

ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

Msc. Semester-II Computer Science
Core Paper- CS201T
Subject- Automata Theory

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

Course objective: This course is designed with the objective to give understanding of several formal mathematical models of computation to the students. Students will learn about automaton, their grammar and they are able to describe how they relate it to formal languages. Students will understand what is possible and what is not possible with computers. They will understand different types of problems such as P, NP, NP complete and NP hard problem.

Course outcome: At the end of the course, the student will be able to analyze different computational models. They will be able to apply rigorously formal mathematical methods to prove properties of languages, grammars and automata. They will be able to identify the limitations of some computational models and possible methods of proving them.

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 -moves, significance, acceptance of languages, -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.





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Text Books:

1. J. E. Hopcroft, J. D. Ullman, Introduction to Automata Theory, Languages, and Computation
2. Perter Linz, An Introduction to Formal Languages and Automata

Reference Books:

1. John C. Martin, Introduction to Languages and the Theory of Computation
2. Mishra, Chandrashekar, Theory of Computer Science




ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

M.Sc. Semester II *computer science*

Core Paper- CS202T

Subject: Computer Graphics

Lectures/Unit	Credits		Theory		Internals		Practical	
			Max	Min	Max	Min	Max	Min
14	T	P	40	14	10	4	34	12
	4	2						

Course objective: The objective is to introduce the use of the components of graphics and will be familiar with building approach of algorithms related to them. The course will comprehend the basic principles of 2-dimensional and 3-dimensional computer graphics, an understanding of how to scan, convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition and provide an understanding of mapping the world coordinates to device coordinates.

Course outcome: Student will be able to implement the basic concepts and various algorithms to scan, convert the basic geometrical primitives, transformations, area filling, clipping, viewing, projections and transformations.

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.



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Text Book:

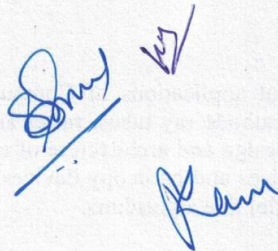
Donald Hearn and M. Pauline Baker, Second Edition, PHI 1997.

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.

Practical List

1. Program to generate a pixel on screen.
2. Program to draw four connected pixels (Rectangle shape).
3. Program to generate line using DDA algorithm.
4. Program to plot line using slope and intercept.
5. Program to plot line using Bresenham's algorithm.
6. Program to generate circle using mid-point circle algorithm.
7. Program to translate line and rectangle.
8. Program to scale line and rectangle.
9. Program to generate ellipse.
10. Program to generate ellipse using mid-point algorithm.



ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

Msc. Semester II *computer science*
Core Paper- CS203T

Subject: Relational Database Management System

Lectures/Unit	Credits		Theory		Internals		Practical	
			Max	Min	Max	Min	Max	Min
14	T	P	40	14	10	4	33	12
	4	2						

Course Objective: To give knowledge of the Relational Model of Data Management. This course contains approaches to organize, store, retrieve and process data, architecture and design techniques for effective implementation, different anomalies, their solutions, a platform for understanding of SQL and PL/SQL, distributed database, transaction concurrency and recovery.

Course Outcome: Student will be able learn database creation and modification. Data definition, manipulation, control using SQL command. They will learn the concepts of joining the database which will help them access data from different relations. Students will be able to implement the programming using PL/SQL for automated and fast database activities.

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 & 5NF. 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.

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UNIT-V

Transaction Management-concurrency & recovery, ACID properties, transaction state, implementation of atomicity and durability, concurrent execution. Basic idea of serializability, concurrency control, 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

Suggested Practical List

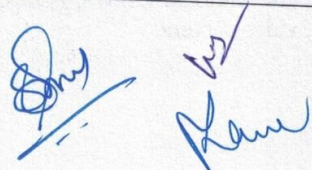
I) Sample Table – Worker

WORKER_ID	FIRST_NAME	LAST_NAME	SALARY	JOINING_DATE	DEPARTMENT
001	Monika	Arora	100000	2014-02-20 09:00:00	HR
002	Niharika	Verma	80000	2014-06-11 09:00:00	Admin
003	Vishal	Singhal	300000	2014-02-20 09:00:00	HR
004	Amitabh	Singh	500000	2014-02-20 09:00:00	Admin
005	Vivek	Bhati	500000	2014-06-11 09:00:00	Admin
006	Vipul	Diwan	200000	2014-06-11 09:00:00	Account
007	Satish	Kumar	75000	2014-01-20 09:00:00	Account
008	Geetika	Chauhan	90000	2014-04-11 09:00:00	Admin

II) Sample Table – Bonus

WORKER_REF_ID	BONUS_DATE	BONUS_AMOUNT
1	2016-02-20 00:00:00	5000
2	2016-06-11 00:00:00	3000
3	2016-02-20 00:00:00	4000
1	2016-02-20 00:00:00	4500
2	2016-06-11 00:00:00	3500

III) Sample Table – Title



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WORKER_REF_ID	WORKER_TITLE	AFFECTED_FROM
1	Manager	2016-02-20 00:00:00
2	Executive	2016-06-11 00:00:00
8	Executive	2016-06-11 00:00:00
5	Manager	2016-06-11 00:00:00
4	Asst. Manager	2016-06-11 00:00:00
7	Executive	2016-06-11 00:00:00
6	Lead	2016-06-11 00:00:00
3	Lead	2016-06-11 00:00:00

- Q-1. Write an SQL query to fetch –FIRST_NAME| from Worker table using the alias name as <WORKER_NAME>.
- Q-2. Write an SQL query to fetch –FIRST_NAME| from Worker table in upper case.
- Q-3. Write an SQL query to fetch unique values of DEPARTMENT from Worker table.
- Q-4. Write an SQL query to print the first three characters of FIRST_NAME from Worker table.
- Q-5. Write an SQL query to find the position of the alphabet ('a') in the first name column 'Amitabh' from Worker table.
- Q-6. Write an SQL query to print the FIRST_NAME from Worker table after removing white spaces from the right side.
- Q-7. Write an SQL query to print the DEPARTMENT from Worker table after removing white spaces from the left side.
- Q-8. Write an SQL query that fetches the unique values of DEPARTMENT from Worker table and prints its length.
- Q-9. Write an SQL query to print the FIRST_NAME from Worker table after replacing 'a' with 'A'.
- Q-10. Write an SQL query to print the FIRST_NAME and LAST_NAME from Worker table into a single column COMPLETE_NAME. A space char should separate them.
- Q-11. Write an SQL query to print all Worker details from the Worker table order by FIRST_NAME Ascending.
- Q-12. Write an SQL query to print all Worker details from the Worker table order by FIRST_NAME Ascending and DEPARTMENT Descending.
- Q-13. Write an SQL query to print details for Workers with the first name as –Vipull and –Satishl from Worker table.
- Q-14. Write an SQL query to print details of workers excluding first names, –Vipull and –Satishl from Worker table.
- Q-15. Write an SQL query to print details of Workers with DEPARTMENT name as –Adminl.
- Q-16. Write an SQL query to print details of the Workers whose FIRST_NAME contains 'a'.
- Q-17. Write an SQL query to print details of the Workers whose FIRST_NAME ends with 'a'.
- Q-18. Write an SQL query to print details of the Workers whose FIRST_NAME ends with 'h' and contains six alphabets.
- Q-19. Write an SQL query to print details of the Workers whose SALARY lies between 100000 and 500000.
- Q-20. Write an SQL query to print details of the Workers who have joined in Feb'2014.
- Q-21. Write an SQL query to fetch the count of employees working in the department 'Admin'.
- Q-22. Write an SQL query to fetch worker names with salaries >= 50000 and <= 100000.
- Q-23. Write an SQL query to fetch the no. of workers for each department in the descending order.
- Q-24. Write an SQL query to print details of the Workers who are also Managers.
- Q-25. Write an SQL query to fetch duplicate records having matching data in some fields of a table.
- Q-26. Write an SQL query to show only odd rows from a table.

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- Q-27. Write an SQL query to show only even rows from a table.
- Q-28. Write an SQL query to clone a new table from another table.
- Q-29. Write an SQL query to fetch intersecting records of two tables.
- Q-30. Write an SQL query to show records from one table that another table does not have.
- Q-31. Write an SQL query to show the current date and time.
- Q-32. Write an SQL query to show the top n (say 10) records of a table.
- Q-33. Write an SQL query to determine the nth (say n=5) highest salary from a table.
- Q-34. Write an SQL query to determine the 5th highest salary without using TOP or limit method.
- Q-35. Write an SQL query to fetch the list of employees with the same salary.
- Q-36. Write an SQL query to show the second highest salary from a table.
- Q-37. Write an SQL query to show one row twice in results from a table.
- Q-38. Write an SQL query to fetch intersecting records of two tables.
- Q-39. Write an SQL query to fetch the first 50% records from a table.
- Q-40. Write an SQL query to fetch the departments that have less than five people in it.
- Q-41. Write an SQL query to show all departments along with the number of people in there.
- Q-42. Write an SQL query to show the last record from a table.
- Q-43. Write an SQL query to fetch the first row of a table.
- Q-44. Write an SQL query to fetch the last five records from a table.
- Q-45. Write an SQL query to print the name of employees having the highest salary in each department.
- Q-46. Write an SQL query to fetch three max salaries from a table.
- Q-47. Write an SQL query to fetch three min salaries from a table.
- Q-48. Write an SQL query to fetch nth max salaries from a table.
- Q-49. Write an SQL query to fetch departments along with the total salaries paid for each of them.
- Q-50. Write an SQL query to fetch the names of workers who earn the highest salary.
- Q-51. Create a View.
- Q-52. Write a Query to Demonstrate equi Join Concept.
- Q-53. Create a Trigger for updating a row.



ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

M.Sc. Semester II *Computer Science*

Core Paper- CS204T

Subject: Operation Research

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

Course Objective: Students will acquire the knowledge and understanding of the mathematical tools that are needed to solve optimization problems, understand the development of reports that describes the formulation of the problem techniques to solve, analyze the results, finally prepare optimal solution used for decision making processes in Management Engineering.

Course Outcome: After the completion of the course students are able to solve and formulate the optimization problems. Develop models for shortest path, critical path, minimum cost flow, and assignment and transshipment problems.

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 $2 \times n$ and $m \times 2$ 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.



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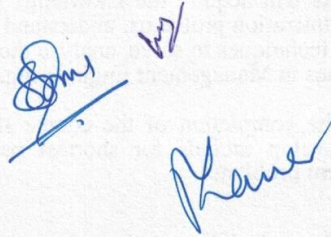
Text Books:

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.





ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

Msc. Semester II Computer Science

Core Paper-CS205T

Subject: Advanced Java Programming and Web Technology

Lectures/Unit	Credits		Theory		Internals		Practical	
			Max	Min	Max	Min	Max	Min
14	T	P	40	14	10	4	33	12
	4	2						

Course objective: The objective of this course is to familiarize the student with client server architecture and development of web application using Java technologies. Students will gain the skills and project-based experience needed to enter into Web Application and Development careers.

Course outcome: Students will be able to write a well formed / valid XML document, can establish connectivity to database, perform Server-Side application using JSP and Servlet, execute interactive effects on websites using JavaScript & jQuery and utilizing AngularJS formats adequately.

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, fading, 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.



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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 Schildt, BPB Pub.

Java Servlet Programming Bible

JavaScript Bible 4th Edition by Danny Goodman,

Database Programming with JDBC and Java - by George Reese

Practical List

1. Create a servlet that prints today's date.
2. Create a servlet for a login page. If the username and password are correct then it says message -Hello <username>| else a message -login failed.
3. create a servlet that uses Cookies to store the number of times a user has visited servlet.
4. Create a servlet that displays some header information from your request as well as any form data.
5. Create a servlet filter that changes all text to upper case.
6. Create a JSP that prints current date and time.
7. Create a JSP that adds and subtracts two numbers.
8. Create a JSP that prints odd numbers that come within a range.
9. Create a JSP for login module.



ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

Msc. Semester IV *computer science*

Core Paper- CS401T

Subject: Compiler Design

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

Course objective: The Objectives of this course is to provide in depth knowledge of

- The principles, algorithms, and data structures involved in the design and construction of compilers.
- Different types of grammars associated with compiler and their use.

Course outcome: At the end of this course, the students will be able to understand the phases of compiler, design and implement a Lexical analyzer, design and implement a Parser, storage allocation, to optimize and design code generator.

UNIT-I

Introduction: language processors, phases of a compiler, a model for a compiler front end, syntax-directed translation, parsing, a translator for simple expressions, Lexical Analysis: role of lexical analyzer, input buffering, specification of tokens, Lex lexical analyzer generator, data structures in compilation.

UNIT-II

Top-Down Parsing: Introduction, Context free grammars, writing a grammar, recursive-descent parsing, LL(1) grammars, predictive parsing, preprocessing steps required for predictive parsing. Bottom-Up Parsing: shift reduce parsing, SLR parsing, CLR parsing and LALR parsing, error recovery in parsing, handling ambiguous grammar, parser generator – YACC.

UNIT-III

Semantic Analysis: syntax-directed definitions, evaluation order for SDD's, application of SDT. Intermediate-Code Generation: syntax trees, three-address code, types and declarations, translation of expressions, type checking.

UNIT-IV

Runtime Environment: storage organization, stack allocation of space, heap management, storage allocation for arrays, strings and records, introduction to garbage collection and trace based collection. Code Generation: issues in the design of code generator, target language, addresses in the target code, basic blocks and flow graphs.

UNIT-V

Optimization of basic blocks, peephole optimization, registers allocation and assignment. Code Optimization: principal sources of optimization, data flow analysis, constant propagation, partial redundancy elimination, loops in flow graphs.

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Text Books:

1. A. V. Aho, Monica S. Lam, Ravi Sethi, J. D. Ullman, Compilers Principles, Techniques, & Tools, (2e)

Reference Books:

1. Dick Grune, Henry E. Bal, Caryl T. H. Jacobs, Modern Compiler Design
2. Kenneth C. Louden, Compiler Construction Principles and Practice
3. Thomas w. Parsons, Introduction to Compiler Construction
4. Andrew N. Appel, Modern Compiler Implementation in C
5. John R. Levin, Tony Mason, Doug Brown, LEX & YACC
6. Cooper, Linda, Engineering a Compiler

ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

Msc. Semester IV *computer science*

Core Paper- CS402T

Subject: Software Project Management

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

Course objective: This course introduces the concepts and methods required for the construction of large Software intensive systems. It develops a broad understanding of the discipline of Software Engineering and Management of Software System. This course provides an understanding of both theoretical and methodological issue involved in Modern Software Engineering Project Management and focuses strongly on Practical techniques.

Course outcome: After the completion of the course the students will understand the fundamental principles of Software Project management & will also understand the responsibilities of a Project Manager. They will be familiar with the different methods and techniques used for Project Management and will have good knowledge of the issues and challenges faced during Software Project Management. They will be able to manage Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques.

UNIT-I

Conventional Software Management: The waterfall model, conventional software Management performance. **Evolution of Software Economics:** Software Economics, pragmatic software cost estimation. **Improving Software Economics:** Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT-II

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process. **Life cycle phases:** Engineering and production stages, inception, Elaboration, construction, transition phases. **Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts, pragmatic artifacts.

UNIT-III

Model based software architectures: A Management perspective and technical perspective. **Work Flows of the process:** Software process work flows, Iteration workflows, **Checkpoints of the process.** Major mile stones, Minor Milestones, Periodic status assessments. **Iterative Process Planning:** Work breakdown structures, planning guidelines, cost and schedule estimating process, Iteration planning process, pragmatic planning.

UNIT-IV

Project Organizations and Responsibilities: Line-of-Business organizations, Project Organizations, evolution of Organizations. **Process Automation:** Automation Building blocks, The Project Environment. **Project Control and Process instrumentation:** The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

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UNIT-V

Tailoring the Process: Process discriminants. Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions. Case Study: The command Center Processing and Display system- Replacement (CCPDS-R).

Text Books:

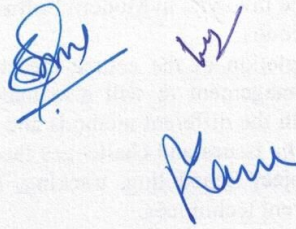
Software Project Management, Walker Royce: Pearson Education, 2005.

Reference Books:

Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.

Software Project Management, Joel Henry, Pearson Education.

Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.



ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

Msc. Semester IV

Computer Science Elective Paper- CSE403T

Subject: TCP/IP Concepts

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

Course objective: The objectives of the course is to give the understanding of the standards of TCP / IP protocol and addressing types. The course also includes the study of various protocols like ARP, RARP, UDP, ICMP, IGMP, Multicasting protocols etc.

Course outcome: After the completion of this course the student will understand the functions, data encapsulation of TCP/IP and UDP, the process of packet fragmentation and reassembly. Also the course will comprehend the basic routing functionality using routing protocols.

UNIT-I

Introduction, layering, DNS-encapsulation, de-multiplexing, client/server model, port numbers, standardization process, the internet. Link layer: introduction, Ethernet and IEEE 802 encapsulation, trailer encapsulation, SLIP, PP-Loop back interface, MTU. Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet mask- special case if IP address, a subnet example.

UNIT-II

Introduction to Address Resolution Protocol, an example, ARP cache packet format, ARP examples, proxy ARP, ARP command. RARP: introduction, RARP packet format, RARP examples, RARP server design. ICMP: introduction, ICMP message types, ICMP address mask request and reply-ICMP timestamp request and reply -4.4 BSD processing of ICMP messages.

UNIT-III

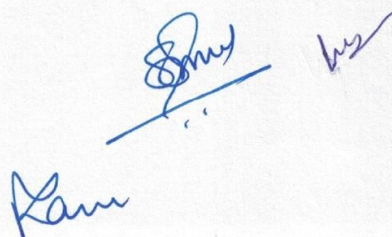
Introduction, ping program, IP record route option, IP time stamp option. Trace route Program: introduction, trace route program operation, LAN output, and WAN output- IP source routing option. IP routing: introduction, routing principles, ICMP host, and ICMP redirect errors Dynamic routing, RIP-ASPF, BGP, CIDR. UDP: introduction, UDP header, UDP checksum, IP fragmentation, UDP server design.

UNIT-IV

Introduction to DNS- basics, message format, simple example, pointer quires, resource records caching, UDP. TFTP: introduction, protocol, security. BOOTP: introduction, packet format, server design, through router. TCP: introduction, services, headers, connection establishment and termination, timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segment, simultaneous open and close-options, server design.

UNIT-V

Introduction to SNMP, protocol, structure of management information, object identifiers, Management information base, instance identification. Telnet: rlogin protocols, examples, telnet protocol and examples, FTP, protocol, examples, STMP protocols, examples, NFS, TCP/IP Applications.



ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

Text Books:

- Behnrouz A. Forouz, TCP/IP Protocol Suite, IV edition, McGraw-Hill Publishing
- W. Richard Stevens, TCP/IP illustrated Volume, I -The protocols, Addison Wesley Longman.
- Jaiswal. S, TCP/IP principles, architecture, protocols and implementation, first Edition, Galgotia publication.

Reference Books:

Candace Leiden and Marshall Wilensky, TCP/IP for Dummies

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ST. ALOYSIUS' COLLEGE (AUTONOMOUS) JABALPUR M.P.

Msc. Semester IV *computer science*

Open Elective Paper-OE404T

Subject: Data Science with Python

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

Course Objective: Data Science Course will cover basics of data science using python. Concept of linear algebra, statistics and probability and understand how and when they're used in Data Science. Collect, explore, clean, munge and manipulate data.

Course Outcome: After the completion of the course, the students will be able to implement models such as k-nearest neighbours, Naive Bayes, linear and logistic regression, decision trees. The Students will also be able to understand the fundamentals of machine learning and can do further study in this field.

UNIT-I

What is Python, Python Features, Python Applications, Python and PyCharm Installation, Python IDE, Python Code Basics- Python Variables, Python Data Types (Lists, Tuples, Sets, Dictionary, Strings, and Numeric), Python Operators, Python Conditional Statements (If Statement, Elif Statement, Else Statement, Python Loops (While Loop, For Loop and Nested Loop), I/O Operations.

UNIT-II

Python NumPy- array (one, multi-dimensional), NumPy array vs list, NumPy operations (ndim, iemsize, dtype, reshape, slicing, linspace, max/min, addition, vertical and horizontal stacking, ravel). Python Matplotlib, types of plot, Python Pandas, Pandas Operations: Slicing the data frame, Merging & Joining, Concatenation, Changing the index, Change Column headers, Data munging.

UNIT-III

Making sense of Data through Advanced Visualization: Controlling the line properties of a chart, Creating multiple plots, Playing with text, Styling your plots, Box plots, heat maps, Scatter plots with histograms, A scatter plot matrix, Area plots, bubble charts, Hexagon bin plots, Trellis plots.

UNIT-IV

Uncovering Machine learning: Different types of machine learning, Decision trees, Linear regression, Logistic regression, The naive Bayes classifier, The k-means clustering, Hierarchical clustering, Neural Networks.

UNIT-V

Performing Predictions with a Linear Regression: Simple linear regression, Multiple regression, Generating Recommendations with Collaborative Filtering: Recommendation data, User-based collaborative filtering, Item-based collaborative filtering, Natural Language Processing: Word Clouds, n-gram models, Grammars.

Text Book: Mastering Python for Data Science by Samir Madhavan.

Reference Book: Data Science from Scratch by Joel Grus

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