



**Uttarakhand Technical University, Dehradun**

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**SCHEME OF EXAMINATION**

**&**

**SYLLABI**

**For**

**M.Tech. in Computer Science (2012-13)**

# Uttarakhand Technical University, Dehradun

## Teaching scheme for M.Tech. (Computer Science)

### Semester 1:

S.No.	Course Title	Course Code	Credit
1.	Software Engineering	CS-183	4
2.	Advance Computer Network	CS-184	4
3.	Elective-I	See (Annexure-1)	4
4.	Elective-II	See (Annexure-1)	4

### Semester 2:

S.No.	Course Title	Course Code	Credit
1.	Advance DBMS	CS-198	4
2.	Advance Data Structure and File System	CS-197	4
3.	Elective-III	See (Annexure-1)	4
4.	Elective-IV	See (Annexure-1)	4

### Semester3:

S.No.	Course Title	Course Code	Credit
1.	Distributed Computing	CS-284	4
2.	Elective-V	See (Annexure-1)	4
3.	Seminars on Computer Engineering	CS-381	4
4.	Project	CS-382	4

### Semester4:

S.No.	Course Title	Course Code	Credit
1.	Thesis	CS-481	16

# List of Courses

## Annexure 1

### Elective-I

S.No.	Course Title	Course Code	Credit
1.	Advance Data Modeling	CS-188	4
2.	Multimedia System	CS-189	4
3.	Real Time System	CS-190	4

### Elective-II

S.No.	Course Title	Course Code	Credit
1.	Distributed Operating System	CS-290	4
2.	Foundation of Computer Science-I	CS-181	4
3.	Advance Algorithm Techniques	CS-187	4

### Elective-III

S.No.	Course Title	Course Code	Credit
1.	Foundation of Computer Science-II	CS-182	4
2.	Data Warehousing and Mining	CS-289	4
3.	Network Security and Cryptography	CS-191	4

### Elective-IV

S.No.	Course Title	Course Code	Credit
1.	Oracle System Administration	CS-195	4
2.	Web Technology	CS-283	4
3.	Mobile Computing	CS-288	4

### Elective-V

S.No.	Course Title	Course Code	Credit
1.	Genetic Algorithm & Neural Network	CS-199	4
2.	Unix System Administration	CS-196	4
3.	OO Analysis & Design	CS-281	4

# Software Engineering

**CS183**

**L T P Credits**

**3 0 2 4**

The software crisis, principles of software engineering, programming-in-the-small vs. programming-in-the-large, The Software Lifecycle, Software and systems engineering: overview, examples and industrial realities Project Management - Project Planning and Scheduling, Team organisation

Case studies

SRS ( Software requirement specification). Design for reuse, design for change, design notations, design evaluation and validation, coding and testing, software maintenance and reliability.

Software Economics, Software Quality and standards, Software Metrics - Measurement, Estimation and Prediction, Requirements Management, Configuration Management., Risk Management Testing and Inspection Architecture Description Languages, Pattern-Oriented Software Architecture, Component-based Development, Aspect-oriented development

CASE (Computer Aided Software Engineering): CASE and its Scope, CASE support in software life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

## Reference Books

1. Shari Lawrence Pfleeger, "Software Engineering, Theory and Practice," Prentice-Hall 1998.
2. Merlin Dorfman and Richard H. Thayer, "Software Engineering, Edited ," IEEE Computer Society Press, 1997.
3. Sommerville: Software Engineering 8th Edition. Addison Wesley. 2006
4. R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 2001

# Advanced Computer Network

CS184

L T P Credits

3 0 2 4

**Prerequisite:** Computer Network

IPv6, Next Generation IP protocol, Wireless Networks, GSM, CDMA, Mobility in networks, Mobile IP, Mobile TCP, TCP extensions for high speed network, IP multicasting, BSD Sockets, TCP/IP programming.

Mobility in network. Security related issues. IP Multicasting. Multicasting routing protocols, address assignments, session discovery, etc. TCP extensions for high-speed networks, transaction-oriented application, other new option in TCP.

IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management.

Network security at various layers. Secure-HTTP, SSL, ESP, Authentication header, Key distribution protocols. Digital signatures, digital certificates.

## Case study

Study of various network simulators, Network performance analysis using NS2

## Reference Books:

1. C.E.Perkins, B.Woolf and S.R.Alpert, "Mobile IP, Design Principles and Practices," Addison Wesley, 1997
2. Schiller, "Mobile Communication,"
3. Tanenbaum, "Computer Networks," Pearson Education
4. Stevens, "Network Programming,"

# Advance Algorithm Techniques

**CS187**

**L T P Credits**

**3 0 2 4**

**Prerequisites:** Abstract data types: lists, stacks, queues, trees, search trees. Hashing. Priority queues: heaps. Sorting and searching. Graphs: representation and algorithms. Running-time analysis of algorithms and order notation

Approximation algorithms, Linear programming concepts, NP hard optimization problems. Parallel algorithms models and basic operations, Parallel algorithms -- Linear recurrences, matrix operations ,Graph partitioning, Cache aware and cache oblivious algorithms -- Matrix multiplication ,computational effort of an algorithm, randomized algorithms. Computational geometry, algorithms for string matching, network flow problems, Maximum flow -- Ford-Fulkerson method.

## Reference Books:

1. Introduction to algorithms, T.H. Cormen, C.E. Leiserson, R.L. Rivest, C. Stein, second edition, MIT press, 2001.
2. Approximation algorithms, V. V. Vazirani, Springer, 2003
3. Computational Geometry: Algorithms and Applications, M. De Berg , M. van Kreveld, M. Overmars, and O. Schwarzkopf, Springer-Verlag, 1997
4. Randomized Algorithms, R. Motwani and P. Raghavan, Cambridge University Press, 1995

## Advance Data Modeling

**CS188**

**L T P Credits**

**4 0 0 4**

Introduction to Systems Analysis and Design Information Systems Building Block, Systems Development Life Cycle & Methodology Project Management ,Systems Analysis & Requirements discovery,Feasibility Analysis and System Proposal,requirements definition using Use Case Modeling Systems, Relational Database Concepts & Basic Data Modelling , Data Modeling Using CASE Tools , Process Modeling : Data Flow Diagram , Activity Diagram ,Object-Oriented analysis Using UML , Application Architecture and Modeling, Output Design and Prototyping ,Input Design and Prototyping ,Prototyping Tool, Systems Construction and Implementation .

Conceptual Object Data Model – XML and Web Data – XML Schema –Distributed Data bases – OLAP and Data Mining – ROLAP and MOLAP

Enhanced Data Model for Advanced Applications: Database Operating System, Introduction to Temporal Database Concepts, Spatial and Multimedia Databases, Data Mining, Active Database System, Deductive Databases, Database Machines, Web Databases, Advanced Transaction Models, Issues in Real Time Database Design.

## Reference Book:

1. Jeffrey Whitten and Lonnie Bentley Systems Analysis and Design Methods, 7th edition, McGrawHill, 2007
2. R.Elmasri and S.B. Navathe, "Fundamentals of Database Systems", Addison Wesley,
3. Abraham Silberschatz, Henry F. Korth, S. Sudharsan, "Database System Concepts", Tata McGraw Hill

## Multimedia Systems

**CS189**

**L T P Credits**

**3 0 2 4**

Introduction to Multimedia, Multimedia Objects, Multimedia in business and work. Multimedia hardware, Memory & Storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools, card and page based authoring tools.

Text, Sound MIDI, Digital Audio, audio file formats, MIDI under windows environment Audio & Video Capture.

Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding Higher Order Modeling. Finite Context Modeling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression, Compression ratio loss less & lossy compression.

Digital Audio concepts, Sampling Variables, Loss less compression of sound, loss compression & silence compression.

Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file formatic animations Images standards, JPEG Compression, Zig Zag Coding.

Video representation, Colors, Video Compression, MPEG standards, MHEG Standard recent development in Multimedia.

### Reference Books:

1. Tay Vaughan "Multimedia, Making IT Work" Osborne McGraw Hill.
2. Buford "Multimedia Systems" Addison Wesley.
3. David Hillman "Multimedia technology and Applications" Galgotia Publications.
4. Mark Nelson "Data Compression Book" BPB.

# Real Time System

CS190

L T P Credits

4 0 0 4

**Introduction:** Concept of Real Time System, Issues in real time computing, Performance measures of Real Time System, Issues in Real Time Computing, Performance measures of Real time Systems, Real Time Application.

**Task Assignment and Scheduling:** Different task model, Scheduling hierarchy, offline vs Online Scheduling, Clock Drives.

**Model of Real Time System:** Processor, resources, temporal parameter, Periodic Task Model, Sporadic Task Model, Precedence Constraints and Data Dependencies, Scheduling hierarchy

**Scheduling of Periodic Task:** Assumptions, fixed versus dynamic priority algorithms, schedulability test for fixed priority task with arbitrary deadlines.

**Scheduling of Aperiodic and Sporadic Tasks:** Assumptions and approaches, deferrable, sporadic servers, slack stealing in deadline driven and fixed priority systems. Two level scheme for integrated scheduling, Scheduling for applications having flexible constrains.

**Resources and Resource Access Control:** Assumptions on resources and their usage, resource contention, resource access control(Priority Ceiling Protocol, Priority Inheritance protocol, Slack Based Priority Ceiling Protocol, Preemption Ceiling Protocol).

**Multi Processor Scheduling:** Model of multi processor and distributed systems, Scheduling algorithms for end to end periodic tasks in homogeneous/heterogeneous systems, Predictability and validation of dynamic multiprocessor system.

**Real time Communication:** Model of real time Communication, Priority base service

For switched network, Weighted Round Robin Service, Medium access Control Protocol, Real Time Protocol.

## Reference Books:

1. Jane .W. S. Liu "Real Time Systems" Pearson Education.
2. Krishna .C.M "Real Time Systems" Mc-Graw Hill Publication.



# Distributed Operating Systems

CS290

L T P Credits

4 0 0 4

Monolithic kernel, layered systems, virtual machines. Process based models and client server model. The micro-kernel based client-server approach. Interprocess communication and Remote Procedure Call. Tasks and Threads. Examples from LINUX, Solaris 2 and Windows NT. Resource allocation, failure-recovery and deadlock in distributed systems. Requirements for protection and security in distributed systems.

Issues in the design of distributed file systems: naming, transparency, update semantics and fault resilience. Use of the Virtual File System layer. Examples of distributed systems including Sun NFS, and the Coda files system. Design of the server file system. Example systems: NTFS, Unix ext2 and ext3. The Common Object Request Broker Architecture and Microsoft DCOM models and software and their relationship to Operating Systems.

## Reference Books:

1. Tanenbaum, A. S. and Van Steen, M. "Distributed Systems Principles and Paradigms," (ISBN 0-13-088893-1), Prentice Hall 2002.
2. Bacon, J.," Concurrent Systems, 2nd Edition, (ISBN 0-201-177-676), Addison Wesley 1998.
3. Silberschatz, A., Galvin, P. and Gagne, G., " Applied Operating Systems Concepts, 1st Edition," (ISBN 0-471-36508-4), Wiley 2000..
4. Coulouris, G. et al, "Distributed Systems: Concepts and Design, 3rd Edition," (ISBN 0-201-61918-0), Addison Wesley 2001.

# Foundations of Computing Science I

CS181

L T P Credits

4 0 0 4

**Prerequisites:** Knowledge of basic concepts on Sets, different operations on sets, binary operations, functions.

RELATION: Type and compositions of relations, Pictorial representation of relations, Equivalence relations, Partial ordering relation. Function: Types, Composition of function, Recursively defined function Mathematical Induction: Piano's axioms, Mathematical Induction, Discrete Numeric Functions and Generating functions, Simple Recurrence relation with constant coefficients, linear recurrence relation without constant coefficients, Asymptotic Behavior of functions, Algebraic Structures: Properties, Semi group, monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups.

Propositional Logic: Proposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram,

Lattices: Introduction, Ordered set, Hasse diagram of partially ordered set, Consistent enumeration, Isomorphic ordered set, Well ordered set, Lattices, Properties of lattices, Bounded lattices, Distributive lattices, and Complemented lattices.

Introduction to defining language, Kleene Closure, Arithmetic expressions, Chomsky Hierarchy, Regular expressions, Generalized Transition graph. finite Boolean algebra, functions of Boolean algebra.

Conversion of regular expression to Finite Automata, NFA, DFA, Conversion of NFA to DFA, Optimizing DFA, FA with our Moore machine, Mealy machine, Conversions.

## Reference Books:

1. Kenneth H. **Rosen**, "*Discrete Mathematics and Its Applications*", Sixth Edition, 2008, Tata McGraw-Hill (TMH) Publications Pvt. Ltd., New Delhi.
2. D. S. **Malik** & M. K. Sen, "*Discrete Mathematical Structures*", First Edition, 2005, CENGAGE Learning India Pvt. Ltd., New Delhi.
3. Judith L. **Gersting**, "*Mathematical Structures for Computer Science: A Modern treatment to Discrete Mathematics*", Fifth / Sixth Edition (Asian Student Editions), 2008, W. H. Freeman & Company, New Delhi.

## Advanced Database Systems

CS198

L T P Credits

4 0 0 4

Object-relational databases, active databases, and distributed databases. Topics covered include object-relational type extension, active rules and their design, distributed database design, distributed query processing and optimization, distributed concurrency control, and multidatabases. An overview of other modern database technologies, such as parallel databases, multimedia databases, spatial and temporal databases, data warehousing and data mining, deductive databases, and uncertainty in databases, is also given.

### Reference Books:

1. Carlo Zaniolo, et al., "Advanced Database Systems," Morgan Kaufmann Publishers, Inc., 1997
2. M. T. Ozsu and P. Valduriez, "Principles of Distributed Database Systems, 2nd Ed.," Prentice Hall, Inc., 1999
3. M. Stonebraker, "Object-Relational DBMSs, 2nd Ed.," Morgan Kaufmann Publishers, Inc., 1999

## Genetic Algorithms and Neural Networks

CS199

L T P Credits

4 0 0 4

An Overview of Combinatorial Optimization. An Introduction to Genetic Algorithms, Theoretical Foundations of Genetic Algorithms, Genetic Algorithms in Engineering and Optimization, Genetic Algorithms in Natural Evolution, Simulated Annealing and Tabu Search, Artificial Neural Networks, Evolving Neural Networks Implementing Genetic Algorithms: GALib, Genetic Algorithm Optimization Toolbox (GAOT) under Matlab.

### Reference Books:

1. Goldberg, "Genetic Algorithms," Addison Wesley, 1989, ISBN 0-201-15767-5
2. Golden, "Mathematical Methods for Neural Network Analysis and Design," MIT Press, 1996
3. Mitchell, "An Introduction to Genetic Algorithms," MIT Press, 1998 (paper)

# Unix Network Programming

CS196

L T P Credits

2 0 4 4

Client/Server Model, Peer-to-Peer Model, overview of IPv4 and IPv6, TCP and UDP, Socket programming, Multiplexing I/O, Encapsulation, Unix Domain Protocols, Daemon Processes, super server, broadcasting and Multicasting, Threaded network programming, Raw Socket, HTTP Server Design.

## Reference Books:

1. W. Richard Stevens, "UNIX Network Programming," Volume 1, second edition," Prentice Hall. ISBN #0-13-490012-X
2. Douglas Comer, "Internetworking with TCP/IP," Volume I, II & III, Prentice Hall

# Advanced Data Structure & File System

CS197

L T P Credits

3 0 2 4

**Prerequisite:** Data Structures

Contents:

Arrays, Linked Lists, Stack, Queue, Dqueue, Priority Queue, Tree, Binary Search Tree, Heap Tree, Threaded Tree, Fibonacci Tree, Tree Traversal, Binomial Tree, B, B+ Tree, AVL Tree, Graphs, Graph Traversal, Spanning Trees, Shortest Path, Hashing.

## Reference Books:

1. Cormen, "Introduction to Algorithms," McGraw Hill
2. Tanenbaum, "Data Structures using C and C++, PHI
3. Jean-Paul Tremblay, Sorenson, "An Introduction to Data Structures with Applications," McGraw Hill

# Foundations of Computer Science-II

CS182

L T P Credits

4 0 0 4

Regular expressions and finite Automata:Regular languages, Finite automata, Union, Intersections & complements. Non deterministic Finite automata, Kleene's theorem.

Regular & Non regular languages:Criterion for regularity, minimal Finite Automata, Pumping lemma, Decision problems, languages & computers.

Context-free grammars:Derivation Trees & Ambiguity, An Unambiguous CFG for algebraic expressions, simplified forms and normal forms.

Pushdown Automata:Definition, Deterministic pushdown automata, A PDA corresponding to a given context-freegrammar, context-free grammar corresponding to a given PDA, parsing.

Context-free and Non-Context-free languages:The pumping lemma for context-free languages, Intersections & complements of context-freelanguages, decision problems involving context-free languages.

Turing Machines:Definitions, computing partial functions, combining Turing machine, variation of Turing machines, Non-Deterministic Turing Machines, Universal Turing Machine, Church-Turing Thesis.

Graph Theory:Introduction, Isomorphism, Sub-graphs, walks, paths and circuits, connected graphs, disconnected graphs and components, Euler graphs, Operations on graphs, more on Euler Graphs, Hamiltonian paths and circuits, The traveling salesman problem, Chromatic number, Chromatic partitioning,Chromatic polynomial, Matchings.Continuous-Parameter Markov chains and Queuing Theory:Introduction, The Birth and death process, other special cases of the Birth-Death Model, Non-Birth-Death processes.

## Reference Books

1. Introduction to languages & the theory of computation by John C Martin, Tata McGraw Hill publication Co. Ltd., 3rd edition, 2004.
2. Narsingh Deo – Graph Theory with Applications to Engineering & Computer Science – Prentice Hall of India.
3. K.S. Trivedi - Probability and Statistics with Reliability and Queuing and Computer Science Applications, Prentice Hall of India.
4. John E Hopcroft and Jeffrey D Ullman – Introduction to Automata theory, Languages and Computation – Narosa Publication House, 2004.

# Data Ware Housing and Mining

CS289

L T P Credits

4 0 0 4

Introduction to DATA Warehousing. Client/Server Computing model & Data Warehousing. Parallel processors & Cluster Systems. Distributed DBMS implementations. Client/Server RDBMS Solutions.

Data Warehousing Components. Building a Data Warehouse. Mapping the Data Warehousing to a Multiprocessor Architecture. DBMS Schemas for Decision Support. Data Extraction, cleanup & Transformation Tools. Metadata.

Reporting & Query Tools & Applications. On line Analytical Processing (OLAP). Patterns & Models. Statistics. Artificial Intelligence.

Introduction to Data Mining. Decision Trees. Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms. Rule Induction. Selecting & Using the Right Technique.

Data visualization & Overall Perspective. Data Visualization. Putting it All Together.

Appendices: A : Data Visualization. B : Big Data-Better Returns : Leveraging Your Hidden Data Assets to Improve ROI. C : Dr. E.F. Codd's 12 Guidelines for OLAP. D : Mistakes for Data warehousing Managers to Avoid.

## Reference Books:

1. Berson, "Data Warehousing, Data Mining & OLAP".
2. Mallach, "Data Warehousing System", (McGraw Hill).

# Network Security & Cryptography Security

**CS191**

**L T P Credits**

**3 0 2 4**

OSI Architecture - Classical Encryption techniques – Cipher Principles – Data Encryption Standard – Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES – AES Cipher – Triple DES – Placement of Encryption Function – Traffic Confidentiality

Key Management - Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public Key Cryptography and RSA.

Authentication requirements – Authentication functions – Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs – MD5 message Digest algorithm - Secure Hash Algorithm – RIPEMD – HMAC Digital Signatures – Authentication Protocols – Digital Signature Standard

Authentication Applications: Kerberos – X.509 Authentication Service – Electronic Mail Security – PGP – S/MIME - IP Security – Web Security.

Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.

## REFERENCES BOOK

1. William Stallings, "Cryptography And Network Security – Principles and Practices", Prentice Hall of India, Third Edition, 2003.
2. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003.
3. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.

# Oracle System Administration

CS195

L T P Credits  
2 0 4 4

Oracle Database Administration, Oracle System Administration, Managing Oracle Applications Security, Administrating Folders ,User and Data Auditing, Oracle Applications Help, User Profiles, Managing Concurrent Programs and Requests, Managing Concurrent Processing, Applications DBA Duties, Document Sequences, Zoom and Customizing Oracle Applications Loaders,Alerts,Windows,Reports,Implementing Oracle System Administrator.



# Web Technology

CS283

L T P Credits  
3 0 2 4

History of Web, Protocols governing Web, Creating Websites for individual and Corporate World, Cyber Laws, Web Applications, Writing Web Projects, Identification of Objects, Target Users, Web Team, Planning and Process Development.

List, Tables, Images, Forms, Frames, CSS Document type definition, XML schemes, Object Models, Presenting XML, Using XML Processors: DOM and SAX, Introduction to Java Script, Object in Java Script, Dynamic HTML with Java Script.

Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API Introduction to Servlets, Lifecycle, JSDK, Servlet API, Servlet Packages: HTTP package, Working with Http request and response, Security Issues.

Introduction to JSP, JSP processing, JSP Application Design, Tomcat Server, Implicit JSP objects, Conditional Processing, Declaring variables and methods, Error Handling and Debugging, Sharing data between JSP pages- Sharing Session and Application Data.

Database Programming using JDBC, Studying Javax.sql.\*package, accessing a database from a JSP page, Application-specific Database Action, Developing Java Beans in a JSP page, introduction to Struts framework.

## Reference Books:

1. Burdman, "Collaborative Web Development" Addison Wesley.
2. Chris Bates, "Web Programming Building Internet Applications", 2nd Edition, WILEY, Dreamtech
3. Joel Sklar, "Principal of web Design" Vikash and Thomas Learning
4. Horstmann, "CoreJava", Addison Wesley.
5. Herbert Schildt, "The Complete Reference:Java", TMH.
6. Hans Bergsten, "Java Server Pages", SPD O'Reilly

# Mobile Computing

CS288

L T P Credits

4 0 0 4

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

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

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

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

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

## Reference Books:

1. Shambhu Upadhyaya, Abhijeet Chaudhary, Kevin Kwiat, Mark Weises, "Mobile Computing", Kluwer Academic Publishers
2. UWE Hansmann, Lothar Merk, Martin-S-Nickious, Thomas Stohe, "Principles of Mobile Computing", Springer International Edition

# OO Analysis and Design

CS281

L T P Credits  
3 0 2 4

An Overview of Object Oriented Systems Development, 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.

Identifying use cases - Object Analysis - Classification – Identifying Object relationships – Attributes and Methods. Design axioms - Designing Classes – Access Layer - Object Storage – Object Interoperability. Designing Interface Objects – Software Quality Assurance– System Usability - Measuring User Satisfaction.

## REFERENCES BOOKS

1. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 1999 (Unit I, III, IV, V).
2. Martin Fowler, "UML Distilled", Second Edition, PHI/Pearson Education, 2002. (UNIT II)
3. Stephen R. Schach, "Introduction to Object Oriented Analysis and Design", Tata McGraw-Hill, 2003.
4. James Rumbaugh, Ivar Jacobson, Grady Booch "The Unified Modeling Language Reference Manual", Addison Wesley, 1999.
5. Hans-Erik Eriksson, Magn