WITH EFFECT FROM THE ACADEMIC YEAR 2008-2009

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IIIrd YEAR

COMPUTER SCIENCE & ENGINEERING

SEMESTER - II

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		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. Bemard 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