

**Shri Rawatpura Sarkar University,
Raipur**



Examination Scheme & Syllabus

For

Master of Computer Application

Semester-II

(Effective from the session: 2022-23)



**SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR,
CHHATTISGARH
DEPARTMENT OF COMPUTER SCIENCE**

**Master of Computer Application
Teaching & Examination Scheme –Semester –II
(Effective from the session: 2022-23)**

S.N.	Course Code	Th/Pr	Subject	Type of Course	Teaching hours per week			TC	Examination Scheme				Total Marks
					L	T	P		Theory		Practical		
									EX	IN	EX	IN	
1	SMC04-201	Th	Artificial Intelligence & Applications	Core	4	-	-	4	70	30	-	-	100
2	SMC04-202	Th	Information Security	Core	4	-	-	4	70	30	-	-	100
3	SMC04-203	Th	Linux System Administration	Core	4	-	-	4	70	30	-	-	100
4	SMC04-204	Th	Machine Learning with R Programming	Core	4	-	-	4	70	30	-	-	100
5	SMC04-205	Th	Internet of Things	Core	4	-	-	4	70	30	-	-	100
6	SMC04-251	Th	Elective – I	Core	4	-	-	4	70	30	-	-	100
7	SMC04-291	Pr	Artificial Intelligence Lab	Core	-	-	4	2	-	-	35	15	50
8	SMC04-292	Pr	Linux Lab	Core	-	-	4	2	-	-	35	15	50
9	SMC04-293	Pr	R Programming Lab	Core	-	-	4	2	-	-	35	15	50
Total Contact hrs. per week: 34					Total Credit: 30				Grand Total Marks:				750

TABLE –I ELECTIVE- I SUBJECTS

S.No	Type of Course	Subject Code	Subject Name
1	Core	SMC04251 A	Client Server Computing
2	Core	SMC04251 B	Cloud Technology
3	Core	SMC04251 C	Software Testing



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Course Title	Artificial Intelligence & Applications				
Course Code	SMC04-201				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Students must have basic knowledge of Data Structure and Algorithms.				
Course Objectives	<ul style="list-style-type: none"> • Introduce the basic principles of AI towards problem solving, inference, perception, knowledge representation and learning. • Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural Networks and other machine learning models. • Experiment with a machine learning model for simulation and analysis. • Explore the current scope, potential, limitations, and implications of intelligent systems. • To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language. 				
Course Contents	<p>UNIT I: Overview & Search Techniques Introduction to AI, Problem Solving, State space search, Blind search: Depth first search, Breadth first search, Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search, Constraint satisfaction. Game tree, Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.</p> <p>UNIT II: Knowledge Representation (KR) Introduction to KR, Knowledge agent, Predicate logic, WFF, Inference rule & theorem proving forward chaining, backward chaining, resolution; Propositional knowledge, Boolean circuit agents. Rule Based Systems, Forward reasoning: Conflict resolution, backward reasoning: Use of Backtracking, Structured KR: Semantic Net - slots, inheritance, Frames-exceptions and defaults attached predicates, Conceptual Dependency formalism and other knowledge representations.</p> <p>UNIT III: Handling uncertainty & Learning: Source of uncertainty, Probabilistic inference, Bayes' theorem, Limitation of naïve</p>				



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	<p>Bayesian system, Bayesian Belief Network (BBN), Inference with BBN, Dempster-Shafer Theory, Fuzzy Logic, Fuzzy function, Fuzzy measure, Truth maintenance systems. Learning: Concept of learning, Learning model, learning decision tree, Paradigms of machine learning, Supervised & Unsupervised learning, Example of learning, Learning by induction, Learning using Neural Networks.</p> <p>UNIT IV: Natural Language Processing (NLP) & Planning: Overview of NLP tasks, Parsing, Machine translation, Components of Planning System, Planning agent, State-Goal & Action Representation, Forward planning, backward chaining, Planning example: partial-order planner, Block world.</p> <p>UNIT V Expert System & AI languages: Need & Justification for expert systems- cognitive problems, Expert System Architectures, Rule based systems, Non production system, knowledge acquisition, Case studies of expert system. Ai language: Prolog syntax, Programming with prolog, backtracking in prolog, Lisp syntax, Lisp programming.</p> <p>UNIT V: Expert System & AI languages: Need & Justification for expert systems- cognitive problems, Expert System Architectures, Rule based systems, Non production system, knowledge acquisition, Case studies of expert system.</p>
<p align="center">Course Outcomes</p>	<p>After successful completion of the course, students will be able</p> <ol style="list-style-type: none"> 1. Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems. 2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning. 3. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models. 4. Demonstrate proficiency in applying scientific methods to models of machine learning.
<p align="center">Text Books</p>	<ol style="list-style-type: none"> 1. Artificial Intelligence by Elaine Rich and Kevin Knight, Tata Me Graw Hill. 2. Introduction to Artificial Intelligence and Expert Systems by Dan W.Patterson, Prentice Hall of India.
<p align="center">Reference Books</p>	<ol style="list-style-type: none"> 1. Principles of Artificial Intelligence by Nils J.Nilsson, Narosa Publishing house. 2. Programming in PROLOG by Clocksin & C.S. Melish, Narosa Publishing house. 3. Rule based Expert Systems-A practical Introduction by M. Sasikumar, S.Ramani, et. al., Narosa Publishing House



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Course Title	Information Security				
Course Code	SMC04-202				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Students must be aware of Cyber crimes.				
Course Objectives	By the completion of this course, students will be able to understand different cyber-crime and be aware of cyber law. He can also understand basics of E-security, type of attack and digital Signatures.				
Course Contents	<p>UNIT – I: E-Security</p> <p>E-Security –Overview-security, Principles of security, Attack methods: the difference between targeted attacks and target-of opportunity attacks, Types of attacks, Denial-of-service attacks, Target-of-opportunity malware, attacks, Intruders: intrusion detection.</p> <p>UNIT – II: Introduction to cyber laws</p> <p>Introduction to cyber laws: Introduction Cyber-crimes and cyber laws, Information Technology act 2000. Cyber Regulation Advisory committee– Violation, damages and penalties–Cyber flying, The cyber regulation Appellate Tribunal [composition, qualifications, powers and rights]</p> <p>UNIT – III: Cyber-crime, criminal justice, cyber squatters and copyright protection</p> <p>Cyber-crime, criminal justice, cyber squatters and copyright protection : Introduction Hacking with case studies, Cyber Fraud and cheating, Virus on the internet, Defamation Harassment and E-mail abuse with case study, Cyber pornography, Other IT offence, Jurisdiction and cyber-crime, case study, Concept of Domain name and reply to cyber squatters, Copy right in fragment, remedies and offences, Computer software privacy.</p> <p>UNIT – IV: E-commerce Taxation</p> <p>E-commerce Taxation: Introduction E-commerce, finding the P E in cross border E-commerce, the impact of the internet on customer duties, Taxation policies in</p>				



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	India. UNIT – V: Digital Signature Digital Signature: Introduction Digital Signatures, Digital Signature certificate, Certifying authorities and liability in the event of digital Signature compromise.
Course Outcomes	<ul style="list-style-type: none">• This course student will be able to understand all Security systems & Cyber Law.• Students must know about Digital Signature.
Text Books	<ol style="list-style-type: none">1. Cryptography and Network Security Principle and Practice 3rd Edition by William Stalling Pearson.2. Cyber law: The Indian Perspective" by Pavan Duggal, Saakshar Law Publications3. Cryptography and Network Security Principle 2nd edition by atul kahte
Reference Books	<ol style="list-style-type: none">1. Cyber law simplified – vivek sood (TMH)2. Corporate Computer and Network Security by Raymond R Panko, Pearson Publications



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Course Title	Linux System Administration				
Course Code	SMC04-203				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Students will learn and understand the principles and techniques involved in developing applications with Linux OS.				
Course Objectives	The subject operating systems starts with the basic features of LINUX operating system and their subsequent developments. It includes the various types of users in LINUX OS.				
Course Contents	<p>UNIT I LINUX – AN OPERATING SYSTEM- History and development of LINUX O.S. Features, Structures of LINUX O.S. Kernel, Shell, Applications Utilities. Installation requirements LINUX User Interface- Classes of user, Operational users, Programmers, End users, Types of Interface, Command language, Command structure, Shell, Windows, Icons , slide bars, title bars.</p> <p>UNIT II ESSENTIAL LINUX COMMANDS- Startup & shutdown Process: Booting Procedure with different stages,Login process, Password concept, who, who am i ,tty, date and cal commands, System shutdown. File concept: File types in LINUX, Hierarchical directory structure File creating, displaying, concatenating and copying Creating and changing directories, removing files and directories, cd ,cp, md, rm, mkdir, rmdir, cat Various users and access rights File attributes and permissions Setting permissions, Changing permissions, Changing group & group ownership of file and directory chmod, chown,chgrp.File processing commands wc, head, tail, cut, paste join, split, sort, grep, egrep, tr, comm, cmp, diff, more,less, File formatting and printing commands pr with all options, lp commands</p> <p>UNIT III LINUX PROCESSES AND OTHER UTILITIES- On line help facilities in LINUX Man and help command Mathematical commands bc, expr, factor, units Linking files and directories Inter-process communication, Pipes and filters, tele command Other process facilities, Background processing,</p>				



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	<p>UNIT IV</p> <p>VI AND OTHER EDITORS- VI-Editor Features of vi, modes of vi, creating, editing & saving text, urSOR movement commands, text scrolling commands, text deletion commands, find and replace, copying and yanking text, cut and paste in vi , set commands, abbreviations and map commands, saving files & quitting, vi.</p> <p>UNIT V</p> <p>SHELL PROGRAMMING AND AWK- Shell scripts writing and executing, Parameter substitution, Shell variables, Standard shell variables, User define variables, Command substitution, Expressions, arithmetic operators, logical, Operators, test expressions, read statement, test command, control structures,– for, while and until statements, if structure, nested if structure, if.. then-else statement, case structure.</p>
Course Outcomes	The subject operating systems starts with the basic features of LINUX operating system and their subsequent developments. It includes the various types of users in LINUX OS.
Text Books	<ol style="list-style-type: none">1. Red hat Linux unleashed by Techmedia (BPB publication)2. LatestUNIX concept and Applications by Sumitabha Das Tata McGraw HillPublication, N.Delhi, Latest
Reference Books	<ol style="list-style-type: none">1. Linux Installation andAdministration by Nicholas Wells,2. Course technology, (VikasPublishing, New Delhi), Latest3. Unix Operating System by PeterNortornBPP Publications, Latest



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Course Title	Machine Learning with R Programming				
Course Code	SMC04-204				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Students must know the concept of data interpret, statistics and patterns.				
Course Objectives	<p>After completing the course, students will learn Exposure to theory as well as practical knowledge through R used in data analytics. Fundamental basics of statistics used in analyzing the data</p> <ol style="list-style-type: none"> How to find the pattern in the given dataset How to interpret the data graphically How to apply different types of algorithms for the given dataset 				
Course Contents	<p>UNIT – I: Introduction to Data analytics, Basic Statistics and Distribution Introduction to Data analytics: Overview of Big-data, Need of Data Analytics, Applications of Data Analytics, Datasets, tools for data analytics Basic-Statistics: Mean, Median, mode, Standard Deviation, Variance, Correlation. Distribution: normal, binomial.</p> <p>UNIT-II: Introduction to R and R Data Structures Introduction to R: R overview and history, Basic features of R, Installing R, packages in R, Getting started: Window section of R-Studio, first interaction, command line versus scripts, comments. Variables in R: Naming variables, assigning values to variables, finding variables, removing variables, and operators. R Data Structures: Vectors, Character Strings, Matrices, Lists, Data Frames, and Classes.</p> <p>UNIT-III: Input of Data, Functions and Decision making structure Input of Data: input of data from terminal, input of data through R-objects. Output Functions: print () function, cat () function. In-Built functions in R: Mathematical functions, String functions. User defined functions ñ function without arguments, function with arguments. Decision making structure: simple if statement, if-else statement, switches statement. Loops: while loop, for loop,</p>				



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	<p>Repeat loop.</p> <p>UNIT-IV: Data Types of R Vectors & Matrices Data Types of R Vectors: class of a vector, Elements of a vector, accessing vector elements, functions for vectors, obtaining the Length of a Vector. Common vector operations: Arithmetic & logical operations, Vector Indexing, using all () and any () functions, Vectorized operations, NA and NULL values. Matrices: creating a matrix, accessing matrix elements, functions for matrices, matrix indexing, filtering on matrices. Arrays: creating an array, accessing elements of an array, functions for array.</p> <p>UNIT-V: Lists, Import and Export of data and Data Visualization techniques Lists: creating a list, accessing list elements, functions for list, General list operations, list indexing, adding and deleting list elements .Import and Export of data: Import and export of data in excel file:reading from excel format, write to excel format. Data Visualization Techniques: Introduction, pie chart, bar chart, scatter and box plots.</p>
Course Outcomes	<ol style="list-style-type: none"> 1. Data-Visualization tools and techniques offer executives and other knowledge workers new approaches 2. Data visualization is a general term that describes any effort to help people understand the significance of data by placing it in a visual context.
Text Books	<ol style="list-style-type: none"> 1. Data Analytics with R, WILEY Publishing , Dr.Bharti Motwani. 2. The Art of R Programming by Norman Matlof, No starch press, SAN FRANCISCO,2011. 3. Data Analytics using R, McGrawHill Publications, Seema Acharya
Reference Books	<ol style="list-style-type: none"> 1. Rumset D. J. (2010): Statistical Essentials for Dummies. Hoboken: Wiley Publishing 2. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data by Hadley Wickham , O'Reilly



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Course Title	Internet of Things				
Course Code	SMC04-205				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Students must know basic concept of about internet, network				
Course Objectives	<ul style="list-style-type: none"> • To understand Concepts, design and characteristics of IoT. • To understand Architecture of IoT. • To understand basic protocols of IoTs. • To understand challenges and applications of IoTs • To develop IoT applications using Tools. 				
Course Contents	<p>UNIT-1 : Introduction to IoT</p> <p>Introduction to IoT, Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs.</p> <p>UNIT-2 : IoT & M2M</p> <p>IoT & M2M Machine to Machine, Difference between IoT and M2M, Software define Network.</p> <p>UNIT-3: Network & Communication Aspects</p> <p>Network & Communication Aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.</p> <p>UNIT-4: Challenges and Applications of IoT</p> <p>Challenges and Applications of IoT Design challenges, Development challenges, Security challenges, Other challenges. Home automation, Industry applications, Surveillance applications, Other IoT applications.</p> <p>UNIT -5 : Developing IoTs</p>				



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	Developing IoTs Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python.
Course Outcomes	<ul style="list-style-type: none">• Students will familiar with the concepts of Internet of Things.• Students will familiar with IoT Architecture• Students will ready to Analyze basic protocols in wireless sensor network• Students will be capable to design IoT applications in different domain and be able to analyze their performance• Capable to implement basic IoT applications on embedded platform
Text Books	<ol style="list-style-type: none">1. Vijay Madiseti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"2. Waltenegeus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"
Reference Books	<ol style="list-style-type: none">1. Internet of Things with Arduino Cookbook by Macro Schwart Published by Packt Publishing Ltd



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Course Title	Artificial Intelligence Lab				
Course Code	SMC04-291				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	-	-	4	2	
Prerequisites	Students must have basic knowledge of Data Structure and Algorithms.				
Course Objectives	<ul style="list-style-type: none"> • Introduce the basic principles of AI towards problem solving, inference, perception, knowledge representation and learning. • Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural Networks and other machine learning models. • Experiment with a machine learning model for simulation and analysis. • Explore the current scope, potential, limitations, and implications of intelligent systems. • To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language. 				
Course Contents	<p>List's of Practical's(Perform any 10)</p> <ol style="list-style-type: none"> 1. Write a prolog program to find the rules for parent, child, male, female, son, daughter, brother, sister, uncle, aunt, ancestor given the facts about father and wife only. 2. Write a program to find the length of a given list 3. Write a program to find the last element of a given list 4. Write a program to delete the first occurrence and also all occurrences of a particular element in a given list. 5. Write a program to find union and intersection of two given sets represented as lists. 6. Write a program to read a list at a time and write a list at a time using the well defined read & write functions. 7. Write a program given the knowledge base, If x is on the top of y, y supports x. If x is above y and they are touching each other, x is on top of y. A cup is above a book. The cup is touching that book. Convert the following into wff's, clausal form; Is it possible to deduce that 'The book supports the cup'. 8. Write a program given the knowledge base, If Town x is connected to 				



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	<p>Town y by highway z and bikes are allowed on z, you can get to y from x by bike. If Town x is connected to y by z then y is also connected to x by z. If you can get to town q from p and also to town r from town q, you can get to town r from town p. Town A is connected to Town B by Road 1. Town B is connected to Town C by Road 2. Town A is connected to Town C by Road 3. Town D is connected to Town E by Road 4. Town D is connected to Town B by Road 5. Bikes are allowed on roads 3, 4, 5. Bikes are only either allowed on Road 1 or on Road 2 every day. Convert the following into wff's, clausal form and deduce that 'One can get to town B from town D'.</p> <p>9. Solve the classical Water Jug problem of AI. 10. Solve the classical Monkey Banana problem of AI. 11. Solve the classical Crypt arithmetic problems such as DONALD + GERALD = ROBERT of AI. 12. Solve the classical Missionary Cannibals problem of AI. 13. Solve the classical Travelling Salesman Problem of AI. 14. Solve the classical Blocks World Problem of AI. 15. Write a program to search any goal given an input graph using AO* algorithm.</p>
Course Outcomes	<p>After successful completion of the course, students will be able</p> <ol style="list-style-type: none">5. Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.6. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.7. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.8. Demonstrate proficiency in applying scientific methods to models of machine learning.
Text Books	<ol style="list-style-type: none">1. Artificial Intelligence by Elaine Rich and Kevin Knight, Tata McGraw Hill.2. Introduction to Artificial Intelligence and Expert Systems by Dan W.Patterson, Prentice Hall of India.
Reference Books	<ol style="list-style-type: none">1. Principles of Artificial Intelligence by Nils J.Nilsson, Narosa Publishing house.2. Programming in PROLOG by Clocksin & C.S. Melish, Narosa Publishing house.3. Rule based Expert Systems-A practical Introduction by M. Sasikumar, S.Ramani, et. al., Narosa Publishing House4. Ivan Bratko : Logic & prolog programming.5. Carl Townsend : Introduction to Turbo Prolog, BPB, Publication.6. W.F. Clocksin & Mellish : Programming in PRLOG, Narosa Publication House.



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Course Title	Linux Lab				
Course Code	SMC04-292				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	-	-	4	2	
Prerequisites	Students will learn and understand the principles and techniques involved in developing applications with Linux OS.				
Course Objectives	The subject operating systems starts with the basic features of LINUX operating system and their subsequent developments. It includes the various types of users in LINUX OS.				
Course Contents	<p>LIST OF EXPERIMENTS(Any 10)</p> <ol style="list-style-type: none"> Practice on stty command Study of password command Study of who, who am i, tty,date and cal commands Executing commands in background Study of ps , kill commands Listing the files in a directory using all options tols. Creating sub-directories. Changing the mode of afile/directory. Changing the owner of afile/directory. Study of file processing commands Commands using pipes and I/O redirectors Display date using various formats Study of VI editor Modes of vi Creating and saving files usingvi Cursor movement commands 				



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	17. Cut and paste commands 18. Find and replace commands.
Course Outcomes	The subject operating systems starts with the basic features of LINUX operating system and their subsequent developments. It includes the various types of users in LINUX OS.
Text Books	1. Red hat Linux unleashed by Techmedia (BPB publication) 2. Latest UNIX concept and Applications by Sumitabha Das Tata McGraw
Reference Books	1. Linux Installation and Administration by Nicholas Wells, 2. Course technology, (Vikas Publishing, New Delhi), Latest. 3. Unix Operating System by PeterNortorn BPP Publications, Latest



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Course Title	R Programming Lab				
Course Code	SMC04-293				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	-	-	4	2	
Prerequisites	Students must know basic concept of Excel, factorial, Mean & Mode .				
Course Objectives	Students should be able to understand the basic knowledge of R Programming.				
Course Contents	<p>List of Practical's</p> <ol style="list-style-type: none"> 1. Write a program in R. To compute the product of two values. 2. Write a program in R. to check whether the given number is even or odd. 3. Write a program in R. Sum of natural numbers. 4. Write a program in R. Find the factorial. 5. Exporting data to Excel, Text File 6. Mean, Median, Standard Deviation, Variance, Correlation in R 7. Correlation in R: Pearson & Spearman with Matrix Example 8. T Test in R 9. Chi-Square Test in R 10. Prediction using linear regression and visualizing the regression graphically 				
Course Outcomes	<ul style="list-style-type: none"> • Data-Visualization tools and techniques offer executives and other knowledge workers new approaches • Data visualization is a general term that describes any effort to help people understand the significance of data by placing it in a visual context. 				
Text Books	<ol style="list-style-type: none"> 1. The Book of R: A First Course in Programming and Statistics: Tilman M. Davies. 2. R For Dummies, Andrie de Vries, Joris Meys 				
Reference Books	<ol style="list-style-type: none"> 1. Rumset D. J. (2010): Statistical Essentials for Dummies. Hoboken: Wiley Publishing 2. R for Data Science: Import, Tidy, Transform, Visualize, and Model 				



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	Databy adley ickham , O'Reilly				
Course Code	SMC04-251 A				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Students must have basic knowledge of networking and client server.				
Course Objectives	Client Server Computing Model defines the way successful organizations will use technology during the next decade. As a result knowledge of client server architecture has become an essential part of computer science. The main objective is to provide the basic concepts of client server computing and the new technologies involved in it.				
Course Contents	<p>Unit 1 Client Server System Concepts – Introduction – Concepts – Client Server Architecture – Two-Tier Architecture – Three-Tier Architecture – N-Tier Architecture – N-Tier vs 2-Tier Architecture – Case Study of N-Tier Architecture – Client Server Models – Gartner Classification – Middleware – Characteristics and types of Server – File Server – Database Server – Communication Server – Object Server – Groupware Server – Transaction Server – Characteristics and types of Clients – Thin Client – Fat Client.</p> <p>Unit 2 Components of Client Server Computing – Client – Role of the Client – Client Services – Request for Service – Components of Client Server Computing – Server – Role of the Server – Server Functionality in detail – Components of Client Server Applications – Connectivity – OSI – Communications Interface Technology.</p> <p>Unit 3 Client Server System Architecture – Client Server Building Blocks – Hardware – Client Hardware – Server Hardware – Client Server Building Blocks – Software – Client Server Systems Development Methodology – Project Management – Architecture Definition – Systems Development Environment – Middleware – Types of Middleware – DCE, MOM, TP – Monitors – ODBC – Design Overview of ODBC – ODBC Architecture – Components – Applications – Driver Managers – Database Drivers – ODBC Data Sources – Network Operating System – Base Services – External Services.</p>				



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	<p>Unit 4 SQL Database Servers – Server Architecture – Multithread Architecture – Hybrid Architecture – Stored Procedures – Triggers – Client Server Transaction Processing – Rules of Client Server Transaction Processing – Transaction Models – Chained and Nested Transactions – Transaction Management Standards – Data Warehousing – Warehousing Techniques – Data Mining.</p> <p>Unit 5 Client Server Protocols – RPC – IPC – Recent Trends – Intranet – Extranet – Internet – CORBA.</p>
Course Outcomes	Students will be able to defines the way successful organizations using technology during the next decade and have the knowledge of client server.
Text Books	1. Robert Orfali, Dan Harkey and Jerri Edwards: Essential Client/Server Survival Guide, John Wiley & Sons Inc 1996
Reference Books	1. Alex Berson: Client Server Architecture 2. Patrick Smith, Steve Guengerich: Client Server Computing, Second Edition, Prentice Hall of India Pvt Ltd.

Course Title	Cloud Technology (Elective – I)
Course Code	SMC04-251B



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Semester	MCA – 2nd Semester				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Students must know the basic concepts of networking.				
Course Objectives	<p>At the end of the course,</p> <ol style="list-style-type: none"> 1. Cloud computing represents a latest in the long history computing mainframe, Personal computing networked computing and expected to revolutionize the business is done. 2. This course covers the theoretical and practical aspects of cloud computing. 3. To appreciate the cloud computing paradigm, recognize its various forms and able to implement some cloud computing features. 				
Course Contents	<p>UNIT I Introduction to Cloud Computing, The Emergence of Cloud Computing, Cloud-Based Service Offerings, Benefits of using a Cloud Model, Key Characteristics of Cloud Computing, Understanding- Public & Private cloud environments, The Evolution of Cloud Computing – Hardware & Internet Software Evolution.</p> <p>UNIT II Cloud Security Challenges, Software-as-a-Service, Security Management People, Security Governance, Security Portfolio Management, Security Architecture Design, Identity Access Management (IAM), Data Security.</p> <p>UNIT III Cloud as: Communication-as-a-Service (CAAS), Infrastructure-as-a-Service (IAAS), Monitoring-as-aService (MAAS), Platform-as-a-Service (PAAS), Software-as-a-Service (SAAS).</p> <p>UNIT IV The MSP Model, Evolution from the MSP Model to Cloud Computing and Software-as-a-Service, TheCloud Data Center, Basic Approach to a Data Center-Based SOA, Open Source Software, Service- Oriented Architectures as a Step Toward Cloud Computing.</p> <p>UNIT V Virtualization concepts & Smartphone: virtualization benefits, Hardware virtualization, Software Virtualization, Memory Virtualization, Storage Virtualization, Data Virtualization, Network Virtualization, Virtualization Security Recommendations, Introduction to Various Virtualization OS VMware , KVM, Virtual Machine Security, Smartphone, Mobile Operating Systems for Smartphone’s (iPhone, Windows Mobile), Google(Android) Blackberry, Ubuntu Mobile Internet.</p>				



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Course Outcomes	<ol style="list-style-type: none">1. Students will be able to perform cloud oriented analysis.2. Students will be able to model cloud candidate derived from existing business documentation.3. Students will be able to design the composition of a cloud services.4. Students will be able to design application services for technology abstraction.
Text Books	<ol style="list-style-type: none">1. Toby Velte, Anthony Vote and Robert Elsenpeter, “Cloud Computing: A Practical Approach”, McGraw Hill, 2002
Reference Books	<ol style="list-style-type: none">1. George Reese, “Cloud Application Architectures: Building Applications and Infrastructures in the Cloud”, O’Reilly Media, 2003.2. Tim Mathern, SubraKumaraswamy and ShahedLatif, “Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance”, O’Reilly Media, 2005.



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Course Title	Software Testing (Elective – I)				
Course Code	SMC04-251 C				
Semester	MCA – 2 nd Semester				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Students must know the basic concept of software.				
Course Objectives	<ul style="list-style-type: none"> • To study software testing objectives, process, criteria, strategies, and methods. • To study various software testing issues and solutions in software unit, integration, regression, and system testing. • To study planning of a test project, design test cases, conduction of testing operations, generation of a test report. • To understand automation testing process, its problems and solutions. 				
Course Contents	<p>Unit-I: Quality Revolution, Software Quality, Role of Testing, Objectives of Testing, Concept of Complete Testing, Central Issue of Testing, Sources of Information for Test Case selection, Test Planning and Design, Monitoring and Measuring Test Execution, Test Tools and Automation, Test Team Organization and Management.</p> <p>Unit-II: Basic Concepts of Testing Theory, Theory of Goodenough and Gerhart, Theory of Weyuker and Ostrand, Theory of Gourlay, Adequacy of Testing, Limitations of Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Debugging.</p> <p>Unit-III: Outline of Control Flow Testing, Control Flow Graph, Paths in Control Flow Graphs, Path Selection Criteria, Data Flow Testing criteria, Comparison of Data Flow and Test Selection Criteria, Domain Error, Testing of Domain Errors.</p> <p>Unit-IV: System Test design, Test design Factors, Requirement Identification, Test Objective Identification, Structure of a System Test Plan, Assumptions, Test</p>				



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	<p>Approach, Test Suite Structure, Types of Acceptance Testing</p> <p>Unit-V: Five Views of Software Quality, Quality Control, Quality assurance, Cost of quality, Software Quality Assurance, SQA Plan, ISO 9000, Capability Maturity Model, McCalls Quality Factors.</p>
Course Outcomes	<p>After successful completion of the course, students will be</p> <ul style="list-style-type: none">• To design and conduct a software test process for a software testing project.• To identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.• To use software testing methods and modern software testing tools for their testing projects.
Text Books	<ol style="list-style-type: none">1. Kshirasagar Naik, “Software Testing and Quality Assurance”, John Wiley & Sons.2. William Perry, “Effective Methods for Software Testing”, John Wiley & Sons.
Reference Books	<ol style="list-style-type: none">1. Cem Kaner and Jack Falk, “Testing Computer Software”, Wiley.2. Ron Patton, “Software Testing”, SAMS Publications.