SCHEME OF INSTRUCTION AND EXAMINATION
B.E. IIIrd YEAR
COMPUTER SCIENCE & ENGINEERING

SEMESTER - I

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction			Scheme of Examination	
			Periods per Week		Dura-tion in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessi-onals
		THEORY					
1.	CS 301	Database Systems	4	-	3	75	25
2.	CS 302	Microprocessor Systems and Interfacing	4	-	3	75	25
3.	CS 303	Computer Networks	4	-	3	75	25
4.	CS 304	Software Engineering	4	-	3	75	25
5.	CM 371	Managerial Economics and Accountancy	4	-	3	75	25
		PRACTICALS					
1.	CS 331	Database Lab	-	3	3	50	25
2.	CS 332	Microprocessor Lab	-	3	3	50	25
3.	CS 333	Network Programming Lab	-	3	3	50	25
		TOTAL	20	9	-	525	200

CS 301

DATABASE SYSTEMS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction : Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Object-based and Semistructured Databases, Data Storage and Querying, Transaction Management, Data Mining and Analysis, Database Architecture, Database Users and Administrators.

Database Design and E-R Model : Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E-R Design Issues, Weak Entity Sets, Extended E-R features, Database Design for Banking Enterprise, Reduction to Relational Schemas, Other aspects of Database Design, The UML.

UNIT-II

Relational Model : Structure of Relational Databases, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations, Null Values, Modification of the Database.

Structured Query Language : Data Definition, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Complex Queries, Views, Modification of the Database, Joined Relations.

UNIT-III

Advanced SQL : SQL Data Types and Schemas, Integrity Constraints, Authorization, Embedded SQL, Dynamic SQL, Functions and Procedural Constructs, Recursive Queries, Advanced SQL Features.

Relational Database Design : Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional Dependency Theory, BCNF Decomposition, 3NF Decomposition.

UNIT-IV

Indexing and Hashing : Basic Concepts, Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Multiple-Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Index Definition in SQL.

Transactions : Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability.

UNIT-V

Concurrency Control : Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling, Insert and Delete Operations, Weak Levels of Consistency, Concurrency in Index Structures.

Recovery System : Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with Loss of Nonvolatile Storage, Advanced Recovery Techniques. Remote Backup Systems.

Suggested Reading :

1. Abraham Silberschatz, Henry F Korth, S Sudharshan, *"Database System Concepts"*, Fifth Edition, McGraw-Hill International Edition, 2006.

References :

1. Date CJ, Kannan A, Swamynathan S, *"An Introduction to Database Systems"*, Eighth Edition, Pearson Education, 2006.

2. Raghu Ramakrishnan, Johannes Gehrke, *"Database Management Systems"*, Third Edition, McGraw Hill, 2003.

3. Ramez Elmasri, Durvasul VLN Somayazulu, Shamkant B Navathe, Shyam K Gupta, *"Fundamentals of Database Systems"*, Fourth Edition, Pearson Education, 2006

4. Peter Rob, Carlos Coronel, *"Database Systems"*, Thomson, 2007.

CS 302

MICROPROCESSOR SYSTEMS AND INTERFACING

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

8086 Architecture: CPU Architecture, Internal Operation, Machine Language Instructions: Instruction Formats, Instruction Execution Timings. Assembler Language programming: assembler Instruction Format, Data Transfer Instruction, Arithmetic Instructions, Branch Instructions, Loop Instructions, NOP and HL T Instruction, Flat Manipulation and Logical Instructions, Shift and Rotate Instructions,

UNIT-II

Directive and Operators

Modular Programming: Linking and Relation, Stacks, Procedures, Interrupts and Interrupt Routines, Macros, Program Design.

Byte and String Manipulation

UNIT-III

I/O Programming

I/O Interfaces: Serial Communication Interfaces. Parallel Communication, Programmable Timers and Event Counters.

UNIT-IV

Peripheral Devices: Keyboard and display: Keyboard Design, Display Design, Keyboard/Display Controller (8279), DMA Controllers, Diskette Controllers.

UNIT-V

Pentium Processor: Real and protected modes, functional description, processor registers, instruction types, addressing modes, interrupt processing-hardware and software interrupts, interrupt vector table, interrupt processing requires, multiple and special interrupts, ISR.

Suggested Reading:

1. Liu Yu-Cheng, Gibson GA, Microcomputer Systems: The 8086/8088 Family Architecture, Programming and Design, 2nd Edition PHI, 1995.

2. James L.Antonakos, The Pentium Processor, Pearson Education, 1997 (Chapter 2 and chapter 5 only)

References:

1. Walter A.Trieble, Avtar Singh, *The 8088 and 8086 Microprocessors, Programming, Interfacing, Software, Hardware and Applications*, Pearson Education, 2004.

2. Douglas V.Hall, *Microprocessors and Interfacing programming and Hardware*, 2nd Ed. Tata McGraw Hill 2003.

CS 303

COMPUTER NETWORKS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

Introduction: Uses of Computer Networks, Network Hardware, Network Software: Reference Models (ISO -OSI, TCP/IP).

Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service

UNIT-II

Internetworking: Concatenated virtual circuits, connectionless internetworking, tunneling, internetwork routing, fragmentation.
Network layer in the Internet: IP protocol, IP addressees Internet control protocols, OSPF, BGP, internet multicasting, mobile IP,IPv6.
Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols: UDP, Internet Transport Protocols: TCP.

UNIT-III

Network Programming

Socket Interface: Sockets, Socket Address, Elementary Sockets, Advanced Sockets, Socket Options, Non Blocking I/O ,Out of Band Data, Daemon Processes and Internet Super Server.

XTI: X/Open Transport Interface

XTI: TCP Clients, Names and Functions, XTI TCP Servers, XTI Options

UNIT-IV

Application Layer:
Domain Name System: DNS Name Space, Resource Records, Name Servers. Electronic Mail: Architecture and Services, User Agent, Message Formats, Message transfer and Final Delivery.
World Wide Web: Architectural Overview, Static Web Documents, Dynamic Web documents, HTTP, Wireless Web.

Multimedia : Digital Audio, Streaming Audio, Voice over IP, Video on Demand.

UNIT-V

Network Security: Cryptography, symmetric key algorithms, Publics key Algorithms, Digital Signatures, Management of Public Keys, Communication Security, Authentication protocols, E-mail security, web security.

Suggested Reading:

1. Andrew S. Tanenbaurn , "*Computer Networks*", 4th Edition, Pearson Education.
2. W. Richard Stevens, " *Unix Network Programming*", Pearson Education 2003.

References:

1. James F. Kurose, Keith W. Ross, "*Computer Networking, A Top-Down Approach Featuring the Internet*", 2nd Edition, 2003.
2. William Stallings: '*Computer Networking with Internet Protocols and Technology*", *Pearson Education, 2004*

CS 304

SOFTWARE ENGINEERING

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction to Software Engineering:

A generic view of Process: Software Engineering, Process Framework, CMM< Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process.

Process Models: Prescriptive models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process.

An Agile view of Process: What is Agility, What is an Agile Process, Agile Process Models.

UNIT-II

Software Engineering Practice: SE practice, Communication practices, Planning practices, Modeling practices, Construction Practice, Deployment.

System Engineering: Computer-based Systems, The System Engineering Hierarchy, Business Process Engineering, Product Engineering, System Modeling.

Requirements Engineering: A bridge to Design and Construction , Requirements Engineering Tasks, Initiating Requirements Engineering Process, Eliciting Requirements, Developing Use-Cases, Building the Analysis Model, Negotiating Requirements, Validating Requirements.

UNIT-III

Building the Analysis Model: Requirements Analysis Modeling Approaches, Data Modeling Concepts, Object-Oriented Analysis, Scenario based Modeling, Flow-Oriented Modeling, Class-based Modeling, Creating a Behavioral Model

Design Engineering: Design within the context of SE, Design Process and Design Quality, Design Concepts, The Design Model, Pattern-based Software Design.

UNIT-IV

Creating an Architectural Design: Software architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Assessing Alternative Architectural Designs, Mapping Data Flow into a Software Architecture.

Modeling Component-Level Design: What is a Component, Designing Class-based Components, Conducting Component-Level Design, Object Constraint Language, Designing Conventional Components.

Performing User Interface Design: The Golden rules, User interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

UNIT-V

Testing Strategies: A strategic approach to software testing, Strategic issues, Test strategies for O-O Software, Validation testing, System testing, the art of debugging.

Testing Tactics: Software Testing fundamentals, Black-box and White-box testing, Basis path testing, Control Structure testing, O-O testing methods, Testing methods applicable on the class level, Inter class test case design, Testing for Specialized environments, architectures, and applications. Testing patterns.

Product Metrics: Software quality, A frame work for Product metrics, Metrics, for the analysis model, Metrics for the Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Suggested Readings:

1. Roger S. Pressman, *"Software Engineering: A Practitioner's Approach"*, 6th Edition, Tata McGrawHill, 2005.

2. Pankaj Jalote, *"An Integrated Approach to Software Engineering"*, 3rd Eidtion, Narosa Publishing House, 2005.

3. James F. Peters, Witold Pedrycz, *"Software Engineering – An Engineering Approach"*, John Wiley Inc. 2000.

CM 371
MANAGERIAL ECONOMICS AND ACCOUNTANCY

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction of Economics and its evolution – Managerial Economics its scope, importance and relation to other sciences, its usefulness to engineers– Basic concept of Managerial economics.

UNIT-II

Demands Analysis- Concept of demand, determinants, Law of demand, its assumptions, Elasticity of demand, price income and cross elasticity, Demand Forecasting – Markets Competitive Structures, Price-output determination under perfect competition and Monopoly. (theory questions and small numerical problems can be asked.

UNIT-III

Theory of Production – Firm and Industry – Production function – input-output relations – laws of returns – internal and external economics of scale.

Cost Analysis: Cost concepts – fixed and variable costs – explicit and implicit costs –out of pocket costs and imputed costs – Opportunity cost – Cost output relationship – Break-even analysis. (theory and problems)

UNIT-IV

Capital Management: Its significance, determinants and estimation of fixed and working capital requirements sources of capital – Introduction to capital budgeting, methods of payback and discounted cash flow methods with problems.

(Theory questions are numerical problems on estimating working capital requirements and evaluation of capital budgeting opportunities can be asked).

UNIT-V

Book-keeping: Principles and significance of double entry book keeping, Journal, Subsidiary Books, Ledger Accounts, Trial Balance concept and preparation of Final Accounts with simple adjustments – Analysis and interpretation Financial Statements through Ratios.

(Theory questions and numerical problems on preparation of final accounts, cash book, petty cash book, Bank Reconciliation Statement, Calculation of Some ratios)

Suggested Reading:

1. Varshney RL and KL Maheswari, *Managerial Economics*, Sultan Chand
2. JC Pappas and EF Brigham, *Managerial Economics*.
3. Grawal T.S.*Introduction to Accontancy.*
4. Maheswari S.N.*Introduction to Accountancy.*
5. Panday I.M. *Financial Management.*

CS 331

DATABASE LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1. Creation of database (Exercising the commands for creation)
2. Simple to Complex condition query creation using SQL Plus.
3. Usage of Triggers and Stored Procedures.
4. Demonstration of blocks, cursors and database triggers
5. Creation of Forms for Student Information, Library Information, Pay roll, Etc.
6. Creation of Reports based on different queries
7. Writing PL/SQL procedures for data validation
8. Generation using SQL reports.
9. Creating Password and Security features for applications.
10. Usage of File locking, table locking, facilities in applications.
11. Creation of small full pledged database application spreading over 3 sessions.

Note : The creation of sample database for the purpose of the experiments is Expected to be pre-decided by the instructor.

References :

1. Nilesh Shah, *"Database Systems Using Oracle"*, PHI, 2007.
2. Rick F Van der Lans, *"Introduction to SQL"*, Fourth Edition, Pearson Education, 2007.
3. Benjamin Rosenzweig, Elena Silvestrova, *"Oracle PL/SQL by Example"*, Third Edition, Pearson Education, 2004.
4. Albert Lulushi, *"Oracle Forms Developer's Handbook"*, Pearson Education, 2006.

CS 332

MICROPROCESSOR LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments :

1. Tutorials with 8086 kit
2. Fixed-point multiplication and division
3. Floating-point multiplication and division
4. Sorting hexadecimal array
5. Code conversion from hexadecimal to decimal
6. Searching
7. D/A conversion using 8255
8. A/D conversion using 8255
9. 8255/8253 counter interface
10. Screen and keyboard processing
11. Printer control using BIOS Interrupt
12. Reading and Writing FAT contents of a given file

CS 333
NETWORK PROGRAMMING LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1. Understanding and using the following commands. Ifconfig, netstat, ping, arp, telnet, tftp, ftp.

2. Understanding Socket system Calls and XTI-X/Open Transport Interface functions.

3. Implementation of concurrent and iterative Echo Server using both connection oriented and connectionless Socket System Calls.

4. Implementation of time of the day service as Connection -Oriented Concurrent Server using Socket System Calls.

5. Implementation of Ping Service using Socket System Calls.

6. Build a Web Server Using Sockets.

7. Build a Concurrent Multithreaded File Transfer Server. Use Separate Threads to allow the server to handle multiple clients concurrently.

8. Implementation of Remote Program execution using Socket system calls. Programs to demonstrate the usage of Advanced Socket System Calls like Getsockopt ( ), Setsockopt( ), Select ( ), Readv ( ), getpeernamet ( ), Getsockname

9. Program to demonstrate the Non-Blocking (Asynchronous) Input-Output.

10. Program to demonstrate the implementation of Pre forked Server Design.

11. Implement a Concurrent Chart Sever that allows currently logged in users to communicate with one another. Use Socket System Calls.

12. Implementation of the above programs with XTI-X/Open Transport Interface Primitives.

13. Understanding of rpcgen Tool and Middle Layer and Higher Layers of RPC Interface.

14. Implementation of Echo Server Using Middle Layer RPC interface.

15. Implementation of Remote files Access using RPC.

SCHEME OF INSTRUCTION AND EXAMINATION
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COMPUTER SCIENCE & ENGINEERING

SEMESTER - II

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction			Scheme of Examination	
			Periods per Week		Dura-tion in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessi-onals
		THEORY					
1.	CS 351	Web Programming & Services	4	-	3	75	25
2.	CS 352	Principles of Programming Languages	4	-	3	75	25
3.	CS 353	Automata, Languages and Computation	4	-	3	75	25
4.	CS 354	Design and Analysis of Algorithms	4	-	3	75	25
5.	CS 355	Object Oriented System Development	4	-	3	75	25
6.	CS 356	Mobile Computing	4	-	3	75	25
		PRACTICALS					
1.	CS 381	Web Programming & Services Lab	-	3	3	50	25
2.	CS 382	Object Oriented System Development Lab	-	3	3	50	25
3.	CS 384	Industrial Visit	-	-	-	-	*Gr
		TOTAL	24	9	-	550	200

CS 351

WEB PROGRAMMING & SERVICES

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Web Basics and overview: Introduction to Internet ,World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmer's tool box

Introduction to XHTML Cascading Style Sheets

Basics of Java Script

UNIT-II

Java Scripts and HTML Documents DOM Events and Event Handling

Dynamic documentation with Java scripts

Introduction to XML XML document structure, namespaces Schemas XSLT style sheets XML processors

UNIT-III

J2EE Platform for Web Development servelets and JSPs

Extending and enhancing WEB services with Java servelets , major features of servelets : filters, session management;

Creating dynamic WEB pages with JSPs: elements, directives, actions and scripting;

UNIT-IV

.NET Platform

Introduction to .NET Framework; Common Type System: Types and Objects, Generics;

Common Language Runtime CLR , .NET Languages ASP.NET Constructing WEB Services Advertising WEB Services

Database access thro the WEB JDBC and MYSQL

UNIT-V

Service oriented Architecture and Web Services Fundamentals: common characteristics of contemporary SOA ;WEB services and primitive SOA: web service framework – services, modes, service description(WSDL), messaging (SOAP)

Contemporary service oriented Architecture: message exchange patterns, service activity, coordination, atomic transactions, business activities, orchestration, advanced messaging

Suggested Reading:

1. *Programming the World Wide Web* (third edition) Robert W Sebesta Pearson Education, 2007.

2. *Service Oriented Architecture Concepts, Technology and Design,* Thomas Erl - Pearson Education Pub. (chapters 3,5,6 and 7)

3. *An Introduction to WEB Design + Programming*, Paul S Wang Sanda S Katila Thomson Learning 2007 (chapters1 2, 3, 6, 8 and 9).

4. *J2EE 1.4 – A Professional guide,* Aaron E Walsh Wiley 2004 (chapters 1, 2, 3, 5, 6, 9, 10 and 11).

5. *Professional .NET Framework 2.0,* Joe Duffy Wiley India 2007 (chapters 1, 2, 3, 4, 5 and 7).

CS 352

PRINCIPLES OF PROGRAMMING LANGUAGES

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

The Role of Programming Languages: Towards Higher-Level Languages, Problems of Scale, Programming Paradigms, and Language Implementation.

Language Description: Expression Notations, Abstract Syntax Trees, Lexical Syntax Context-Free Grammars, Grammars for Expressions, Variants of Grammar.

UNIT-II

Statements: Structured Programming: Need for structured programming, Syntax Directed control How, Design considerations. Handling special cases in Loops, Programming with invariants, Proof rules for partial correctness, Control flow in C.

Types : Data Representation: Role of Types, Basic Types, Arrays, Records, Unions, Sets, Pointers, Types and Error Checking.

Procedure Invocation: Introduction to Procedures, Parameter Passing Methods, Scope rules for Names- Nested Scopes, Activation Records, Lexical Scope : in C.

UNIT-III

Groupings of Data and Operations: Constructs for Program Structuring, Information Hiding, Program design, Modules and defined types. Class declarations in C++, Dynamic Allocation in C++, Templates, Implementation of Objects.

Object Oriented Programming: Object, Object-Oriented thinking. Inheritance, Object Oriented Programming in C++, Derived Classes, Objects in Smalltalk.

UNIT-IV

Elements of Functional Programming: Language of Expressions, Types, Function Declarations, approaches to Expression Evaluation, Lexical Scope, Type Checking.

Functional Programming in a Typed Language: Exploring a List, Function declaration by Cases, Functions as First - Class Values, ML: Implicit Types, Data Types, Exception Handling in ML. -

Functional Programming with Lists: Scheme, Structure of Lists, List Manipulation, Simplification of Expressions, Storage Allocation for Lists.

UNIT-V

Logic Programming: Computing with Relations, Introduction to Prolog, Data Structures in Prolog, Programming Techniques, Control in Prolog, Cuts.

Introduction to Concurrent Programming : Parallelism in Hardware, Streams, Concurrency as Interleaving, Live ness properties, safe Access to Shared Data, Concurrency in Ada, Synchronized Access to Shared Variables.

Suggested Reading:

1. Ravi Sethi, *Programming Languages,* 2nd edition, Pearson Education Asia, 2001.
2. Winston, *LISP,* 2nd edition, Pearson Education Asia, 2001.

References:

1. Robert W. Sebesta , *"Concepts of Programming Languages"* 7th Edition Pearson Education.

CS 353

AUTOMATA, LANGUAGES AND COMPUTATION

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Automata: Introduction to Finite Automata, Central Concepts of Automata Theory. Finite Automata: An Informal Picture of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, An Application, Finite Automata with Epsilon Transitions.

Regular Expressions and Languages: Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions.

UNIT -II

Properties of Regular Languages: Proving Languages not to be Regular, Closure. Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.
Context Free Grammars and Languages: Context-Free Grammar s, Parse Trees, Applications, Ambiguity in Grammars and Languages.

UNIT- III

Pushdown Automata: Definition, Languages of PDA, Equivalence of PDA's and; CFG's. Deterministic Pushdown Automata. Properties of Context-Free Languages: Normal Forms for Context-Free Grammars, Pumping Lemma, closure properties, Decision Properties of CFL's..

UNIT -IV

Introduction to Turing Machines: Problems that Computer Cannot Solve, The Turing, Machine, Programming Techniques for Turing Machines, Extensions to the Turing 4 Machines, Restricted Turing Machines, Turing Machine and Computers.

UNIT-V

Undecidability: A language that is not Recursively Enumerable, An Undecidable Problem that is RE, Undecidable problems About Turing Machines, Post's Correspondence Problem, Other Undecidable Problems.

Intractable Problems: The Classes P and NP, An NP Complete Problem, A Restricted satisfiability Problem.

Suggested Reading:

1. John E. Hopcroft, Rajeev Motwani, Jeffery D Ulman, *Introduction to Automata Theory Languages and Computation,* Second Edition, Pearson Education 2003.

References:

1. John C. Martin, *Introduction to Languages and the Theory of Computation,* 3rd Edition, Tata McGraw Hill, 2003.

2. Bernard M. Moret, *The Theory of Computation, Pearson Education,* 2002.

CS 354

DESIGN AND ANALYSIS OF ALGORITHMS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction & Elementary Data Structures: Order notation, Analysis of algorithm review of elementary data structures- Heaps and Heap sort. Hashing. Sets representation, UNION, FIND.

UNIT-II

Divide- and Conquer: The general method, binary search, finding maximum minimum. Merge sort, quick sort and selection.

Greedy Method : Knapsack problem, Optimal Storage on Tapes, Job sequencing with Deadlines, Optimal Merge Pattern, Minimum Spanning Trees and Single Source shortest Paths.

UNIT-III

Dynamic programming and Traversal Techniques: Multistage Graphs, All Pairs shortest Paths, Optimal Binary Search Trees, 0/1 Knapsack, Reliability Design Traveling Salesman Problem, Bi connected Components and Depth First Search.

UNIT-IV

Backtracking and Branch and Bound: 8-Queens Problem, Graph Colouring Hamiltonian cycles, Knapsack Problem. 0/1 Knapsack Problem, Travelling Salesperson problem, Lower-Bound Theory.

UNIT-V

NP-Hard and NP-Completeness: Basic concepts, Cook's theorem, NP-hard graph problems and scheduling problem.. N P-hard code generation problems. Decision problem. Node covering problem.

Suggested Reading:

1. Horowitz E. Sahni S: "*Fundamentals of Computer Algorithms*", Galgotia Publications.

References:

1. Anany Levitin, "*Introduction to the Design & Analysis of Algorithms*", 2003: Pearson Education.

2. Aho, Hopcroft, Ullman, *The Design and Analysis of Computer Algorithms*, Pearson Education, 2000.

3. Parag H. Dave, Himanshu B. Dave "*Design and Analysis of Algotrithms*" Pearson Education, 2008.

CS 355

OBJECT ORIENTED SYSTEM DEVELOPMENT

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

UML Introduction : Why we Model, Introducing the UML, Hello World.

Basic Structural Modeling: Classes, Relationships, Common Mechanisms, Diagrams, Class Diagrams.

Advanced Structural Modeling: Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages, Instances, Object Diagrams, Components.

UNIT-II

Basic Behavioral Modeling: Interactions, Use Cases, Use Case Diagrams, Interaction diagrams, Activity diagrams.

Advanced Behavioral Modeling: Events and Signals, State Machines, Processes and Threads, Time and Space, State Chart Diagrams.

UNIT-III

Architectural Modeling: Artifacts, Deployment Collaborations, Patterns and Frame- works, Artifact diagrams, Deployment diagrams, Systems and models.

UNIT-IV

Unified Software Development Process: The Unified Process, The Four Ps, A Use-Case-Driven Process, An Architecture-Centric Process, An Iterative and Incremental Process.

UNIT-V

Core Workflows: Requirements Capture, Capturing Requirements as Use Cases, Analysis, Design, Implementation, Test.

Suggested Reading:

1. Grady Booch, James Rumbaugh, Ivor Jacobson, *"The Unified Modeling Language-User Guide"*(Covering UML 2.0), 2nd Edition, Pearson Education, India, 2007.
2. Ivor Jacobson, Grady Booch, James Rumbaugh *"The Unified Software Development Process"*, Pearson Education, India, 2008.

CS 356

MOBILE COMPUTING

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

Introduction and applications of mobile computing, Wireless transmission: Frequencies, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems.

Medium access control, SDMA, FDMA, TDMA, CDMA, Comparisons.

UNIT-II

Telecommunication system, GSM, DECT, TETRA, UMTS & IMT-2000, Satellite systems: Applications, Basics, routing, localization, Handover. Broadcast systems: cyclic representation of data, Digital Audio Broadcasting, Digital video broadcasting, Convergence of Broadcasting and Mobile Communications.

UNIT-III

Wireless LAN : Infrared Vs Radio transmission, Infrastructure and Adhoc Networks, IEEE 802.11, HYPERLAN, Bluetooth.

UNIT-IV

Mobile IP, Dynamic Host Configuration Protocol, Mobile Adhoc Networks, Mobile Transport Layer, Traditional TCP, Classical TCP improvements, TCP over 2.5/3G Wireless Networks, Performance Enhancing Proxies.

UNIT-V

Operating Systems for Mobile Devices: Features of Windows CE, Palm OS. Symbian OS, Java Card Support for Mobility: File systems, WWW, Wireless Application Protocol.

Suggested Reading:

1. Jochen, M Schiller, *Mobile Communications*,2nd Edition Pearson Education, India, 2003.
2. Hansmann, Merk, Nicklous, Stober, *Principles of Mobile Computing,* 2nd Edition, Springer International Edition, 2003.

Reference:

1. Frank Adelstein , Sandeep K.S. Gupta *"Fundamentals of Mobile and Pervasive Computing "* , Tata McGraw-Hill 2005.

CS 381

WEB PROGRAMMING & SERVICES LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1) Creation of Static web site using XHTML

2) Demonstration of XML , XSLT

3) Validation of Static web site using Java Script

4) Usage of CSS for a web site

5) Usage of Swing Applets in web sites

6) Creation of dynamic content in a web site using servlets

7) Creation of dynamic content in a web site using JSP

8) Creation of dynamic content in a web site using ASP .NET

9) Providing data store support for web site using JDBC

10) Creation of a web service using WSDL

CS 382

OBJECT ORIENTED SYSTEM DEVELOPMENT LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

Select one large Information System / Approach and device the following using CASE TOOL.

1. Data Flow diagram

2. E-R diagram

3. Dynamic Model and Using Finite State Automata

4. Software Requirement Specification Document (SRS)

5. Functional Decomposition and Structure.

6. Data Dictionary

7. Module Specifications

8. Test Data Generation

9. Cost and Resource Estimates

10. Verification

11. User Manual

12. Study of Software Maintenance Tools (SCCS, Debug Tools).

13. A case study using Case Tool supporting UML