

Semester I
Core Paper- CS101T
Subject: Computer System Architecture

Lectures/Unit	Credits		Theory		Internals		Practical	
			Max	Min	Max	Min	Max	Min
14	T	P	40	16	10	5	34	17
	4	2						

UNIT I

Computer Arithmetic: Arithmetic Algorithms - Addition & Subtraction (with signed Magnitude data, hardware implementation, Hardware Algorithm, Addition and Subtraction with Signed-2's Complement Data, Multiplication Algorithms -Hardware implementation for signed Magnitude data, Hardware Algorithm, Booth's Algorithm, Array Multiplier, Division algorithm- Hardware implementation for signed Magnitude data, Divide overflow, Hardware Algorithm. Floating point Arithmetic Operations- Register Configuration, Addition, Subtraction, Multiplication and Division.

UNIT II

Introduction to Parallel Processing: Parallelism in Uni-Processor Systems, Parallel Processing Mechanisms, **Parallel Computer Structures:** Pipeline Computers, Array Computers, Multiprocessors Systems, Performance of Parallel Computers, Dataflow and New Concepts, Architectural Classification Schemes, Applications of Parallel Processing.

UNIT III

Pipeline & Vector Processing: Principles of pipelining, Arithmetic pipeline, Instruction Pipeline Vector Processing, Matrix multiplication, Memory Interleaving, Supercomputers, Array Processor(Attached Array and SIMD).

UNIT IV- ASSEMBLER

Introduction to Assembly Language, Name field, operator field, comment field, program data (Number, Character), variable(Byte, word, array), named constant, Basic instructions (MOV,XCHG,ADD,SUB,INC,DEC). **Program Structure:** memory model, data segment, stack segment, code segment. **Input and output instruction:** INT instruction: INT 21h single key input, display a character, display a string.

UNIT V

Process status and flags register: Status flag, carry flag, parity flag, auxiliary carry flag, zero flag, sign flag, overflow flag DEBUG program Flow control instruction(conditional jump, branching structure, looping structure, logic and shift instruction, stack application, Procedure(call and RET).

Textbooks:

Computer System Architecture, by Morris Mano, PHI.
 Computer Architecture & Parallel Processing by Hwang, Briggs, McGraw-Hill. **Reference Books:**

Computer Organization and Design, 3rd edition by David Patterson and John Hennessy's ,
 Tanenbaum, A. S. *Structured Computer Organization*, 3rd Ed., Prentice Hall, 1990.

Semester I
Core Paper- CS102T
Subject: Software Engineering

Lectures/Unit	Credits		Theory		Internals	
			Max	Min	Max	Min
14	T	P	40	16	10	5
	4	0				

UNIT I

Software Processes: Processes, projects and products, component software processes, characteristics of a software process, software development process, project management process, software configuration management process, and process management process. **Software requirement Analysis and Specification:** Software requirement, need for SRS, requirement process, problem analysis, analysis issues, informal approach, structured analysis, object oriented modeling, other modeling approaches, prototyping, requirement specialization, characteristics of an SRS, component of an SRS, specialization languages, structure of requirement document validation, requirement reviews, other method metrics, size measures, quality metrics.

UNIT II

Planning Software Project: Cost estimation, uncertainties in cost estimation, building cost estimation models, on size estimation, COCOMO model, project scheduling, average estimation, project scheduling and milestones, staffing and personnel planning, Raleigh curve, personnel plan, team structure, software configuration management plans, quality assurance plans, verification and validation, project monitoring plans, risk management.

UNIT III

Function Oriented Design: Design principles, coupling, cohesion, design notation and specification, structured design methodology, verification, network metrics, stability metrics, information flow metrics software Testing.

UNIT IV

Testing Methods: Software testing fundamentals, test case design, white box testing, control structure testing, black - box testing, testing for specialized environments. **Software Testing Strategies:** A strategic Approach to software testing, strategic issues, unit testing, validation testing, system testing, the art of debugging.

UNIT V

Re-Engineering: Software re-engineering, software maintenance, software reengineering process model, reverse engineering, reverse engineering user interfaces restructuring, code restructuring, data restructuring, forward engineering the economics of reengineering. **Client / Server software Engineering:** The structure of Client/server systems, software engineering for c/s systems, analysis modeling issues, design for c/s systems, testing issues. **Computer-Aided software Engineering:** What is case, building blocks for case, taxonomy of case tools, integrated case environments, the integration architecture, case repository.

Textbooks:

Software Engineering, A Practitioners Approach Tata Mc Graw hill by Pressman Rogers

Reference Books:

An Integrated Approach to Software Engineering by Pankaj Jalote.

Software Engineering Concepts by R.E. Fairly, Mc Graw Hill.

Software Project Management by Boyce

Semester I
Core Paper- CS103T

Subject: Object Oriented Modeling and Design using UML

Lectures/Unit	Credits		Theory		Internals	
			Max	Min	Max	Min
14	T	P	40	16	10	5
	4	0				

UNIT I

Object orientation, OO Development, Modeling Concepts- Modeling as a Design Technique- Modeling, Abstraction, the three models, Class Modeling- Object and class concepts, Link and association concepts, generalization and inheritance, Advanced class modeling- Concepts, association ends, N-ary associations, aggregation, abstract classes, multiple inheritance.

UNIT II

State Modeling- Events, states, transitions and conditions, state diagrams, Advanced state modeling- nested state diagrams, nested states, concurrency, Interaction Modeling- use case models, sequence models, activity models.

UNIT III

Analysis and Design- Process overview- Development stages, development life cycle, Domain analysis-overview of analysis, domain class model, domain state model, domain interaction model, iterating the analysis, Application analysis- Application Interaction Model, application state model, System Design- Estimating performance, making a reuse plan, breaking a system into subsystems, identifying concurrency, allocation of subsystems, management of data storage, handling global resources, common architectural styles.

UNIT IV

Class Design- Bridging the gap, realizing use cases, designing algorithms, recursing downward, design optimization, adjustment of inheritance, organizing a class design, process summary, Implementing Modeling- fine-tuning classes, fine-tuning generalization, realizing associations, testing.

UNIT V

Databases- Implementing structure-basic, implementing structure-advanced, implementing functionality, Programming Style: Object-Oriented Style, Reusability, Extensibility, Robustness, Programming – in –the Large, Software Engineering- Iterative Development, Managing Models.

Text Books

Object-Oriented Modeling and Design with UML by Michael Blaha, James Rumbaugh, Pearson Prentice Hall Pub.

Reference Books:

Object Oriented Analysis & Design with Application by Grady Booch, Pearson Prentice Hall Pub.

He UML User Guide by G. Booch, J Rumbaugh, Ivar Jacobson, Pearson Education

Semester I
Core Paper- CS104T
Subject: Computer Oriented Statistical Analysis

Lectures/Unit	Credits		Theory		Internals		Practical	
			Max	Min	Max	Min	Max	Min
14	T	P	40	16	10	5	33	17
	4	2						

UNIT I

Probability Distribution & Statistical Inference: Discrete Probability Distribution, Binomial & Poisson Distribution. Continuous probability Distribution: Exponential and normal distribution (for all probability distribution simple properties and application) testing of hypothesis, testing of single and two mean, z and t test for variables, chi square for independence of two attributes(m x n) table and goodness of fit.

UNIT II

Correlation and Regression Analysis: Objectives, Correlation and Regression, coefficients and lines, partial correlation coefficient, polynomial curve fitting, fitting of a regression plane.

UNIT III

Analysis of Variance and Time Series Analysis: Basic principles of design of experiments, analysis of variance of one way(equal and unequal observation for treatment) and two way classified data (one observation per cell), time series analysis trend and seasonal variation.

UNIT IV

Statistical Quality Control: Introduction, Control Charts and its Types, Setting up a Control Procedure, XChart, RChart, Control Chart for C, P. Advantages and Limitations of Statistical Quality Control. Acceptance Sampling.

UNIT V

Business Forecasting: Introduction, Role, Steps, Methods, Theories and Cautions.
Statistical Decision Theory: Introduction, Ingredients, Optimal Decisions and Miscellaneous Illustrations using Decision Tree Analysis.

Textbooks

Statistical Methods by S.C. Gupta

Reference Books

Gupta S.C. & Kapoor Mathematical Statistics. Chand and Company Limited

Semester-I
Core Paper- CS105T
Subject- Java with GUI and Javascript

Lectures/Unit	Credits		Theory		Internals		Practical	
			Max	Min	Max	Min	Max	Min
14	T	P	40	16	10	5	33	17
	4	2						

UNIT I

Introduction of Java, Features of Java, Java Development Kit(JDK), Java Runtime Environment(JRE), Java Virtual Machine (JVM), JVM components, Unicode System, Data Type, Control Statement, Array, String, Java Class and Object, Methods Overloading , Inheritance, Method Overriding, Constructor, Object Cloning, super, this and static keyword, Extending and Implementing Interface, inner classes.

UNIT II

Access Modifiers, Packages, Multithreading, Interrupting Threads, thread life cycle ,Thread Properties, Inter thread communication, Thread synchronization, Exception Handling, **Applet Class:** Life Cycle of an Applet, The Applet Tag and their attributes, Passing Parameter to an Applet, Graphics in Applet. **AWT:** Event Handling: Event Handling Mechanism, the Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, AWT controls, Adapter Classes, Layout Managers and Menus.

UNIT III

Swings: JButton, JLabel, JTextField, JTextArea, JPasswordField, JCheckBox, JRadioButton, JComboBox, JTable, JList, JOptionPane , JScrollBar, JMenuItem & JMenu, JPopupMenu , JCheckBoxMenuItem , JTree , JTabbedPane , JPanel , JFrame, JScrollPane ,Use of ToolTip.

UNIT IV

Java Database Connectivity(JDBC): Introduction, JDBC Driver, DB Connectivity steps, Connectivity with Oracle, MySQL and MS Access, Connection Interface, Statement Interface, ResultSet Interface, Scrollable ResultSet, PreparedStatement, Transaction Management.

UNIT V

Networking: Socket Overview, Client/Server, TCP/IP Client Sockets and TCP/IP Server Sockets.

Javascript: Introduction, Variables, Data type, control statements, functions, arrays, Strings, Math and Dates, Window properties and Methods, Document Object Model.

Methods of document object: Write(), getElementById(), getElementsByName(), getElementsByTagName(). innerHTML and innerText property, Javascript validations.

Text Books:

The Complete Reference: Java 2 – 5Ed, Herbert Schildt, Tata McGraw-Hill Publishing Company Limited.

Core Java 2, Vol. I – Fundamentals 7Ed, Cay S. Horstmann and Gary Cornell, (LPE) Pearson Education, Sun Microsystems.

Reference Books:

Java Examples in a Nutshell - by David Flanagan

The Java AWT Reference by John Zukowski Publisher: O'Reilly & Associates, Inc.

The Java Class Libraries: An Annotated Reference by Patrick Chan, Rosanna Lee
 Publisher: Addison-Wesley

Designing Better Apps and Applets with Java by Peter Coad, Mark Mayfield

Semester-II
Core Paper- CS201T
Subject- Automata Theory

Lectures/Unit	Credits		Theory		Internals	
			Max	Min	Max	Min
14	T	P	40	16	10	5
	4	0				

UNIT I

Fundamentals – alphabets, strings, languages, problems, graphs, trees, Finite State Systems, definitions, Finite Automaton model, acceptance of strings, and languages, Deterministic finite automaton and Nondeterministic finite automaton, transition diagrams, transition tables, proliferation trees and language recognizers, equivalence of DFA’s and NFA’s. Finite Automata with ϵ -moves, significance, acceptance of languages, ϵ -closure.

UNIT II

Minimization of finite automata, Finite Automata with output– Moore and Melay machines. Regular Languages: regular sets, regular expressions, identity rules, constructing finite automata for a given regular expressions, conversion of finite automata to regular expressions. Pumping lemma of regular sets and its applications, closure properties of regular sets. Grammar Formalism: Regular grammars–right linear and left linear grammars.

UNIT III

Context free grammar, derivation trees, sentential forms, right most and leftmost derivation of strings, ambiguity. Context Free Grammars: Simplification of Context Free Grammars, Chomsky normal form, Greibach normal form.

UNIT IV

Pumping lemma for context free languages and its applications, closure of properties of CFL (proofs omitted). Push Down Automata: PDA definition, model, acceptance of CFL, acceptance by final state and acceptance by empty state and its equivalence. Turing Machine: TM definition, model, design of TM, computable functions, unrestricted grammars, recursively enumerable languages.

UNIT V

Linear bounded automata and Context sensitive language. Computability Theory: Chomsky hierarchy of languages. Definitions of P and NP problems, NP complete and NP hard problems.

Text Books:

J. E. Hopcroft, J. D. Ullman, Introduction to Automata Theory, Languages, and Computation

Reference Books:

1. John C. Martin, Introduction to Languages and the Theory of Computation
2. Mishra, Chandrashekar, Theory of Computer Science
3. Perter Linz, An Introduction to Formal Languages and Automata 4. ZviKohav, Niraj K Jha, Switching and Finite Automata Theory

Semester II
Core Paper- CS202T
Subject: Computer Graphics with Multimedia

Lectures/Unit	Credits		Theory		Internals		Practical	
			Max	Min	Max	Min	Max	Min
14	T	P	40	16	10	5	34	17
	4	2						

UNIT I

A brief background about applications of Computer Graphics. Overview of graphic systems, video display devices, refresh cathode ray tubes, raster and random screen display, color CRT monitors, flat panel displays, LCD's. Design and architecture of raster scan and random scan display systems. A brief introduction to input devices and hardcopy devices. Output primitives, DDA and Bresenham's 2D line drawing algorithms, parallel line algorithms.

UNIT II

Midpoint circle generating algorithm, Ellipse generating algorithm, other curves, filled area primitives, scan line polygon fill algorithm, inside outside test, boundary fill algorithms, flood fill algorithm, character generation, attributes of output primitive, line and curve attributes, character attributes.

UNIT III

Anti-aliasing, two dimensional geometric transformations, composite transformations. General composite transformations and computational efficiency, other transformations, affined transformation, two dimensional viewing, window to view port coordinate transformations.

UNIT IV

Clipping operations, Cohen Sutherland line clipping, Liang Barsky line clipping, Nicholl-Lee- Nicholl line clipping, polygon clipping, Sutherland Hodgeman and Weiler Atherton polygon clipping, text and curve clipping. Three dimensional concepts, display methods, polygon surfaces, quadric surfaces and super quadrics.

UNIT V

Three dimensional geometric and modeling transformations, general three dimensional rotation. Three dimensional viewing, pipeline projections, parallel and perspective projections, view volume and general projective transformations. Visible surface detection methods, Back Face detection, Depth Buffer Method, A buffer method, Depth sorting method.

Text Book:

Donald Hearn and M. Pauline Baker, Second Edition, PHI 1997.

Reference Books:

J. D. Foley, A van Dam, S. K. Feiner, J. F. Hughes, Addison Wesley Publ. Company, 1997
 Jim Blinn, Jim Blinn's Corner : A trip down the graphics pipeline, Morgan Kaufman, 2000.
 Computer Graphics by schaum's outlines.

Semester II
Core Paper- CS203T

Subject: Relational Database Management System (SQL Programming using Oracle)

Lectures/Unit	Credits		Theory		Internals		Practical	
			Max	Min	Max	Min	Max	Min
14	T	P	40	16	10	5	33	17
	4	2						

UNIT I

Introduction: Advantages of DBMS approach, various views of data, data independence, schema & sub-schema, Primary concepts of data models, Database languages, transaction management, database administrator, & uses, data dictionary, overall system architecture.

ER Model: Basic concepts, design issues, mapping constraints, keys, ER diagram, weak & strong entity sets, specialization & generalization, aggregation, inheritance, design of ER schema, reduction of ER schema to tables.

UNIT II

Domain Relation & Keys: Domains, relations, kinds of relation, relational databases, various types of keys, candidate, primary, alternate & foreign keys. **Relation algebra & SQL:** The structure, relation algebra with extended operations, modification of database, idea of relational calculus, basic structure of SQL, set operation, aggregate function, null values, nested sub queries, derived relations, views, modification of database, join relations, DDL & SQL.

UNIT III

Functional dependencies & Normalization: Base definition, trivial and nontrivial dependencies, closure set of dependencies, & of attributes, irreducible set of dependencies, introduction to normalization, non-loss decomposition, FD diagram, I,II & III NF, dependencies prevention, BCNF, multivalued dependencies, preventions, BCNF, Multivalued dependencies & 4NF, Join dependencies & 4NF. **Database Integrity:** General idea, Integrity rule, domain rules, attributes, relation, rules, database rule, assertions, triggers, integrity& SQL.

UNIT IV

Distributed databases: Basic idea, distributed, data storage, data replication, data fragmentation, horizontal, vertical, & mixed fragmentation. **Emerging field in DBMS:** Object- Oriented database- basic idea & the model object structures Object, class, inheritance, multiple object identify, data warehousing terminology, definitions, characteristics, data mining & its overview, database on WWW, multimedia database difference with conventional DBMS, issues, similarity based retrieval continuous media data, multimedia data formats, video servers.

UNIT V

Network & Hierarchical model: Basic idea, data structure diagram, DBTG model, implementation, tree structure diagram, implementation techniques, comparison of three models. **Transaction concurrency & recovery:** Basic concept, ACID properties, transaction state, implementation of atomicity and durability, concurrent execution. Basic idea of serializability, basic idea of concurrency control, basic idea of deadlock, failure classification, storage structure- types, stable storage implementation, data access. **Recovery & Atomicity:** Log based recovery, deferred database modifications, immediate database modification, and check points.

Text Books:

Data base concepts by Henry F. Korth, MGH

An Introduction to database system by Bipin C. Desai, Galgotia Pub.

Reference Books:

Database Management system by Arun K. Majumdar & P. Bhattacharya, TMH Pub.

Principles of Database system by Jeffrey O. Ullman, Galgotia Pub, Co. Ltd.

Principles of Database Management system by James Martin, PHI

Semester II
Core Paper- CS204T
Subject: Operation Research

Lectures/Unit	Credits		Theory		Internals	
			Max	Min	Max	Min
14	T	P	40	16	10	5
	4	0				

UNIT I

Linear programming – Mathematical formulation of problems, graphical solution, simplex method, two phase method, Big M method, concept of duality, dual simplex method, degeneracy and its resolution, sensitivity analysis.

UNIT II

Assignment problems – Mathematical formulation, Hungarian method for solution, unbalanced assignment problem, infeasible assignment, Crew based problems, transportation problems – Vogel’s approximation method, optimal solution by stepping stone method and modified distribution method, degeneracy in transportation problems, transshipment problems.

UNIT III

Game theory, two person zero sum game, minimax (maximin) criterion, solution of games with saddle point and without saddle point, equivalence of the rectangular game and linear programming and solution by simplex method, concept of dominance, graphical method for 2 x n and m x 2 games, algebraic method for a general game, iterative method, sequencing problems of n jobs through 2 machines, 3 machines, and n jobs through m machines.

UNIT IV

Replacement problems – replacement of items that deteriorate with time, money value and present work factor, replacement policy when money value changes, replacement of items that are failed completely, group replacement of items, integer programming, nonlinear programming problem, Kuhn Tucker conditions, graphical solution, quadratic programming, solution by Wolf’s method.

UNIT V

Dynamic programming – minimum path problems, problems on single additive constraint additive separable return, single multiplicative constraint additive separable return, single additive constraint multiplicative separable return, serial multistage model. Development of CPM/PERT technique, constraint of network diagram, determination of critical path, probability of completing the project by scheduled date.

Text Books:

Operations Research: S.D.sharma

Reference Books:-

Introduction to Operation research: A Computer Oriented Algorithmic Approach
 Gillett Billy E Tata Mc-Graw Hill Publishing Company Ltd., New Delhi.

Fundamentals of Operation Research. A Ckoff, R.L. and Sasieni,
 M.W, Wiley, 1968. Linear Programming, Hadley G. Oxford and
 IBH Publishing Co. Ltd., New-Delhi.

Semester II
Core Paper-CS205T

Subject: Advanced Java Programming with Web Technology

Lectures/Unit	Credits		Theory		Internals		Practical	
			Max	Min	Max	Min	Max	Min
14	T	P	40	16	10	5	33	17
	4	2						

UNIT I

Servlet: Introduction, Web Terminology: static and dynamic website, HTTP, HTTP Requests, Get and Post request, Servlet API, Servlet interface, GenericServlet class, HttpServlet class, Life Cycle of a Servlet, ServletRequest Interface, RequestDispatcher interface, ServletConfig Interface, ServletContext Interface, cookies, hidden form field, HttpSession.

UNIT II

Data Access with Servlets: JDBC Concepts, Connecting to a Database, Retrieving Data. **JSP Overview:** Why use JSP?, Advantages of JSP, JSP Environment Setup: Setting up Java Development Kit, Setting up Web Server: Tomcat, Setting up CLASSPATH. **JSP Architecture, JSP- Life Cycle:** JSP Compilation, JSP Initialization, JSP Execution, JSP Cleanup. **JSP Syntax:** The Scriptlet, JSP Declarations, JSP Expression, JSP Comments, JSP Directives, JSP Actions, JSP Implicit Objects, Control Flow Statements, Decision Making Statements, Loop Statements, JSP Operators, JSP Literals.

UNIT III

JSP Directives: The page Directive, Attributes, The include Directive, The taglib Directive. **JSP- Client Request:** The HttpServletRequest Object, HTTP Header Request Example. **JSP- Server Response:** The HttpServletResponse Object, HTTP Header Response Example. **JSP Form Processing:** GET method, POST method, Reading Form Data using JSP, GET Method Example Using URL.

UNIT IV

AngularJS: Introduction, MVC Architecture, Data Binding- One way and two way, Expressions, Directives, Controllers, Modules, Scopes, Dependency, Filters, Tables, Select, DOM, Forms, Validations, Ajax, Animation.

UNIT V

jQuery: Introduction, Selectors, Effects: display, fadding, sliding,hide method, show method, toggle method, fadein method,fadeout method,fadeToggle method,fadeTo method, slideup and slidedown method.

Text Books:

Java Servlet Programming Bible, S. Rajagopalan, R. Rajamani, R. Krishnaswamy, and S. Vijendran, WILEY dreamtech India Pvt. Lmt.

The Complete Reference: Java 2 – 5Ed, Herbert Schildt, Tata McGraw – Hill Publishing Company Limited.

Core Java 2 Vol. II – Advance Features 7Ed, Cay S. Horstmann and Gary Cornell, (LPE) Pearson Education, Sun Microsystems.

JavaScript Bible 4th Edition by Danny Goodman, Wiley dreamtech Pub

Reference Books:

OOPS with C++- E Balaguruswamy.

Complete Reference C++ by Herbert Schield, BPB Pub.

Java Servlet Programming Bible
JavaScript Bible 4th Edition by Danny Goodman,
Database Programming with JDBC and Java - by George Reese