireless LANs – Relationship of Wireless, Internet and Ubiquitous Computing – Pervasive Computing and Ubiquitous Computing – Ambient Computing – Pervasive Web application Architecture – Requirements of Computational Infrastructure – Failure Management – Security – Performance – Dependability.

UNIT II MOBILE DEVICE TECHNOLOGIES 9

Mobile Computing Devices Characteristics – Adaptation – Data Dissemination and Management – Heterogeneity – Interoperability – Context awareness – Language localization issues – User Interface Design Issues – Difference between UI Design for Mobile Devices and Conventional Systems – Mobile Agents – Mobile Device Technology Overview – Windows CE – Symbian – J2ME – Pocket PC – BREW.

UNIT III SENSOR NETWORKS AND RFID'S 9

Sensor Networks – Sensor Node Architecture – Sensor Network Architecture – Types of Sensor Networks – Platforms for Wireless Sensor Networks – Applications of Wireless Sensor Networks –RFID – Transponder and Reader Architecture – Types of Tags and Readers – Frequencies of Operation – Application of RFID Technologies.

UNIT IV LOCAL AREA AND WIDE AREA WIRELESS TECHNOLOGIES 9

IEEE 802.11 Technologies – Infrared Technologies – Bluetooth Networks (OBEX Protocol) – Personal Area Networks – Mobility Management – Mobile IP – Establishing Wide Area Wireless Networks – Concept and Structure of Cell – Call Establishment and Maintenance – Channel Management – Frequency Assignment Techniques.

UNIT V PROTOCOLS AND APPLICATIONS 9

Networking Protocols – Packet Switched Protocols – Routing Protocols for Sensor Networks – Data Centric Protocols – Hierarchical Protocols – Location Based Protocols – Multimedia Messaging Service (MMS) Protocols – Wireless Application Protocol (WAP) – Applications of Pervasive Computing – Retail – Healthcare – Sales Force Automation – Tracking Applications.

Total: 45 hrs.

TEXT BOOK

1. Burkhardt, Henn, Hepper, Rintdorff, Schaeck, "Pervasive Computing", Addison Wesley, 2002.

REFERENCES

1. F. Adelstein, S. K. S. Gupta, "Fundamentals of Mobile and Pervasive Computing", Tata McGraw Hill, 2005.
2. Ashoke Talukdar and Roopa Yavagal, "Mobile Computing", Tata McGraw Hill, 2005

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UNIT I FUNDAMENTALS 9

Real Time Systems – Embedded Systems – Pervasive Computing – Information – Access Devices & Smart Cards – Embedded Controllers – Hardware – Fundamentals.

UNIT II RTOS 9

Real Time Operating Systems – Memory Management – Processes, Threads – Interrupts – Events – User Interface.

UNIT III REAL TIME UML 9

Requirements Analysis – Object Identification Strategies – Object Behavior – Real Time Design Patterns.

UNIT IV SOFTWARE DEVELOPMENT 9

Concurrency – Exceptions – Tools – Debugging Techniques – Optimization – Case Studies.

UNIT V CONNECTIVITY 9

Wireless Connectivity – BlueTooth – Other Short Range Protocols – Wireless Application Environment – Service Discovery – Middleware.

Total: 45 hrs.

TEXT BOOK

1. R.J.A. Buhr, D.L.Bailey, “An Introduction to Real -Time Systems”, Prentice Hall International, 1999.

REFERENCES

1. C. M. Krishna, KangG.Shin, “Real -Time Systems”, McGraw-Hill International Editions, 1997.
2. B. P. Douglass, “Real -Time UML”, Third Edition, Addison Wesley, 2004.
3. D. E. Simon, “An Embedded Software Primer”, Addison Wesley, 1999.
4. J. Schiller, “Mobile Communications”, Second Edition Addison Wesley, 2008.
5. V. Hansmann, L. Merk, M. S. Nicklous, T. Stober, “Pervasive Computing Handbook”, Springer, 2001.

CA5276 – OPEN SOURCE TECHNOLOGIES

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UNIT I LINUX FUNDAMENTALS I 9

Overview of free/open source software – Definition of FOSS and GNU – History of GNU/Linux and the free software movement – Advantages of free software and GNU/Linux – FOSS usage – Trends and potential – Global and Indian – GNU/Linux OS installation – Detect hardware – Configure disk partitions and file systems – Install a GNU/Linux distribution – Basic shell commands – Logging in – Listing files – Editing files – Copying/moving files – Viewing file contents – Changing file modes and permissions – Process management – User and group management – File ownerships and permissions – PAM authentication – Introduction to common system configuration files and log files – Configuring networking – Basics of TCP/IP networking and routing – Connecting to the internet. (through dialup –DSL- Ethernet –Leased line)

UNIT II LINUX FUNDAMENTALS II 9

Configuring additional hardware – Sound cards – Displays and display cards – Network cards – Modems – USB drives – CD writers – Understanding the OS boot-up process – Performing every day tasks using gnu/linux – Accessing the internet-playing music – Editing documents and spreadsheets – Sending and receiving email – Copy files from disks and over the network – Playing games – Writing CDS – X window system configuration and utilities – Configure X windows – Detect display devices – Installing software – From source code as well as using binary packages – Setting up email servers – Using postfix (SMTP Services) – Courier (IMAP & POP3 Services) – Squirrel mail (Web Mail Services) – Setting up web servers – Using apache (HTTP Services) – PHP (Server-Side Scripting) – Perl (CGI Support) – Setting up file services – Using samba (File and Authentication Services for Windows Networks) – Using NFS (File Services for Gnu/Linux / Unix Networks) – Setting up proxy services – Using squid (Http / Ftp / Https Proxy Services) – Setting up printer services – Using CUPS (Print Spooler) – Foomatic.(Printer Database)

UNIT III DEVELOPMENT ENVIRONMENT 9

Setting up a firewall – Using netfilter and IP tables – Using the GNU compiler collection – GNU compiler tools – C preprocessor (CPP) – C compiler (GCC) and the C++ compiler (G++) – Assembler (GAS) – Understanding build systems – Constructing make files and using make – Using autoconf and autogen to automatically generate make files tailored for different development environments – Using source code versioning and management tools – Using CVS to manage source code revisions – Patch and diff.

UNIT IV LINUX INTERNALS 9

Understanding the GNU LIBC libraries and linker – Linking against object archives (.a libraries) and dynamic shared object libraries (.so libraries) – Generating statically linked binaries and libraries – Generating dynamically linked libraries – Using the GNU debugging tools – GDB to debug programs – Graphical debuggers like DDD – Memory debugging / profiling libraries MPATROL and VALGRIND – Review of common programming practices and guidelines for GNU/Linux and FOSS – Basics of bash – SED and Awk scripting- Basics of the X windows server architecture.

UNIT V DESKTOP PROGRAMMING 9

QT programming – GTK+ programming – Python programming – Programming GUI applications with localization support.

Total: 45

TEXT BOOK

1. N. B. Venkateshwarlu, “Introduction to Linux: Installation and Programming”, B S Publishers, 2005.

REFERENCES

1. Matt Welsh, Matthias Kalle Dalheimer, Terry Dawson and Lar Kaufman, “Running Linux”, 4th Edition, O'Reilly Publishers, 2002.
2. Carla Schroder, “Linux Cookbook”, 1st Edition, O'Reilly Cookbooks Series, November 2004.

ON-LINE MATERIALS

1. “Open Sources: Voices from the Open Source Revolution”, 1st Edition, January 1999.
URL: <http://www.oreilly.com/catalog/opensources/book/toc.html>
2. “The Linux Cookbook: Tips and Techniques for Everyday Use”, 1st Edition, Michael Stutz, 2001. URL: http://dsl.org/cookbook/cookbook_toc.html
3. “The Linux System Administrators' Guide”, Lars Wirzenius, Joanna Oja, Stephen Stafford, and Alex Weeks, December 2003.
URL: <http://www.tldp.org/guides.html>
4. Using GCC, Richard Stallman et al. URL: <http://www.gnu.org/doc/using.html>
5. An Introduction to GCC, Brian Gough. URL: <http://www.network-theory.co.uk/docs/gccintro/>
6. GNU Autoconf, Automake and Libtool, Gary V. Vaughan, Ben Elliston, Tom Tromey and Ian Lance Taylor. URL: <http://sources.redhat.com/autobook/>
7. Open Source Development with CVS, 3rd Edition, Karl Fogel and Moshe Bar. URL: <http://cvsbook.red-bean.com/>
8. Advanced Bash Scripting Guide, Mendel Cooper, June 2005.
URL: <http://www.tldp.org/guides.html>
9. GTK+/GNOME Application Development, Havoc Pennington.
URL: <http://developer.gnome.org/doc/GGAD/>
10. Python Tutorial, Guido van Rossum, Fred L. Drake, Jr., Editor.
URL: <http://www.python.org/doc/current/tut/tut.html>