

JSS MAHA VIDYAPEETHA

JSS College of Arts, Commerce and Science

Ooty Road, Mysuru - 570 025

Department of Master of Computer Applications



OVERALL COURSE GRID OF

Master of Computer Applications

2021-2022

Master of Computer Applications

2 Years / 4 Semesters

1. Introduction:

MCA is Masters of Computer Application is a PG course of two years and has it is a master Course in Computer Application the MCA subjects are related to computer languages computer software and the MCA syllabus is divided into 4 semesters has the MCA subjects consists 5 number but their brief knowledge is given in two years so the MCA syllabus is made in such a way that the students learn MCA subjects in two years in such a pattern that the gain all the knowledge

The MCA course includes classroom teaching, practical assignments, and project work which is a mandate in the MCA course syllabus. MCA course syllabus emphasis the latest programming languages and tools to develop better and faster applications. Some colleges encourage students to spend a full semester working in the industry to explore and understand how IT works.

To train MCA course subjects offered by the universities are Data Structures and files using C, Project Visual C++, Computer Networks and Java programming etc. MCA syllabus varies from university to university and some of them are- Internet & JAVA Programming, Modeling and Simulation, Computer and 'C' Programming, Management Information System, and many others.

The MCA course list also emphasis certain specialization topics like Troubleshooting, System Engineering, Software Development, Hardware Technology, etc.

2. Lecture-Practical/Project-Tutorial (L-P-T)

A course shall have either or all the three components, i.e. a course may have only lecture component, or only practical/project component or a combination of any two/three components

Lecture (L): Classroom sessions delivered by faculty in an interactive mode. It should be conducted as per the scheme of lectures indicated in respective course.

Practical/Project(P): Practical / Project Work consisting of Hands-on experience /Field Studies / Case studies that equip students to acquire the much required skill component. Besides separate Practical/Project course, three course in each semester include few practical assignment and it will be evaluated under internal evaluation

Tutorial (T): Session consisting of participatory discussion/ self-study/ desk work/ brief seminar presentations by students and such other novel methods that make a student to absorb and assimilate more effectively the contents delivered in the Lecture sessions

A Mini project is an assignment that the student needs to complete at the end of every semester in order to strengthen the understanding of fundamentals through effective application of the courses learnt. The details guidelines have been given in the course structure.

The Project Work to be conducted in the FINAL Semester and evaluated at the end of the semester. The detail guidelines have been in the respective course structure.

The teaching / learning as well as evaluation are to be interpreted in a broader perspective as follows:

- i) Teaching – Learning Processes: Classroom sessions, Group Exercises, Seminars, Small Group Projects, Self-study, etc.
- ii) Evaluation: Tutorials, Class Tests, Presentations, Field work, Assignments, competency based Activity, etc.

The MCA Programme is a combination of:

- a. Four-Credit Courses (100 Marks each): 4 Credits each
- b. One-Credit Courses (50 Marks each):

Following are the session details per credit for each of L-P-T model

- 1) Every ONE-hour session per week of L amounts to 1 credit per Semester,
- 2) Minimum of TWO hours per week of P amounts to 1 credit per Semester
- 3) Minimum of ONE hours per week of T amounts to 1 credit per Semester

Scheme and Syllabus

Semester I					
Course Title	Course Code	Credits	Contact hours	EXT	INT
Java Programming	IT11	4:0:0	4	70	30
Data Structure and Algorithms	IT12	4:0:0	4	70	30
Computer Organisation and Architecture	IT13	4:0:0	4	70	30
Operating System Concepts	IT14	4:0:0	4	70	30
Computer Networks	IT15	4:0:0	4	70	30
Management Information System	BT11	4:0:0	4	70	30
Mathematical foundations	MT11	4:0:0	4	70	30
Java Programming Lab	IT11L	0:0:1	2	30	20
Data Structure and Algorithms Lab	ITC11	0:0:1	2	30	20
	TOTAL	30	32	550	250

Semester II						
Sl. No.	Course Title	Course Code	Credits	Contact Hours	EXT	INT
1	Python Programming	IT21	4:0:0	4	70	30
2	Software Architecture	IT22	4:0:0	4	70	30
3	Optimization Techniques	MT21	4:0:0	4	70	30
4	Advanced Internet Technologies	IT23	4:0:0	4	70	30
5	Analysis and Design of Algorithms	IT24	4:0:0	4	70	30
6	DBMS	IT 25	4:0:0	4	70	30
7	Elective	ET2X	4:0:0	4	70	30
8	Python Programming Lab	IT21L	0:0:1	2	30	20
9	Advanced Internet Technologies Lab	IT23L	0:0:1	2	30	20
			30	32	550	250

ELECTIVES:

Machine Intelligence Stream		Data Sciences Stream		Applications Stream	
ET21	Artificial Intelligence and Robotics	ET22	NOSQL	ET23	Enterprise Resource Planning

Semester III						
Sl. No.	Course Title	Course Code	Credits	Contact Hours	EXT	INT
1	Mobile Application Development	IT31	4:0:0	4	70	30
2	Data Warehousing and Data Mining	IT32	4:0:0	4	70	30
3	Software Testing and Quality Assurance	IT33	4:0:0	4	70	30
4	.NET Technologies	IT34	4:0:0	4	70	30
5	Cloud Computing	IT35	4:0:0	4	70	30
6	Cryptography and Network Security	IT36	4:0:0	4	70	30
7	Elective	OC32	4:0:0	4	70	30
8	Mobile Application Development Lab	IT31L	0:0:1	2	30	20
9	Data Warehousing and Data Mining Lab	IT32L	0:0:1	2	30	20
			30	32	550	250

ELECTIVES:

Machine Intelligence Stream		Data Sciences Stream		Applications Stream	
ET31	Soft Computing	ET32	Big Data Analytics	ET33	Software Project Management and Practices

Semester IV					
Sl. No.	Course Title	Course Code	CP	EXT	INT
1	Business Intelligence	BM41	4:0:0	70	30
2	Project	ITC41	0:0:12	150	100
			16	220	130

Semester	Credit	IE	UE
Semester I	30	260	540
Semester II	30	260	540
Semester III	30	260	540
Semester IV	16	130	220
Total	106	910	1840
			2750

IT : Information Technology

BT: Business Technology

MT: Mathematics Technology

Semester I

Course Code: IT-11

Course Name: Java Programming

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30	-	-	70	100

Course Description:

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Demonstrate and implement programs using components and constructs of a Java language

CO2: Identify classes, objects, members of a class and use packages and interfaces appropriately.

CO3: Demonstrate for Java program for multithread, synchronization and exception handling concepts.

CO4: Use the concept of string, event handling, simple data structures like arrays and members of classes of Java API in application development

CO5: Design and develop Java based UI and Networking applications using applets, swing components and networking concepts.

TOPICS COVERED:

UNIT 1 – Java Basics 10 Hours

History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, exploring string class

UNIT 2 – OOP Concepts in Java, Packages and Interfaces 10 Hours

Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class.

Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

UNIT 3 - Exception Handling and Multi Threading 10 Hours

Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling, Exploring java.util.

Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads; inter thread communication, thread groups, daemon threads. Enumerations, auto boxing, annotations, generics.

UNIT 4 - String and Event Handling 10 Hours

String fundamentals, String Constructors, Three string related language features, The Length() method, Obtaining the characters within the string, String comparison, using index Of() and lastIndexOf(), changing the case of the characters within the string, String buffer and String builder.

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scroll pane, dialogs, menu bar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT 5 – Applets, Swings and Networking with Java.Net 12 Hours

Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Swings- Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

Networking fundamentals, Networking Classes & Interfaces, The InetAddress class, The Socket class, URL class, URL connection class, Http URL connection class, Exploring collection framework, Collection overview, Collection classes and interfaces, Array class.

TEXT BOOKS / REFERENCES:

1. Herbert Schildt. Java - The Complete Reference, Ninth Edition. Oracle Press, McGraw Hill Education (India) Edition- 2014.

Reference books:

1. Cay S. Horstmann, Gary Cornell. Core Java, Core Java Volume-1 – Fundamentals, 9th edition, Pearson Education, 2014.
2. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.

ADDITIONAL LEARNING SOURCES:

1. <http://www.oracle.com/technetwork/java/index-jsp-135888.html>
2. <http://www.javaworld.com/article/2074929/core-java>
3. <http://www.javaworld.com/>
4. <http://www.learnjavaonline.org/>
5. <https://www.codecademy.com/learn/learn-java>
6. <http://www.tutorialspoint.com/java/>
7. <http://www.java-examples.com/>
8. <http://www.homeandlearn.co.uk/java/java.html>

Course Code: IT-12

Course Name: Data Structure and Algorithms

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30	-	-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

- CO1: Design and analyze programming problem statements.
- CO2: Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.
- CO3: Apply mathematical abstraction to solve problems.
- CO4: Demonstrate various methods of organizing large amounts of data.
- CO5: Analyze algorithms and to determine algorithm correctness and time efficiency class.
- CO6: demonstrate linear data structures linked list, stack and queue (apply)
- CO7: implement tree, graph, hash table and heap data structures (apply)
- CO8: apply brute force and backtracking techniques (apply)
- CO9: demonstrate greedy and divide-conquer approaches (apply)
- CO10: implement dynamic programming technique (apply)

UNIT 1 - Introduction and overview of C Programming

12 Hours

Introduction to C programming, Variables, Data types, Constants, Declarations, Operators, Precedence, Associativity, Order of evaluation. Input and output statements; Control Statements, Arrays – Single dimension, Two dimensional, Multi dimensional Arrays, Strings. Functions, Categories of functions. Examples Pointers, Pointer arithmetic, Call by value, Pointer Expression, Pointer as function arguments, recursion, passing strings to functions, Call by reference, Functions returning pointers, Pointers to functions, Programming Examples. Structures and Unions.

UNIT 2 - Introduction to Data Structures 8 Hours

Information and its meaning: Abstract Data Types, Sequences as Value Definitions, ADT for Varying length character Strings, pointers and review of Pointers, Dynamic Memory Allocation - definition, malloc, calloc, and realloc, free. Data Structures: Array as an ADT, Arrays as Parameters, String as an ADT.

UNIT 3 - The Stack

12 Hours

Definition and examples, Primitive operations, Example, The stack as an ADT, Representing stacks, Implementing the pop, push operations using function overloading, Examples for infix, postfix, and prefix expressions, Basic definition and Examples. Applications of Stacks: Expression Evaluations, Expression conversion, Recursion as application of stack, Properties of recursive definition or algorithm. Binary search, Towers of Hanoi problem.

UNIT 4 - Queues and Linked List

12 Hours

The queue and its sequential representation, the queue as ADT, Basic operations using polymorphism and inheritance, Priority queue, Array implementation of a priority queue. Linked lists, inserting and removing nodes from a list, Linked implementations of stacks, Linked implementation of queues, linked list as a data Structure. Example of list operations.

UNIT 5 - Linked Lists and Trees

8 Hours

Other list structures: Circular lists, Stack as circular lists, doubly linked lists. Application of linked lists: Stacks, Queues, double-ended queues, priority queues. Sorting and Searching: Applications and implementation with function overloading. Tree: Definition and representation, Types of trees, Basic operations on Tree.

TEXT BOOKS/ REFERENCES :

Text Books :

1. Programming in ANSI C, Third Edition, E. Balaguruswamy. 6th Edition (2013).
2. Data Structures Using C and C++ by Aaron.M. Tenenbaum, Yedidyah Langsam and Moshe J. Augustine, PHI, Edition, 2011.

Reference Books :

1. Data structures, Algorithms and Applications in C++, S. Sahani, University Press (India) Pvt Ltd, 2nd Edition.
2. The complete reference C, Herbert Schildt, Fifth Edition, Tata McGraw Hill.

ADDITIONAL LEARNING SOURCES:

1. <http://www.tutorialspoint.com/Data-Structures-in-C-Online-Training/classid=13>
2. http://nptel.ac.in/datastructures_c
3. www.javatpoint.com
4. www.oracle.com
5. www.geeksforgeeks.org/java

Course Code: IT-13

Course Name: Computer Organisation and Architecture

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30	-	-	70	100

Upon Successful Completion of this Course, Student will know

CO1: Computer Architecture-Hardware, software

CO2: Design of Interfaces

CO3: Addressing Modes

UNIT-1

12 Hours

Principles of Computer design - Software, hardware interaction layers in computer architecture. Central processing unit. Machine language instructions, Addressing modes, instruction types, Instruction set selection, Instruction cycle and execution cycle.

UNIT-2

12 Hours

Control unit, Data path and control path design, Microprogramming Vs hardwired control, RISC Vs CISC, Pipelining in CPU design: Superscalar processors.

UNIT-3

12 Hours

Memory system, Storage technologies, Memory array organization, Memory hierarchy, interleaving, cache and virtual memories and architectural aids to implement these.

UNIT-4

8 Hours

Input-output devices and characteristics. Input-output processing, bus interface, data transfer techniques, I/O interrupts, channels.

UNIT-5

8 Hours

Performance evaluation - SPEC marks, Transaction Processing benchmarks.

TEXT BOOKS/ REFERENCES :

1. Pal Chauduri, P., "Computer Organisation and Design", Prentice Hall of India, New Delhi, 1994.
2. Rajaraman, V., and Radhakrishnan, T., "Introduction to Digital Computer Design" (4th edition). Prentice Hall of India, New Delhi, 1997.
3. Stallings, W., "Computer Organization and Architecture, (2nd edition) Prentice Hall of India, New Delhi

Course Code: IT-14

Course Name: Operating System and Linux

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30	-	-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Recognize the structure of operating system, interaction of an operating system and application programs.

CO2: Analyze the various programming paradigms viz., multi-process and multi-threaded programming.

CO3: Examine the various resource and memory management techniques.

CO4: Distinguish the different features of real time and mobile operating systems.

CO5: Identify current issues in system security; demonstrate various factors can influence the overall performance of an operating system.

TOPICS COVERED:

UNIT 1- Computer and Operating Systems Structure 11 Hours

Basic Elements, Processor Registers, Instruction Execution, The Memory Hierarchy, Cache Memory, I/O Communication Techniques, Introduction to Operating System, Mainframe Systems, Desktop Systems, Multiprocessor Systems, Distributed Systems, Clustered Systems, Real - Time Systems, Handheld Systems, Feature Migration, Computing Environments.

System Structures: System Components, Operating – System Services, System Calls, System Programs, System Structure, Virtual Machines, System Design and Implementation, System Generation

UNIT 2 - Process Management and Mutual Execution 10 Hours

Process, Process States, Process Description, Process Control, Execution of the Operating System, Security Issues, Processes and Threads, Symmetric Multiprocessing(SMP), Micro kernels, CPU Scheduler and Scheduling. Principles of Concurrency, Mutual Exclusion: Hardware Support, Semaphores, Monitors, Message Passing, Readers/Writes Problem.

UNIT 3 - Deadlock and Memory Management

11 Hours

Principles of Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, An Integrated Deadlock Strategy, Dining Philosophers Problem Memory Management: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing

UNIT 4 - File System and Secondary Storage

10 Hours

File Concept, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection, File – System Structure, File – System Implementation, Directory Implementation, Allocation Methods, Free–Space Management, Disk Structure, Disk Scheduling, Disk Management.

UNIT 5 - Computer Security and Case study of Linux Operating system

10 Hours

The Security Problem, User Authentication, Program Threats, System Threats. Linux System Linux history, Design Principles, Kernel modules, Process, management, scheduling, Memory management, File systems, Input and output, Inter-process communications.

TEXT BOOKS/REFERENCES:

TEXT BOOKS :

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne: Operating System Principles, 8th edition, Wiley India, 2009.
2. William Stallings, “Operating System Internals and Design Principles” Pearson, 6th edition, 2012

REFERENCES:

1. Dhananjay M. Dhamdhare, “Operating Systems – A Concept – Based Approach”, TataMcGraw – Hill, 3rd Edition, 2012.
2. Harvey M Deital: Operating systems, 3rd Edition, Pearson Education, 1990.
3. Chakraborty , “Operating Systems” Jaico Publishing House, 2011

ADDITIONAL RESOURCES:

1. https://www.tutorialspoint.com/operating_system/os_linux
2. <https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems>.

Course Code: IT-15

Course Name: Computer Networks

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30	-	-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Analyze and distinguish the basic concepts, principles and techniques of data communication along with the layers of OSI and TCP/IP model.

CO2: Independently understand and distinguish the concept of links, nodes and data transmission issues in the network.

CO3: Capability to categorize wired LANs: Ethernet, IPv4 addresses and performance of The network-layer.

CO4: Design and demonstrate the services of TCP and UDP.

CO5: Ability to summarize and interpret the basic concepts of Application-Layer paradigms and standard client-server protocols.

TOPICS COVERED:

UNIT 1 - Basics of Data Communications and Physical Layer 10 Hours

Data Communications: Components, Data Representation, Data Flow, Networks; Network Criteria, Physical Structures, Network Types: LAN, WAN, Switching, Network Models: Protocol Layering: Principles of Protocol Layering, Logical Connections, TCP/IP Protocol Suite: Layered Architecture, Layers in the TCP/IP Protocol Suite, Encapsulation and Decapsulation, Addressing, Multiplexing and Demultiplexing, The OSI Model; OSI versus TCP/IP, Lack of OSI Model's Success, Introduction to Physical Layer, Data and Signals, Periodic Analog Signals, Digital Signals, Transmission Impairment, Data Rate Limits, Performance, Switching: Circuit-Switched Networks, Packet Switching, Datagram Networks, Virtual Circuit Networks.

UNIT 2 - Data Link Layer 10 Hours

Introduction to Data-Link Layer, Link-Layer Addressing: Address Resolution Protocol (ARP), Error Detection and Correction: Introduction, Types of Errors, Redundancy, Detection versus Correction, Coding, Block coding: Error Detection, Cyclic Code: Cyclic Redundancy Check,

Polynomials, Cyclic Code Analysis and its Advantages, Checksum, Forward Error Correction: Using Hamming Distance, Using XOR, Chunk Interleaving.

UNIT 3 - LANs and Network Layer 10 Hours

Ethernet Protocol, Standard Ethernet: Characteristics, Addressing, Access Method, Efficiency of Standard Ethernet, Implementation, Changes in the Standard, Fast Ethernet (100 MBPS): Access Method, Physical Layer, 10 Gigabit Ethernet, Introduction to Network Layer, Network- Layer Services: Packetizing, Routing and Forwarding, Packet Switching: Datagram Approach, Virtual-Circuit Approach, Network Layer Performance: delay Throughput, Packet loss, Congestion Control, IPv4 addresses.

UNIT 4 - Transport Layer 10 Hours

Introduction to Transport-Layer: Transport-Layer Services; Transport-Layer Protocols: Port Numbers, User Datagram Protocol: User Datagram, UDP Services, UDP Applications, Transmission Control Protocol: TCP Services, TCP Features, Segment, A TCP Connection, State Transition Diagram, Windows in TCP, Flow Control, Error Control, TCP Congestion Control, TCP Timers.

UNIT 5 - Application Layer and Standard Client-Server Protocols 12 Hours

Introduction to Application Layer, Services, Application-Layer Paradigms, Client-Server Programming: Application Programming Interface, Using Services of the Transport Layer, Iterative Communication using UDP, Iterative Communication using TCP, Concurrent Communication, World Wide Web and HTTP: FTP: Two Connections, Control Connection, Data Connection, Security for FTP, E-Mail: Architecture, Web-Based Mail, TELNET: Local versus Remote Logging, Secure Shell (SSH): Components, Applications, Domain Name System (DNS): Name Space, DNS in the Internet, Resolution, Caching, Resource Records, DNS Messages, Registrars, DDNS, Security of DNS.

TEXT BOOKS / REFERENCES:

Text books:

B. A. Forouzan, Data Communications and Networking, 5th Edition, McGraw Hill Education (India) Private Limited, 2013.

Reference books:

1. William Stallings, Data and Computer Communications, 10th Edition, Pearson, 2013.
2. Larry L. Peterson and Bruce S. David: Computer Networks – A Systems Approach, 5th Edition, Elsevier, 2011.
3. Andrew S. Tanenbaum, Computer Networks, Fourth Edition, PHI, 2008.

4. Fred Halsall, Data Communications, Computer Networks and Open Systems, 4th Edition, Pearson Education, 2005.

1. www.nptel.ac.in/courses

2. <http://freevideolectures.com/Course/2276/Computer-Networks>

Course Code: BT-11

Course Name: Management Information System

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30			70	100

Course Description:

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Apply the different strategies for the management of business to formulate business process.

CO2: Analyze the need for business process re-engineering, and the process of making.

CO3: Analyze and examine business information needs to facilitate evaluation of strategic alternatives.

CO4: Apply Management Information Systems knowledge and skills learned to facilitate the acquisition, development, deployment, and management of information systems.

CO5: Effectively communicate strategic alternatives to facilitate decision-making.

TOPICS COVERED:

UNIT 1- Systems Engineering, Information and Knowledge

12 Hours

System concepts, system control, types of systems, handling system complexity, Classes of systems, General model of MIS, Need for system analysis, System analysis for existing system & new requirement, system development model, MIS & system analysis. Information concepts, classification of information, methods of data and information collection, value of information, information: A quality product, General model of a human as information processor, Knowledge, Introduction of MIS: MIS: Concept, Definition, Role of the MIS, Impact of MIS, MIS and the user, Management as a control system, MIS support to the management, Management effectiveness and MIS, Organization as system. MIS: organization effectiveness.

UNIT 2- Decision Making and DSS 10 Hours

Decision making concepts; decision making process, decision-making by analytical modeling, and Behavioral concepts in decision making, organizational decision-making, Decision structure, DSS components, and Management reporting alternatives

Technology of Information System : Introduction, Data processing, Transaction processing, Application processing, information system processing, TQM of information systems, Human factors & user interface, Strategic nature of IT decision, MIS choice of information technology.

UNIT 3- Electronic Business systems 10 Hours

Enterprise business system – Introduction, cross-functional enterprise applications, real world case, Functional business system, - Introduction, marketing systems, sales force automation, CIM, HRM, online accounting system, Customer relationship management, ERP, Supply chain management (real world cases for the above)

E-business Technology: Introduction to E-business, model of E-business, internet and World Wide Web, Intranet/Extranet, Electronic, Impact of Web on Strategic management, Web enabled business management, MIS in Web environment.

UNIT 4- Strategic Management of Business & Developing Business/IT Strategies /IT Solutions 10 Hours

Concept of corporate planning, Essentiality of strategic planning, Development of the business strategies, Type of strategies, short-range planning, tools of planning, MIS: strategic business planning. Planning fundamentals (real world cases), Organizational planning, planning for competitive advantage, (SWOT Analysis), Business models and planning. Business/IT planning, identifying business/IT strategies, Implementation Challenges, Change management., Developing business systems, (real world case), SDLC, prototyping, System development process, implementing business system .

UNIT 5: E-Commerce Introduction 10 Hours

Introduction to e-commerce, E-commerce Business Models and Concepts, Ecommerce Infrastructure: The Internet and World Wide Web, Web design, JavaScript Internet Information Server (IIS); Personal Web Server (PWS).

E-Commerce techniques and Issues: Introduction to Active Server Pages (ASP), Building an E-Commerce Web Site, E-Commerce Payment Systems, E-Commerce Marketing Techniques, Building product catalogue, Search product catalogue, Web Spider and search agent, Ethical, Social and Political Issues in E-Commerce.

TEXT BOOKS /REFERENCES:

Text Books :

1. Waman S Jhawadekar: Management Information System, 3rd Edition, Tata McGraw Hill.
2. James A O'Brien and George M Marakas: Management Information System, 7th Edition, Tata McGraw Hill, 2006
3. Turban, Rainer, and Potter, Introduction to E-Commerce, second edition, 2003
4. H. M. Deitel, P. J. Deitel and T. R. Nieto, E-Business and E-Commerce: How to Program, Prentice hall, 2001

Reference Books:

1. Ralph M Stair and George W Reynolds: Principles of Information Systems, 7th Edition, Thomson, 2010.
2. Steven Alter: Information Systems - The Foundation of E-Business, 4th Edition, Pearson Education, 2001
3. Elizabeth Chang: E-Commerce Fundamentals and Applications, Wile India Edition.

ADDITIONAL LEARNING RESOURCES:

1. <http://mbaexamnotes.com/management-information-system-notes>
2. https://www.tutorialspoint.com/management_information_system

Course Code: MT-11

Course Name: Mathematical Foundations

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30			70	100

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Implement statistical measures and explore its applications

CO2: Analysis of computational errors and design of algorithms to solve a set of linear equations.

CO3: Applying the concepts of vector and linear functions in real time applications.

CO4: Apply the notion of relations on finite structures, like strings and analyze algorithms using the concept of functions.

CO5: Explore the properties of Graph theory and its applications in computer science.

TOPICS COVERED:

UNIT 1- Statistics 10 hours

Univariate data – different measures of location, dispersion, relative dispersion, skewness and kurtosis, Moments, Measures based on them – comparison with moment measures, Correlation and Regression Analysis.

UNIT 2 – Number Systems and Vector & Matrix Algebra 10 hours

Errors in Numerical Computations, Types of Errors, Analysis and Estimation of Errors, Vector Algebra: Vector spaces with real field, Basis and dimension of a vector space, Orthogonal vectors, Properties of Matrices and Determinants: Matrix Operations, Elementary Matrices, Inverse Matrix, Diagonal Matrix, Symmetric Matrix, and Determinant Matrix.

UNIT 3 - Linear Algebraic Systems 11 hours

Numerical methods for Linear Systems, Direct Methods for Linear Systems: Cramer’s Rule, Gauss Elimination Method, Gauss Jordan Elimination Method, Pivoting Strategies, Gauss- Jordan Method, LU Decomposition Method, Tridiagonal Systems of Linear Equations, Iterative Methods

for Solving Linear Systems, Jacobis Iteration Method, Gauss-Seidel Iterative Method, Convergence Criteria, Eigen Values and Eigen Vectors.

UNIT 4 – Relations and Functions 10 hours

Cartesian products and Relations, Properties of Relations, Functions: Plain and One-to-One, Onto Functions: Stirling Numbers and the Second Kind, Special functions, The Pigeon-hole principle, Function composition and inverse functions.

UNIT 5 - Graph Theory 11 Hours

Definitions and Examples, Subgraphs, Complements, and Graph Isomorphism, Vertex Degree: Euler Trails and Circuits, Planar Graphs, Hamilton Paths and Cycles, Graph Coloring and Chromatic Polynomials.

TEXT BOOKS / REFERENCES:

TEXT BOOKS :

1. Sant Sharan Mishra, “Computer Oriented Numerical and Statistical Methods”, PHI Learning Private Limited, 2013.
2. Rizwan Butt, “Introduction to Numerical Analysis Using Matlab”, Infinity Science Press LLC, 2008
3. Ralph P Grimaldi, B.V.Ramana, “Discrete & Combinatorial Mathematics, An Applied Introduction” 5th Edition, Pearson Education, 2009.

REFERENCES:

1. D.S. Chandrasekharaiah, Discrete Mathematical Structures, 4th Edition, PRISM Pvt. Ltd. 2012.
2. Bondy and U.S.R.Murty: Graph Theory and Applications (Freely downloadable from Bondy's website; Google-Bondy)
3. S. Kumarsean, “Linear Algebra A geometric approach”, Prentice Hall of India Private Limited, 2001
4. Kenneth H Rosen, “Discrete Mathematics & its Applications" 7th edition, McGraw- Hill, 2010.

ADDITIONAL LEARNING SOURCES:

1. <http://www.personal.kent.edu/~rmuhamma/GraphTheory/graphTheory.htm>
2. http://www.tutorialspoint.com/discrete_mathematics/
3. <http://nptel.iitm.ac.in/>
4. <http://www.maths.lu.se/english/library/e-resources/>
5. <http://sunzi.lib.hku.hk/ER/detail/hkul/3743848>
6. <https://www.math.ucdavis.edu/~linear/linear-guest.pdf>

Course Code: IT11L

Course Name: Java Programming Practicals

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
--	3 Hrs./Week	1		50		50	100

Upon successful completion of this course, students will be able to:

CO1: Demonstrate and implement programs using components and constructs of a Java language

CO2: Identify classes, objects, members of a class and exhibit use packages and interfaces appropriately.

CO3: Demonstrate for Java program for multithread, synchronization and exception handling concepts.

CO4: Use the concept of string, event handling, simple data structures like arrays and members of classes of Java API in application development

CO5: Design and develop Java based UI and Networking applications using applets, swing components and networking concepts.

LIST OF PROGRAMS TO BE COVERED:

1. Display Hello world
2. Check entered number is ODD or EVEN
3. Find factorial of number
4. Find the sum of the digits of a given number
5. Swap two numbers without using a temporary variable
6. Accept a name and display the name with greeting message using Class.
7. Generate a salary for an employee using class, object, constructors, methods and access control. Different parameters to be considered are Emp_No, Emp_Name, Age, Basic, DA, HRA, CA, PT, IT.
8. Generate a sales report for a sales executive using class, object, constructors, methods and access control. Different parameters to be considered are Emp_No, Emp_Name, Sales_Q1, Sales_Q2, Sales_Q3, Sales_Q4.
9. Demonstrate Constructor Overloading and Method Overloading.
10. Implement Inner class and demonstrate its Access protection.
11. Write a program in Java for String handling which performs the following:
 - a. Checks the capacity of String Buffer objects.
 - b. Reverses the contents of a string given on console and converts the resultant string in upper case.
 - c. Reads a string from console and appends it to the resultant string of ii.
12. Demonstrate Inheritance.

13. Simple Program on Java for the implementation of Multiple inheritance using
 - a. interfaces to calculate the area of a rectangle and triangle.
14. Write a JAVA program which has
 - a. A Class called Account that creates account with 500Rs minimum balance, a deposit() method to deposit amount, a withdraw() method to withdraw amount and also throws Less Balance Exception if an account holder tries to withdraw money which makes the balance become less than 500Rs.
 - b. A Class called Less Balance Exception which returns the statement that says withdraw amount (Rs) is not valid.
 - c. A Class which creates 2 accounts, both account deposit money and one account tries to withdraw more money which generates a Less Balance Exception take appropriate action for the same.
15. Write a JAVA program using Synchronized Threads, which demonstrates Producer Consumer concept.
16. Write a JAVA program to implement a Queue using user defined Exception Handling (also make use of throw, throws.).
17. Complete the following:
 - a. Create a package named shape.
 - b. Create some classes in the package representing some common shapes like Square,
 - c. Triangle and Circle. Import and compile these classes in other program.
18. Write a JAVA Program
 - a. Create an enumeration Day of Week with seven values SUNDAY through SATURDAY. Add a method is Workday() to the Day of Week class that returns true if the value on which it is called is MONDAY through FRIDAY. For example, the call Day Of Week SUNDAY is Workday () returns false.
19. Write a JAVA program which has
 - a. A Interface class for Stack Operations
 - b. A Class that implements the Stack Interface and creates a fixed length Stack.
 - c. A Class that implements the Stack Interface and creates a Dynamic length Stack.
 - d. A Class that uses both the above Stacks through Interface reference and does the Stack operations that demonstrates the runtime binding.
20. Print a chessboard pattern.
21. Write a JAVA Program which uses File Input Stream / File Output Stream Classes.
22. Demonstrate utilities of Linked List Class.
23. Write a JAVA applet program, which handles keyboard event.
24. Write a JAVA Swing program, to design a form.
25. Create a simple Student Registration application using Swings, JDBC and MySQL.
26. Write a JAVA program which uses Datagram Socket for Client Server Communication.

TEXT BOOKS / REFERENCES:

Text books:

1. Herbert Schildt. Java - The Complete Reference, Ninth Edition. Oracle Press, McGraw Hill Education (India) Edition- 2014.

Reference books:

1. Cay S. Horstmann, Gary Cornell. Core Java, Core Java Volume-1 – Fundamentals, 9th edition, Pearson Education, 2014.
2. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.

ADDITIONAL LEARNING SOURCES:

1. <http://www.oracle.com/technetwork/java/index-jsp-135888.html>
2. <http://www.javaworld.com/article/2074929/core-java>
3. <http://www.javaworld.com/>
4. <http://www.learnjavaonline.org/>
6. <https://www.codecademy.com/learn/learn-java>
7. <http://www.tutorialspoint.com/java/>
8. <http://www.java-examples.com/>
5. <http://www.homeandlearn.co.uk/java/java.html>

Course Code: IT12L

Course Name: Data Structure and Algorithms Practicals

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
--	3 Hrs./Week	1		50		50	100

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Design and analyze programming problem statements.

CO2: Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.

CO3: Apply mathematical abstraction to solve problems.

CO4: Demonstrate various methods of organizing large amounts of data.

CO5: Analyze algorithms and to determine algorithm correctness and time efficiency class.

LIST OF EXPERIMENTS COVERED:

PROGRAMS ON C.

1. Programs to learn and explore C data types, looping and decision making structures. {mean, median, lcm, gcd, min max }
2. Calculate the salary of an employee given his basic pay, HRA = 10% of basic pay, TA=5% of his basic pay and deductions IT = 2.5% of his basic pay.
3. Solve quadratic equations to find the roots of the equation.
4. Programs to implement arrays and structures. {Ex: Students marks calculation, matrix operations }
5. Calculate the average marks of the student test marks and display the result using structure.
6. Programs to implement dynamic memory allocation: malloc, calloc, realloc and free.

STACK

7. Write a C program to evaluate the validity of an expression
8. Write a C program to evaluate a postfix expression.
9. Write a C program to convert an expression from infix to postfix.
10. Write a C program to implement multiple stack of integers.

QUEUES

11. Write a C program to perform basic operations on queue of integers, the program should provide the appropriate message to handle all concerned conditions
12. Write a C program to perform basic operations on list of students information stored in circular queue.

Let student information include regno, course title, year of study

13. Write a C program to implement dual queue.

LINKED LIST

14. Write a C program to implement stack operations using linked list.

15. Write a C program to implement queue operations using linked list.

16. Write a C program to create the students mark list based on the rank. Let the student record contain student-id, name, total marks.

17. Write a C program to perform operations.

a. Creation of list.

b. Insertion of new element [At Front, from rear, based on the position]

c. Deletion of a node [At Front, from rear, based on the position]

d. Display the list.

e. Replace the content of one element by another element.

f. Swap two nodes

18. Write a C program to perform the following operations on doubly linked list.

a. Creation of list by :

Insertion [At beginning, At end, In between] Deletion [At beginning, At end, In between]

b. Display all the nodes.

c. Swap two nodes based on specific criteria.

TREES

19. Write a C program to perform / implement the binary tree using array and hence perform the following

a. To print the left and right child of specified node

b. To print all the ancestors of a specified node

c. To print all the node in a specific level

d. To print only the leaf node

20. Write a C program to perform / implement the binary tree using linked list and hence perform the following

a. To print the left and right child of specified node

b. To print all the ancestors of a specified node

c. To print all the node in a specific level

d. To print only the leaf node

21. Write a C program with recursive routines to traverse the binary tree in all possible orders

a. Create a tree

b. Pre-Order traversal

c. In-Order traversal

d. Post-Order traversal

22. Write a C program to construct a heap of n integers and hence sort them using heap sort Algorithm

23. Implement the search techniques

- a. Linear Search
- b. Binary Search

Text Books :

1. Programming in ANSI C, Third Edition, E. Balaguruswamy. 6th Edition (2013).
2. Data Structures Using C and C++ by Aaron.M. Tenenbaum, Yedidyah Langsam and Moshe J. Augustine , PHI, Edition, 2011.

Reference Books :

1. Data structures, Algorithms and Applications in C++, S. Sahani, University Press (India) Pvt Ltd, 2nd Edition.
2. The complete reference C, Herbert Schildt, Fifth Edition, Tata McGraw Hill.

1. <http://www.tutorialspoint.com/Data-Structures-in-C-Online-Training/classid=13>

2. http://nptel.ac.in/datastructures_c

Semester II

Course Code: IT-21

Course Name: Python Programming

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30			70	100

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Design and apply a solution clearly, accurately in a program using python.

CO2: Comprehend and Apply knowledge in real time situational problems and think creatively about solutions.

CO3: Apply the best features of mathematics, engineering and natural sciences to program using python.

CO4: Apply object-oriented programming concepts to develop dynamic interactive Python applications.

CO5: Demonstrate how to build and package python modules for reusability.

TOPICS COVERED:

UNIT 1 - Introduction to Python

10 Hours

Python Basics: Data Types, Operators, Input/Output Statements, Creating Python Programs, Python Flow Control statements: Decision making statements, Indentation, Conditionals, loops, break, continue, and pass statements. Strings, lists, Tuples, Dictionaries

UNIT 2 - Python Functions

10 Hours

Defining functions, DOC strings, Function parameters: default, keyword required and variable length arguments, key-word only parameters, local and global variables, pass by reference versus value, Anonymous functions, Recursion. Functional Programming: Mapping, Filtering and Reduction, Lambda Functions, List Comprehensions.

UNIT 3 - Object Oriented Programming

10 Hours

Definition and defining a class, Constructor, Destructor, self and del keywords, Access to Attributes and Methods, getattr and setattr attributes, Data Attributes and Class Attributes, Data Hiding, Inheritance, Static Members. Regular Expressions: Defining Regular Expressions and String Processing.

UNIT 4 - File Handling and Python GUI Programming

10 Hours

File object attributes, Read and Write into the file, Rename and Delete a File, Exceptions Handling: Built-in Exceptions and User defined Exceptions GUI Programming, Introduction to Python GUI Programming, Tkinter Programming, Tkinter widgets, Events and Bindings

UNIT 5 - Working with Django 12 Hours

Rendering Templates into HTML and Other Formats, Understanding Models, Views, and Templates, Separating the Layers (MVC) - Models, Views, Templates, Overall Django Architecture, Defining and Using Models, Using Models, Templates and Form Processing, Setting up the Database, Using a Database Server, Using SQLite, Creating the Tables

TEXT BOOKS / REFERENCES:

Text books:

1. Timothy A. Budd: Exploring Python, Tata McGraw-Hill, 2011.
2. Jeff Forcier, Paul Bissex, Wesley Chun: Python Web Development with Django, Addison-Wesley, 2008.

Reference books:

1. Ascher, Lutz: Learning Python, 4th Edition, O'Reilly, 2009.
2. Wesley J Chun: Core Python Applications Programming, Pearson Education, 3rd Edition, 2013.
3. Paul Gries, Jennifer Campbell, Jason Montojo , Practical Programming: An introduction to Computer Science Using Python, second edition, Pragmatic Bookshelf.
4. Allen Downey , Jeffrey Elkner , Learning with Python: How to Think Like a Computer Scientist Paperback –, 2015

ADDITIONAL LEARNING SOURCES:

<http://www.network-theory.co.uk/docs/pytut/> <http://docs.python.org/tutorial/>
<http://zetcode.com/tutorials/pythontutorial/> <http://www.sthurlow.com/python/>
<http://www.tutorialspoint.com/python/> <http://www.djangoproject.com/>
<http://www.djangobook.com/>

Course Code: IT-22

Course Name: Software Architecture

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30			70	100

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Comprehend the need and importance of software architectures.

CO2: Differentiate various architectural styles based on requirement.

CO3: Implement system qualities during architecture development for the application.

CO4: Apply pattern oriented architecture by understanding patterns and their descriptions.

CO5: Design and document the software architecture.

TOPICS COVERED:

UNIT 1 - Introduction, Architectural Styles 12 Hours

The Architecture Business Cycle: Where do architectures come from? Software processes and the architecture business cycle; What makes a “good” architecture? What software architecture is and what it is not; Other points of view; Architectural patterns, reference models and reference architectures; Importance of software architecture; Architectural structures and views.

Architectural styles; Pipes and filters; Data abstraction and object-oriented organization; Event-based, implicit invocation; Layered systems; Repositories; Interpreters; Process control; Other familiar architectures; Heterogeneous architectures.

UNIT 2 - Understanding and Achieving Quality Attributes 10 Hours

Functionality and architecture; Architecture and quality attributes; System quality attributes; Quality attribute scenarios in practice; Other system quality attributes; Business qualities; Architecture qualities.

Achieving Quality: Introducing tactics; Availability tactics; Modifiability tactics; Performance tactics; Security tactics; Testability tactics; Usability tactics; Relationship of tactics to architectural patterns; Architectural patterns and styles.

UNIT 3 - Architectural Patterns – From Mud to Structures, Distributed Systems 12 Hours

Introduction: From mud to structure: Layers, Pipes and Filters, Blackboard. Distributed Systems: Broker; Interactive Systems: MVC, Presentation-Abstraction-Control.

UNIT 4 - Adaptable Systems & Other systems 08 Hours

Adaptable Systems: Microkernel; Reflection. Structural decomposition: Whole – Part; Organization of work: Master – Slave; Access Control: Proxy.

UNIT 5 - Designing and Documenting Software Architecture 10 Hours

Architecture in the life cycle; Designing the architecture; Forming the team structure; Creating a skeletal system. Uses of architectural documentation; Views; Choosing the relevant views; Documenting a view; Documentation across views.

TEXT BOOKS / REFERENCES:

1. Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice, 3d Edition, Pearson Education, 2013.
2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal: Pattern-Oriented Software Architecture, A System of Patterns, Volume 1, John Wiley and Sons, 2012.
3. Mary Shaw and David Garlan: Software Architecture -Perspectives on an Emerging Discipline, Prentice Hall of India, 2010.

Reference books:

1. Richard N. Taylor, Nenad Medvidovic and Eric M. Dashofy: Software Architecture: Foundations, Theory, and Practice, Wiley- India 2012.

ADDITIONAL LEARNING SOURCES:

1. <http://www.sei.cmu.edu/architecture/>
2. <http://handbookofsoftwarearchitecture.com/>
3. <https://leanpub.com/software-architecture-for-developers/read>
4. <http://www.hillside.net/patterns/>

Course Code: MT-21

Course Name: Optimization Techniques

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30			70	100

Prerequisite: Basic mathematical knowledge is essentials.

Course Objectives:

1. To understand the role and principles of optimization techniques in business world.
2. To understand the process of problem statement formulation of the business scenario.
3. To understand the implementation of various decision-making techniques in the process of decision making.
4. To gain the techniques and skills on how to use optimization techniques to support the decision making in business world.

Course Outcomes:

Student will be able to

CO1: Understand the role and principles of optimization techniques in business world (Understand)

CO2: Demonstrate specific optimization technique for effective decision making (Apply)

CO3: Apply the optimization techniques in business environments (Apply)

CO4: Illustrate and infer for the business scenario (Analyze)

CO5: Analyze the optimization techniques in strategic planning for optimal gain. (Analyze)

UNIT 1 Linear Programming

10 Hours

Various definitions, statements of basic theorems and properties, Advantages and Limitations

application areas of Linear programming ,Linear Programming – Concept

Formulation of Linear programming, Solution of LPP using Graphical method

Simplex Method and Problems, Two Phase Simplex Method and problems

UNIT 2 Markov Chains & Simulation Techniques:

12 Hours

Markov chains: Applications related to technical functional areas,

Steady state Probabilities and its implications, Decision making based on the inferences Monte

Carlo Simulation. Application of Markov chain in Queuing theory, Simulation techniques used in

Machine learning and bioinformatics.

UNIT 3 Sequential model and related Problems

10 Hours

Processing n jobs through 2 machines ,Processing n jobs through 3 machines
Processing n jobs through m machine. PERT and CPM: Basic differences between PERT and CPM. Network diagram:Time estimates (Forward Pass Computation, Backward Pass Computation ,Critical Path,Probability of meeting scheduled date of completion, Calculation on CPM network. Various floats for activities, Event Slack: calculation on PERT network. Application of schedule based on cost analysis and crashing Case study-based problems

UNIT 4 Game Theory

12 Hours

Introduction, $n \times m$ zero sum game with dominance ,Solution using Algebraic, Arithmetic and Matrix strategy

Decision Analysis

Introduction to Decision Analysis, Types of Decision-making environment

Decision making under uncertainty and under risk, Concept of Decision Tree.

Text Books:

1. Operations Research by Pannerselvam
2. Operations Research Theory and Application by J. K. Sharma –Mac-Millan Publication
3. Statistical and Quantitative Methods – Mr. Ranjit Chitale

Reference Books:

1. Statistical Methods – S.P.Gupta, Sultan Chand, New Delhi
2. Operation Research by V. k. Kapoor
3. Operations Research by Kanti Swaroop, P. K. Gupta and Man Mohan
4. Introduction to Operations Research by Hiller & Lieberman, Tata Mc Graw Hill
5. Operations Research by H. A. Taha
6. Operation Research by Hira & Gupta
7. What is Game Theory?, David K. Levine, Economics, UCLA

Practicals to be conducted on the following topics. It is expected that, Applications to be covered using Python and /or R

1. Linear Programming
2. Markov Chain and Simulation Techniques
3. Sequential models and related problems
4. CPM and PERT
5. Game Theory
6. Decision Analysis

Course Code: IT-23

Course Name: Advanced Internet Technologies

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30	-	-	70	100

Course Description:

Course Outcomes:

Student will be able to

CO1: Outline the basic concepts of Advance Internet Technologies (Understand)

CO2: Design appropriate user interfaces and implements webpage based on given problem Statement (Apply)

CO3: Implement concepts and methods of NodeJS (Apply)

CO4: Implement concepts and methods of Angular (Apply)

CO5: Build Dynamic web pages using server-side PHP programming with Database Connectivity (Apply)

Course Structure:

UNIT 1 Introduction to HTML5

Basics of HTML5 – Introduction, features, form new elements, attributes and semantics in HTML5, <canvas>, <video>, <audio>.

Introduction to Scalable Vector Graphics (SVG), Introduction to Version compatibility

Installation of Apache Tomcat (Xampp/Lampp/MySQL)

UNIT 2 Introduction to CSS3

Architecture of CSS, CSS Modules, CSS Framework, Selectors and Pseudo Classes, Fonts and Text Effects, Colors, Background Images, and Masks, Transitions, Transforms and Animations Embedding Media, Gradients, Bootstrap

UNIT 3 Node JS

introduction and how it works, installation of node js, REPL, NPM, How modules work, Webserver Creation, Events

Extra Reading: Node.js with MySQL

UNIT 4 Angular (Latest Stable Version)

Introduction (Features and Advantage), Type Script , Modules, Components, Directives, Expression, Filters, Dependency Injection, Services, Routing, SPA (Single Page Application)

UNIT 5 PHP

Installing and Configuring PHP

Introduction, PHP and the Web Server Architecture, PHP Capabilities, PHP and HTTP, Environment Variables, Variables, Constants, Data Types, Operators
Working with Arrays, Decision Making, Flow Control and Loops, Introduction to Laravel, Creating a Dynamic HTML Form with PHP, Database Connectivity with MySQL, Performing basic database operations (CRUD), Using GET, POST, REQUEST, SESSION, and COOKIE Variables

Extra Reading: Sending Emails, PHP with AJAX and XML, Payment Gateway Integration

Text Books:

1. Complete reference HTML, TMH
2. HTML5 & CSS3, Castro Elizabeth 7th Edition
3. Beginning Node.js by Basarat Ali Syed
4. Angular: Up and Running- Learning Angular, Step by Step by Shyam Seshadri
5. Beginning PHP, Apache, MySQL web development Reference Books
6. Introducing HTML5 - Bruce Lawson, Remy Sharp
7. Node.js in Action, 2ed by Alex Young, Bradley Meck
8. Mastering Node.js by Pasquali Sandro
9. Angular Essentials by Kumar Dhananjay Complete Ref. PHP

Course Code: IT-24

Course Name: Advanced DBMS

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

Course Description:

1. Introduction DBMS – Concepts & Architectures

Database and Need for DBMS, Characteristics of DBMS

Database 3-tier schema (ANSI/SPARC) and system architecture of DBMS

Views of data- Schemas and instances, Data Independence

Centralized, Client-Server system, Transaction servers, Data servers, Cloud based servers

Indexing and Hashing - Basic concepts of indexing, ordered index, B+ tree index, B+ tree extensions, Multiple key access, Hashing concepts, types of hashing, Bitmap indices.

2. Data Modelling and Relational Database Design

Data Modelling using ER Diagram: Representation of Entities, Attributes, Relationships and their Type, Cardinality, Generalization, Specialization, Aggregation.

Relational data model: Structure of Relational Database Model, Types of keys, Referential Integrity Constraints, Codd's rules, Database Design using E-R, E-R to Relational

Normalization – Normal forms based on primary (1 NF, 2 NF, 3NF, BCNF)

Note: Case studies based on E-R diagram & Normalization

Extra Reading: Database languages - Relational Algebra, Relational database languages, Data definition in SQL, Views and Queries in SQL, Joins, specifying constraints and Indexes in SQL, Specifying constraints management systems Postgres/ SQL/MySQL.

3. Transaction and Concurrency control

Concept of transaction, ACID properties, States of transaction

Concurrency control, Problems in concurrency controls

Scheduling of transactions, Serializability and testing of serializability

Lock-based Protocol and Time stamp-based ordering protocols, Deadlock Handling

4. Parallel Databases

Introduction to Parallel Databases, Parallel Database Architectures

I/O parallelism, Inter-query and Intra-query parallelism

Inter-operational and Intra-operational parallelism

Key elements of parallel database processing: Speed-up, Scale-up Synchronization and Locking

5. Distributed Databases

Introduction to Distributed Database System, Homogeneous and Heterogeneous Databases, Distributed data storage (Fragmentation and Replication), Distributed transactions, Concurrency control schemes in DDBMS

Commit protocols 2 phase and 3 Phase Commit Protocol

6. Object Oriented Databases & Applications

Overview of Object- Oriented Database concepts & characteristics

Database design for OODBMS – Objects, OIDs and reference type

Spatial data and Spatial indexing (Any two techniques)

Mobile Database: Need, Structure, Features, Limitations and Applications

Temporal databases, temporal aspects valid time, transaction time or decision time

Multimedia Database: Architecture, Type and Characteristics.

7. Crash Recovery and Backup, Failure classifications, Recovery & Atomicity, Log based recovery, Checkpoint and Shadow Paging in Data recovery, Database backup and types of backups

8. Security and Privacy

Database security issues, Discretionary access control based on grant & revoking privilege, Mandatory access control and role-based access control for multilevel security, Encryption & public key infrastructures

9. NO-SQL Database

Introduction, Types of NOSQL, Need of NoSQL databases, Use Cases

Recommended Books:

1. Introduction to database systems C.J. Date, Pearson.
2. Fundamentals of Database Systems by Elmasri Navathe
3. Principles of Database Management James Martin, PHI
4. Database System Concepts by Abraham Silberschatz, H. Korth, Sudarshan

Reference Books:

Database Management System by Raghu Ramakrishnan / Johannes Gherke
Database Management System (DBMS) A Practical Approach. By Rajiv Chopra
Database system practical approach to design, implementation & management by Connolly & Begg,
NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence Martin Fowler

List of Practicals (if any)

To install and configure database software (ORACLE/MYSQL)

To design a database (logical & physical database)

To Perform all SQL operations and queries on designed physical database

To install and configure NO-SQL database and practice for core operations

To perform experiments on database crash and recovery

To perform experiments on database Backup – restoring operations on database server

To perform some operations on Object oriented databases

Course Code: IT-25

Course Name: Analysis and Design of Algorithms

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO 1: Apply object oriented techniques to solve bigger computing problems

CO 2: Explore the knowledge of computational complexity, approximation and randomized algorithms

CO 3: Analyze the range of the algorithm and the notion of tractable and intractable problems

CO 4: Design and analyze a wide range of searching and sorting algorithms

CO 5: Implementation of graph and matching algorithms

TOPICS COVERED:

UNIT 1 - Introduction and overview of C++ Programming 12 Hours

C++ Class Overview- Class Definition, OOPs concepts ,Objects, Class Members, Access Control, Class Scope, Inheritance and Polymorphism ,Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete), Exception handling.

UNIT 2 - Introduction and the fundamentals of the Analysis of Algorithm Efficiency 12 Hours

Notion of Algorithm, Fundamentals of Algorithmic Problem Solving, Important Problem Types, Fundamental data Structures. Analysis Framework, Asymptotic Notations and Basic efficiency classes, Mathematical analysis of Recursive and Non-recursive algorithms, Examples

UNIT 3 - Brute Force and Divide and Conquer 10 Hours

Selection Sort and Bubble Sort, Sequential Search and String Matching, Exhaustive Search, Merge- sort, Quick-sort, Binary Search, Binary tree Traversals and related properties.

UNIT 4 - Decrease-and-Conquer, Transform-and-Conquer 10 Hours

Insertion Sort, Depth First search and Breadth First Search, Topological sorting, Algorithms for Generating Combinatorial Objects. Presorting, Balanced Search Trees, Heaps and Heap sort, Problem Reduction.

UNIT 5 - Space and Time Tradeoffs and Dynamic Programming 10 Hours

Sorting by Counting, Input Enhancement in String Matching, Computing a binomial coefficient, Warshall's and Floyd's Algorithms, The Knapsack Problem and Memory Functions.

Text Book:

1. Anany Levitin: Introduction to the Design and Analysis of Algorithms, Pearson Education, 2003.
2. Herbert Schildt: The Complete Reference C++, 6th Edition, Tata McGraw Hill 2013.

References:

1. Cormen T.H., Leiserson C.E., and Rivest R.L.: Introduction to Algorithms, PHI, 1998.
2. Horowitz E., Sahani S., Rajasekharan S.: Computer Algorithms, Galgotia Publications, 2001.

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/data_structures_algorithms/
2. <http://nptel.ac.in/courses/106101060/>

Course Code: IT-21L

Course Name: Practicals

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
-	10 Hrs./Week	5	-	75	-	50	125

Course Description:

This Practical course contains 2 sections. –

1. List of Practicals – Python Programming
2. List of Practicals – Advanced Internet Technologies

Course Outcomes:

Student will be able to

CO1: implement python programming concepts for solving real life problems. (Apply)

CO2: Implement Advanced Internet Technologies (Apply)

Course Structure:

List of Practicals – Python Programming

Note:

- Recommended IDE for python – IDLE
- Exception handling concepts should be used with file handling programs.
 1. Python installation and configuration with windows and Linux
 2. Programs for understanding the data types, control flow statements, blocks and loops
 3. Programs for understanding functions, use of built in functions, user defined functions
 4. Programs to use existing modules, packages and creating modules, packages
 5. Programs for implementations of all object-oriented concepts like class, method, inheritance, polymorphism etc. (Real life examples must be covered for the implementation of object- oriented concepts)
 6. Programs for parsing of data, validations like Password, email, URL, etc.
 7. Programs for Pattern finding should be covered.
 8. Programs covering all the aspects of Exception handling, user defined exception, Multithreading should be covered.
 9. Programs demonstrating the IO operations like reading from file, writing into file from different file types like data file, binary file, etc.
 10. Programs to perform searching, adding, updating the content from the file.
 11. Program for performing CRUD operation with MongoDB and Python

12. Basic programs with NumPy as Array, Searching and Sorting, date & time and String handling
13. Programs for series and data frames should be covered.
14. Programs to demonstrate data pre-processing and data handling with data frame
15. Program for data visualization should be covered.

List of Practicals – Advanced Internet Technologies

1. Program to implement Audio and Video features for your web page.
2. Program to design form using HTML5 elements, attributes and Semantics.
3. Programs using Canvas and SVG.
4. Programs to demonstrate external and internal styles in the web page using font, text, background, borders, opacity and other CSS 3 properties.
5. Implement Transformation using Translation, Rotation and Scaling in your web page.
6. Program to show current date and time using user defined module
7. Program using built-in modules to split the query string into readable parts.
8. Program using NPM which will convert entered string into either case
9. Write a program to create a calculator using Node JS. (Install and configure Node JS and Server)
10. Write Program for Form validation in Angular.
11. Program to demonstrate the ngif, ngfor, ngswitch statements.
12. Create angular project which will demonstrate the usage of component directive, structural directive and attribute directives
13. Create angular project which has HTML template and handle the click event on click of the button (Installation of Angular and Bootstrap 4 CSS Framework)
14. Program for basic operations, array and user interface handling.
15. Program to demonstrate session management using various techniques.
16. Program to perform the CRUD Operations using PHP Script.

Course Code: ET-21

Course Name: Artificial Intelligence and Robotics

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

Upon successful completion of this course, students will be able to:

CO1: Find appropriate idealizations for converting real world problems into AI problems formulated using the appropriate search algorithm.

CO2: Formulate and implement the appropriate search algorithms to find the solutions for real time and heuristics problems.

CO3: Represent and debug knowledge in an appropriate first order logic representation with the understanding of the fundamentals of knowledge representation.

CO4: Choose and Implement the appropriate algorithms for a real world supervised learning problem.

CO5: Inculcate the basic knowledge of Robotics along with the Artificial Intelligence

TOPICS COVERED:

UNIT: 1 – Introduction to AI, Informed Search and Exploration 10 Hours

Intelligent Agents: Agents and environment; Rationality; the nature of environment; the structure of agents. Problem-solving: Problem solving agents; Example problems; Searching for solution; uninformed search strategies.

Informed search strategies; Heuristic functions; On-line search agents and unknown environment.

UNIT: 2 - Constraint Satisfaction, Adversial Search, Logical Agent 10 Hours

Constraint satisfaction problems; Backtracking search for CSPs. Adversial search: Games; Optimal decisions in games; Alpha-Beta pruning. Knowledge-based agents; The wumpus world as an example world; Logic; propositional logic Reasoning patterns in propositional logic; Effective propositional inference; Agents based on propositional logic.

UNIT: 3 - First-Order Logic, Inference in First-Order Logic:
Hours

12

Representation revisited; Syntax and semantics of first-order logic; Using first-order logic; Knowledge engineering in first-order logic. Propositional versus first-order inference; Unification and lifting; Forward chaining; Backward chaining; Resolution.

UNIT: 4 - Knowledge Representation and Learning, AI: Present and Future 10 Hours

Ontological engineering; Categories and objects; Actions, situations, and events; Mental events and mental objects; The Internet shopping world; Reasoning systems for categories; Reasoning with default information; Truth maintenance systems.

Learning: Forms of Learning; Inductive learning; Learning decision trees; Ensemble learning; Computational learning theory. AI: Present and Future: Agent components; Agent architectures; Are we going in the right direction? What if AI does succeed? Game theory.

UNIT: 5 – Introduction to Robotics :

10 Hours

Introduction; Robot Hardware: sensors and Effectors; Robotic Perception: localization, mapping, other types of perception; Planning to Move: configuration space, cell decomposition methods and skeletonization methods; Planning uncertain movements: robust methods; Moving: dynamics and control, potential field control and reactive control; Robotic Software: architectures, subsumption architecture , three-layer architecture and robotic programming languages ; Application domains.

TUTORIALS:

1. Program to design tic-tac-toe game.
2. Program for breadth first and depth first search.
3. Program to N-Queens Problem.
4. To implement max-min problem.
5. To implement simulated Annealing Algorithm.
6. Write a program to implement A* program.
7. To implement Hill-Climbing Algorithm.

Text Book / References:

Text Book:

1. Stuart Russel, Petr Norvig: Artificial Intelligence A Modern Approach, 2nd Edition, Pearson Education, 2003.

References:

1. Elaine Rich, Kevin Knight: Artificial Intelligence, 2nd Edition, Tata McGraw Hill, 1991.
2. Nils J. Nilsson: Principles of Artificial Intelligence, Elsevier, 1980.

Course Code: ET-22
 Course Name: NOSQL

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

Upon successful completion of this course, students will be able to :

- CO1:** Demonstrate competency in describing how NoSQL databases differ from relational databases from a theoretical perspective.
- CO2:** Demonstrate competency in designing NoSQL database management systems
- CO3:** Use of a number of NoSQL databases to store and retrieve data and perform aggregation functions
- CO4:** Demonstrate competency in selecting a particular NoSQL database for different applications.
- CO5:** Execute various CRUD operations with MongoDB.

TOPICS COVERED:

UNIT 1 – An Overview and Characteristics of NoSQL 10 Hours

Introduction to NoSQL : An Overview of NoSQL , Defining NoSQL, History, What NoSQL is and what it is not, Why NoSQL?, List of NoSQL Databases. Characteristics of NoSQL: Application, RDBMS approach, Challenges, NoSQL approach.

UNIT 2 – NoSQL Storage Types 12 Hours

Modifying and managing NOSQL, Data stores, Indexing and ordering datasets (MongoDB/ CouchDB / Cassandra) NoSQL Storage Types : Storage types, Column-oriented databases, Document store, key-value store, graph store, multi-storage type databases, comparing the models.

UNIT 3 – Advantages and Drawbacks 10 Hours

Advantages and Drawbacks : Transactional application, Computational application, Web-scale application. Performing CURD operations : Creating records, accessing data, updating and deleting data.

UNIT 4 - Querying SQL 10 Hours

Querying NoSQL stores : similarities between NoSQL and MongoDB query features. Managing data stores and managing evolutions.

UNIT 5 – Indexing and Ordering 10 Hours

Indexing and ordering data sets: Essential concepts behind database index, indexing and ordering in MongoDB, indexing and ordering in CouchDB, Comparative Study of NoSQL Products Comparison: Technical comparison, Implementation language, Engine types, Speed, Features, Limits, Bulk operations, Bulk read, Bulk insert, Bulk update, Bulk delete, Query options.

TUTORIAL

Case Study

1. Application definition, Requirement analysis, Implementation using MongoDB, Features and constraints.
2. Database design, Database queries, Database modeling, Schema definition, Writing queries.
3. Queries for a single entity, simple result, Queries for a single entity, Aggregate, Queries for a one to one relationship.
4. Queries for a one to many relationship, Queries for a many to many relationship, Miscellaneous queries.
5. Pagination, Limiting items in an array in result set.
6. Plug-in and dynamic data support, Model refinements.
7. Reference using non-ID property, Demoralizations and document embedding.
8. Complete document embedding and Partial document embedding.
9. Bucketing, Cache document approach, Miscellaneous changes.

TEXT BOOKS / REFERENCES:

TEXT BOOKS :

1. Shanshank Tiwari “Professional NOSQL”, WROX Press, 2011
- Pramod.J.Sadalage and Martin Fowler, “NoSQL Distilled : A Brief guide to the emerging world of polygot persistence”, Pearson Education corporation, I Edition, 2014.

Reference Books :

1. The definitive guide to MONGODB, The NOSQL Database for cloud and desktop computing, Apress 2010.

ADDITIONAL LEARNING SOURCES:

1. <https://www.mongodb.com/nosql-explained>
2. <http://www.dbta.com/Editorial/Trends-and-Applications/NoSQL-for-the-Enterprise-80198.aspx>
3. <http://www.oracle.com/technetwork/database/databasetechnologies/nosqlldb/overview/in dex.html>

Course Code: ET-23

Course Name: Enterprise Resource Planning

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO1: Comprehend the basics and concepts of ERP

CO2: Apply different ERP related technologies

CO3: Implement ERP system by utilizing various concepts of ERP

CO4: Analyze different business models of ERP

CO5: Analyze the present and future trends of ERP.

TOPICS COVERED:

UNIT 1 - Introduction 10 Hours

Enterprise—An Overview, Business Processes, Introduction to ERP, Basics ERP Concepts, Justifying ERP Investments, Risks of ERP, Benefits of ERP.

UNIT 2 - ERP and Technology 10 Hours

ERP and Related Technologies, Business Intelligence (BI) and Business Analytics (BA), E-Commerce and E-Business, Business Process Reengineering (BPR), Data Warehousing and Data Mining, On-line Analytical Processing (OLAP).

UNIT 3 - ERP and Technology 10 Hours

Product Life Cycle Management (PLM), Supply Chain Management (SCM), Customer Relationship Management (CRM), Geographic Information System (GIS), Advanced Technology and ERP Security.

UNIT 4 - ERP Implementation 10 Hours

To be or not to be..., Implementation Challenges, ERP Implementation (Transition) Strategies, ERP Implementation Life Cycle, Pre Implementation Tasks: Getting Ready, Requirements Definition, Implementation Methodologies, ERP Development Methods, Process Definition, Contracts with Vendors, Consultants and Employees, Training and

Education, Data Migration, Project Management and Monitoring, Post-Implementation Activities, Success and Failure Factors of an ERP Implementation

UNIT 5 - The Business Modules 12 Hours

Business Modules of an ERP Packages, Financials, Manufacturing (Production), Human Resource Management, Plant Maintenance, Materials Management, Quality Management, Marketing, Sales, Distribution and Services.

TEXT BOOKS / REFERENCES:

Text books:

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, 14 Aug 2014.

Reference books:

1. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, “Concepts in Enterprise Resource Planning”, Thomson Learning, 2001.
2. Vinod Kumar Garg and N.K .Venkata Krishnan, “Enterprise Resource Planning – concepts and Planning”, Prentice Hall, 1998.
3. Jose Antonio Fernandz, “The SAP R /3 Hand book”, Tata McGraw Hill, 2006.

TUTORIALS:

Developing Following Applications. Using any Database Systems.

1. Financial System.
2. Manufacturing System.
3. Human Resource Planning.
4. Plant Maintenance.
5. Materials Management System.
6. Quality Management System.
7. Marketing, Sales, & Distributing System etc..

ADDITIONAL LEARNING SOURCES:

1. <http://www.netsuite.com/portal/resource/articles/erp/what-is-erp.shtml>
2. <https://www.managementstudyguide.com/enterprise-resource-planning-1-articles.htm>

Semester III

Course Code: IT-31

Course Name: Mobile Applications

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

Upon successful completion of this course, students will be to:

CO1: Gain broad understanding of the discipline of Mobile Application Development using J2ME Technology.

CO2: Develop User Interface for a J2ME application

CO3: Manage data on both service-side components and client-side applications and Address Portability and Compatibility issues between PDA'S and Cell phones.

CO4: Implement the design using Android SDK.

CO5: Implement the design using Objective C and Ios

TOPICS COVERED:

Unit 1 - J2ME Overview, Architecture and Development Environment 12 Hours

Java 2 micro edition and the world of java, inside J2ME, J2ME and wireless devices. small computing technology: wireless technology , radio data networks, microwave technology, mobile radio Networks, messaging, personal digital assistants.

J2ME architecture, small computing device requirements, run time environment, midlet programming, java language for J2ME, J2ME software development kits, hello world J2ME style, multiple midlets in a midlet suite, J2ME wireless toolkit.

Unit 2 - J2ME Best Practices and Patterns 10 Hours

The reality of working in a J2ME world, best practices commands, items, and event processing: J2ME user interfaces , display class, the palm OS emulator, C command class, item class, exception handling. high level display screens: screen class, alert class, form class, item class, list class, text box class, ticker class. low-level display canvas:

The Canvas, User Interactions, Graphics, Clipping Regions, Animation.

Unit 3 - Record Management System 10 Hours

Record storage, writing and reading records, record enumeration, sorting records, searching records, record listener. JDBC objects: The concept of JDBC, JDBC driver types, JDBC packages, overview of the JDBC process, database connection, statement objects, result set, transaction processing, metadata, data types, and exception.

Unit 4 - Technology-I Android-12

10 Hours

Introduction – establishing the development environment – android architecture – activities and views

– interacting with UI – persisting data using SQLite – packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

Unit 5 - Technology-II IOS-12

10 Hours

Introduction to objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

TEXT BOOKS / REFERENCES:

Text Books:

1. James Keogh , J2ME The Complete Reference , Tata McGrawHill.
2. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012.
3. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS.

Reference Books:

1. Michael Juntao Yuan, Enterprise J2ME, Developing Mobile Java Applications Pearson Education , 2011.
2. Sing Li, Jonathan B. Knudsen, Beginning J2ME: From Novice to Professional, Third Edition, Apress, 2015.
3. Development: Exploring the iOS SDK”, Apress, 2013.

ADDITIONAL LEARNING SOURCES:

1. <http://developer.android.com/develop/index.html>.

Course Code: IT-32

Course Name: Software Testing and Practices

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

Course Description:

Upon successful completion of this course, students will be able to: CO1: Gain knowledge on basics of Software Testing, Test case selection and creation . CO2: Illustrate various perspectives of testing with examples. CO3: Use by differentiating boundary value testing, Equivalence class testing, Decision table based testing. CO4: Implement Path testing and Data flow testing based on the requirements CO5: Comprehend different levels of testing, Integration testing and Fault based testing.
TOPICS COVERED:

UNIT 1- Basics of Software Testing 12 Hours

Humans, Errors and Testing, Software Quality; Requirements, Behavior and Correctness, Correctness Vs Reliability; Testing and Debugging; Test Metrics; Software and Hardware Testing; Testing and Verification; Defect Management; Execution History; Test Generation Strategies; Static Testing; Test Generation from Predicates.

Basic Principles, Test case selection and Adequacy

Sensitivity, Redundancy, Restriction, Partition, Visibility and Feedback, Test Specification and cases, Adequacy Criteria, Comparing Criteria

UNIT 2- A perspective on Testing, Examples 8 Hours

Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Error and fault taxonomies, Level of testing, Examples: Generalized pseudocode, The triangle problem, theNextDate function, The commission problem, The SATM (Simple Automation Teller Machine) problem, The currency converter, Saturn windshield wiper.

UNIT 3 - Boundary value, Equivalence class and Decision table based testing 8 Hours

Boundary value analysis, Robustness testing, Worst-case testing, special value testing, Examples, Random testing, Equivalence classes, Equivalence test cases for triangle problem, Next Date function and commission problem, Guidelines and observations, Decision tables, Test cases for triangle problem.

UNIT 4 - Path Testing, Data flow testing, Levels and Integration Testing 12 Hours

DD Paths, Test coverage metrics, Basis path testing, guidelines and observations, Definition Use testing, Slice based testing, Guidelines and observations. Traditional view of testing

levels, Alternative life cycle models, the SATM systems, separating integration and system testing, Guidelines and observations.

UNIT 5 - Fault Based Testing

12 Hours

Assumptions in fault-based testing, Mutation Analysis, Fault-based Adequacy Criteria; Variations on mutation Analysis; From Test case specification to Test Cases, Scaffolding, Generic vs specific Scaffolding, Test Oracles, Self checks as oracles, Capture and Replay.

Agile Testing

Definition and description, how is it different from traditional testing, ten principals for testers, business-facing the test that support the testing.

TEXT BOOKS / REFERENCES:

TEXT BOOKS :

1. Adithya P. Mathur “ Foundations of Software Testing – Fundamental Algorithms and Techniques”, Pearson Education India, 2011
2. Mauro Pezze, Michael Young, Software testing and Analysis- Process, Principles and Techniques”, Wiley India, 2012
3. Paul C Jourgensen, “Software Testing A Craftmans Approach”, Aueredach publications, 3rd edition, 2011
4. Lisa Crisping, Janet Gregory, “Agile Testing : A Practical Guide for Testers and Agile Team”, The Addison Wesley Signature Series, 2009.

REFERENCE BOOKS:

1. KshirasagaraNaik, PriyadarshiTripathy: Software Testing and Quality Assurance, Wiley India 2012
2. M.G.Limaye: Software Testing-Principels, Techniques and Tools – McGrawHill, 2009
3. Brain Marick: The Craft of Software Testing, Pearson Education India, 2008
4. Ron Patton: Software Testing, 2nd Edition, Pearson Education, India, 2013

ADDITIONAL LEARNING SOURCES:

1. <http://www.softwaretestinghelp.com/agile-scrum-methodology-for-development-and-testing/>
2. <http://crbtech.in/Testing/agile-model-software-testing/>
3. <https://www.getzephyr.com/test-management/agile-model-in-software-testing>
4. <http://www.mountangoatsoftware.com/>
5. <http://www.testingexperience.com/>
6. <http://www.infoq.com/> <http://www.qasymphony.com/>

Course Code: IT-33

Course Name: Cloud Computing

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Interpret the basic concepts, principles and techniques of data mining.

CO2: Apply knowledge discovery techniques while mining the data; recognize & fixing the issues in data mining.

CO3: To apply the techniques of clustering, classification, association finding, feature selection and visualization of real world data.

CO4: Demonstrate the real world problem has a data mining solution.

CO5: Apply evaluation metrics to select data mining techniques.

Topics Covered:

UNIT 1- Introduction to Cloud Computing

11 Hours

Defining Cloud Computing, Cloud types, The NIST model, The Cloud Cube Model, Deployment models, Service models, Examining the Characteristics of Cloud Computing, paradigm shift, Benefits of cloud computing, Disadvantages of cloud computing, Assessing the role of open standards. Assessing the Value Proposition: Measuring the Cloud's Value, Early adopters and new application, The laws of clouconomics, Cloud computing obstacles, Behavioral factors relating to cloud adoption, Measuring cloud computing costs, Avoiding Capital Expenditures, Right-sizing, Computing the total cost of ownership, Specifying service level agreements, Defining licensing models. Understanding Cloud Architecture: Exploring the cloud computing stack, Composability, Infrastructure, Platforms. Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud, The Jolicloud Netbook OS, Chromium OS: The browser as an Operating System.

UNIT 2- Understanding Service and Application by Type

10 Hours

Defining Infrastructure as a service (IaaS), Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS), Defining Identity as a Service (IDaaS), and Defining Compliance as a Service (CaaS). Understanding Abstraction and Virtualization: Using Virtualization technologies, Load Balancing and Virtualization, Understanding Hypervisors,

Understanding Machine Imaging, Porting Applications. Capacity Planning: Capacity Planning, Defining Baseline and Metrics, Network Capacity, Scaling.

UNIT 3 - Exploring Platform as a Service

10 Hours

Defining Services, Using PaaS Application Frameworks Using Google Web Services: Exploring Google Applications, Surveying the Google Application Portfolio, Exploring the Google Toolkit, Working with the Google App Engine. Managing the Cloud: Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards.

UNIT 4 - Understanding Cloud Security

10 Hours

Securing the cloud, Securing data, Establishing identity and Presence. Moving Application to the Cloud: Application in the Cloud, Applications and cloud APIs. Working with cloud-based storage: Measuring the digital universe, Provisioning Cloud Storage, Exploring Cloud Backup Solutions, Cloud Storage Interoperability.

UNIT 5: Using Webmail Services

10 Hours

Using Webmail Services: Exploring the cloud Mail Services, Working with syndication services. Communicating with the cloud: Exploring instant messaging, Exploring collaboration technologies, Using social networks. Working with Mobile Devices: Defining the Mobile Market, Using Smart phones with the Cloud.

Text Books/ References:

Text Books:

1. Barrie Sosinsky “Cloud Computing Bible” 2011 by Wiley Publishing, Inc.

Reference Books:

1. Cloud Computing Principles and Paradigms by Rajkumar Buyya 2011, Published by John Wiley & Sons
2. Cloud Computing Theory and Practice by Dan C. Marinescu, 2013, Published by Morgan Kaufmann.

Additional Resource :

1. <https://cloudacademy.com/ebooks>
2. www.freebookcentre.net › Networking Books

Course Code: IT-34

Course Name: Data Warehousing

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Design a data warehouse or data mart to present information needed by management in a form that is usable for management client & Comprehend several data preprocessing methods.

CO2: Ability to do Conceptual, Logical, and Physical design of Data Warehouse

CO3: Able to produce and document dimensional models for a data warehouse based on an informal domain description.

CO4: Utilize the concept of data warehouse and OLAP for data Warehousing and tools.

CO5: xtrapolate knowledge and skills to design a data warehouse to support and provide business solutions

TOPICS COVERED:

Unit 1 - Introduction 12 Hours

Introduction to Data Warehouse. A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology, From Data warehousing to Data Mining. The need for data warehousing, paradigm shift, business problem definition, operational and informational data stores, characteristics. Overview of client/server architecture, server specialization in client/server computing environments, server functions, server hardware architecture, system considerations, risc versus cisc, multiprocessor systems.

Unit 2 - Data Warehousing Components 10 Hours

Overall Architecture, data warehouse database, sourcing, acquisition, cleanup and transformation tools, metadata, access tools, data marts, data warehouse administration and management. Business Considerations, design considerations, technical considerations, implementation considerations, benefits of data warehousing.

Unit 3 - Mapping the data warehouse 10 Hours

Relational database technology for data warehouse, types, database architectures for parallel processing, parallel RDBMS features, alternative technologies, parallel dbms vendors, data layouts for best access, multidimensional data models, bitmapped indexing, complex data types.

Unit 4 - Data Extraction, Cleanup and Transformation Tools 12 Hours

Tool requirements, vendor approaches, access to legacy data, vendor solutions, transformation engines. Meta data: defined, meta data interchange initiative, metadata repository, metadata management, implementation examples, meta data trends. Need for OLAP, OLAP Guidelines, Categorization of OLAP Tools.

Unit 5 - Business Analysis 08 Hours

Tool Categories, Need for applications, cognos impromptu, applications, methodology, business intelligence market definition, situation overview, future outlook, essential guidance.

Tutorials:

Case Studies:

1. Data Warehousing Solution for One of Europe's Largest Financial Services Groups.
2. Data Warehousing for a Health Benefits Company
3. Data warehousing solution for banking system.
4. Data warehousing solutions for tax fraud with advanced analytics.
5. Data warehousing solutions for international satellite TV service provider.
6. Data warehousing solutions for Correlating data across the business.
7. Business Reporting & Customer Information Datamart Architecture Setup & Roll-out for a global technology company.
8. Global Planning Data Automation.
9. COTS-Anti Money Laundering.
10. Management Information System for Trade Finance.

TEXT BOOKS / REFERENCES:

Text books:

1. Alex Berson, Stephen J smith : Data Warehousing, Data Mining, & OLAP, Tata Mcgraw- Hill, 2012.
2. Gajendra Sharma: Data Mining, Data Warehousing and OLAP, Katson Books, 2010.
3. Jiawei Han and Micheline Kamber: Data Mining - Concepts and Techniques, 2nd Edition, Morgan Kaufmann Publisher, 2012.

Reference books:

1. Paulraj Ponnaiah : Data Warehousing fundamentals for IT professionals, wiley student publishers, second edition , 2014.
2. Ralph Kimball, Margy Ross : The data warehouse toolkit, third edition , wiley publishers, 2012.

ADDITIONAL LEARNING SOURCES:

1. <https://www.coursera.org/specializations/data-warehousing>.
2. www.knowledge-management-tools.net/data-warehousing.htm.
3. www.slideshare.net/2cdude/data-warehousing.
4. <https://www.edx.org/course/delivering-relational-data-warehouse-microsoft-dat216x>.

Course Code: IT-35

Course Name: NET Technologies

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Develop application using the concept of .NET framework and basics of C# .NET. CO2: Create server side applications using C#.NET.

CO3: Develop web applications using the ASP.NET.

CO4: Comprehend ASP.NET web form, state management and error handling mechanism.

CO5: Access and manipulate data in a database by using Microsoft ADO.NET

TOPICS COVERED:

UNIT 1 –Introduction to .NET and Basics of C#.NET 12 Hours

The .NET Framework: The Evolution of Web Development-HTML and HTML Forms, Server-Side Programming, Client-Side Programming. The .NET Framework - C#, VB, and the .NET Languages, The Common Language Runtime, The .NET Class Library, Visual Studio. The .NET Languages, C# Language Basics, Case Sensitivity, Commenting, Statement Termination, Blocks, Variables and Data Types-Assignment and Initializes, Strings and Escaped Characters, Arrays, Enumerations, Variable Operations- Advanced Math, Type Conversions. Object-Based Manipulation- String, DateTime and TimeSpan Types, The Array Type. Conditional Logic-The if, switch Statement. Loops- The for, foreach, while loop, Methods-Parameters, Method Overloading, Optional and Named Parameters, Delegates.

UNIT 2 – C#.NET Types, Objects, and Namespaces10 Hours

The Basics About Classes-Static Members, A Simple Class, Building a Basic Class-Creating an Object, Adding Properties, Automatic Properties, Adding a Method, Adding a Constructor, Adding an Event, Testing the Product Class. Value Types and Reference Types-Assignment Operations, Equality Testing, Passing Parameters by Reference and by Value, Reviewing .NET Types. Understanding Namespaces and Assemblies- Using Namespaces, Importing Namespaces, Assemblies. Advanced Class Programming-Inheritance, Static Members, Casting Objects, Partial Classes, Generics.

UNIT 3 - Developing ASP.NET Applications 10 Hours

Visual Studio: Creating Websites-Creating an Empty Web Application, Websites and Web Projects, The Hidden Solution Files, The Solution Explorer, Adding Web Forms, Designing a Web Page-Adding Web Controls, The Properties Window, and The Anatomy of a Web Form-The Web Form Markup, The Page Directive, The Doctype, The Essentials of XHTML. Writing Code-The Code-Behind Class, Adding Event Handlers, Outlining, IntelliSense, Code Formatting and Coloring, Visual Studio Debugging-The Visual Studio Web Server, Single-Step Debugging, Variable Watches, The Anatomy of an ASP.NET Application-ASP.NET File Types, ASP.NET Application Directories. Introducing Server Controls-HTML Server Controls, Converting an HTML Page to an ASP.NET Page, View State, The HTML Control Classes, Adding the Currency Converter Code, Event Handling, Error Handling

UNIT 4 – ASP.NET Web Form Basics, State Management & Error Handling 10 Hours

ASP.NET Configuration- The web.config File, Nested Configuration, Storing Custom Settings in the web.config File, The Website Administration Tool (WAT), Web Controls-Basic Web Control Classes, The Web Control Tags, Web Control Classes, List Controls, Table Controls, Web Control Events and AutoPostBack, A Simple Web Page. The Problem of State-View State, Transferring Information Between Pages, Cookies, Session State, Session State Configuration, Application State, An Overview of State Management Choices. Error Handling, Logging, and Tracing-Common Errors, Exception Handling-The Exception Class, The Exception Chain, Handling Exceptions, Throwing Your Own Exceptions, Logging Exceptions, Page Tracing.

UNIT 5 – ADO.NET Fundamentals 10 Hours

Understanding Databases, Configuring Your Database-SQL Server Express, Browsing and Modifying Databases in Visual Studio, The *sqlcmd* Command-Line Tool. SQL Basics - Running Queries in Visual Studio, The Select, Update, Insert, Delete statement. The Data Provider Model: Direct Data Access-Creating a Connection, The Select Command, The DataReader, Putting It All Together, Updating Data. Disconnected Data Access-Selecting Disconnected Data, Selecting Multiple Tables, Defining Relationships. Introducing Data Binding-Types of ASP.NET Data Binding, How Data Binding Works, Single-Value Data Binding, Repeated-Value Data Binding, Data Source Controls.

TEXT BOOKS / REFERENCES:

Text books:

1. Matthew MacDonald. Beginning ASP.NET 4 in C# 2010, APRESS, 2010

Reference books:

1. Joseph Mayo. Visual studio 2010 - A beginners guide – BPB Publications 2010
2. Greg Buczek: ASP.Net Developer's Guide, Tata McGraw Hill Edition 4th Edition, 2005.
3. Pro ASP.NET 4 in C# 2010, MacDonald and Freeman

ADDITIONAL LEARNING SOURCES:

1. <https://msdn.microsoft.com/en-us/library/4w3ex9c2.aspx>
2. <http://www.asp.net/>
3. <http://www.aspfree.com/>
4. <http://www.devx.com/dotnet>
5. asp.net-tutorials.com/localization/local-and-global-resources/
6. https://www.tutorialspoint.com/asp.net/asp.net_ado_net.htm
7. www.w3schools.com/asp/ado_intro.asp
8. <https://www.tutorialspoint.com/soa/index.htm>

Course Code: IT-36

Course Name: Cryptography and Network Security

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

Upon successful completion of this course, students will be able to:

CO 1: Explore the need for computer security concepts.

CO 2: Apply the principles and techniques of symmetric key encryption and public key encryption.

CO 3: Demonstrate the specifics of message authentication codes and hash algorithms.

CO 4: Analyze the facts of e-mail security and IP security evolution.

CO 5: Comprehend Web Security, Secure Electronic Transaction, Intruder detection and Firewalls.

TOPICS COVERED:

UNIT 1 – Introduction and Classical Encryption Technique

9 Hours

Computer Security Concepts, OSI Security Architecture, Security Attacks, Security Services, Security Mechanism, Model for Network Security. Symmetric Cipher Model, Substitution Techniques, Transposition Techniques.

UNIT 2 - Block Ciphers, Public Key Cryptography and Key Management

11 Hours

Traditional Block Cipher Structure, The Data Encryption Standard, A DES Example, The strength of DES, Block Cipher Design Principles, AES Structure, AES Transformation Functions, AES Key Expansion, An AES Example, Principles of Public Key Cryptosystem, The RSA Algorithm, Key Management, Diffie Hellman Key Exchange.

UNIT 3 - Cryptographic Hash Functions, Message Authentication Codes

12 Hours

Applications of Cryptographic Hash Functions, Message Authentication, Digital Signatures, Two Simple Hash Functions, Requirements and Security, Security Requirements for Cryptographic Hash Functions, Brute-Force Attacks, Cryptanalysis, Hash Functions Based on Cipher Block Chaining, Secure Hash Algorithm (SHA), SHA-3, Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MACs.

UNIT 4 – Electronic Mail Security and IP Security

10 Hours

Pretty Good Privacy (PGP), S/MIME, IP Security Overview; IP Security Architecture; Authentication Header; Encapsulating Security Payload; Combining Security Associations.

UNIT 5 - User Authentication Protocols and Entity Authentication

10 Hours

Web Security Considerations; Secure Socket Layer (SSL) and Transport Layer Security (TLS); Secure Electronic Transaction (SET), Intruders, Intrusion Detection, Firewall Design Principles- Characteristics, Types of Firewall and Firewall Configuration.

Text books:

1. William Stallings, “Cryptography and Network Security – Principles and Practices”, 6th Edition, Pearson Education, 2014.
2. Behrouz A. Forouzan and Debdeep Mukhopadhyay: “Cryptography and Network Security”, 2nd Edition, Tata McGraw-Hill, 2014.

Reference books:

1. Atul Kahate, “Cryptography and Network Security” 2nd Edition, Tata McGraw-Hill Publishing Company, 2010.
2. Network Security Private Communication in a public world, Charlie Kaufman, Radia Perlman & Mike Speciner, Prentice Hall of India Private Ltd., New Delhi, 2011.
3. Network Security Essentials Applications and Standards, William Stallings, Pearson Education, New Delhi, 2010.
4. Network Security Complete Reference by Roberta Bragg, Mark Phodes-Ousley, Keith Strassberg Tata McGraw-Hill, 2009.

ADDITIONAL LEARNING SOURCES:

1. <https://mrajacse.wordpress.com/2012/01/06/cryptography-network-security-ebooks/>
2. www.williamstallings.com/Crypto/Crypto4e.html

Course Code: ET-31

Course Name: Soft Computing

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

Upon successful completion of this course, students will be able to,

CO1: Identify and describe soft computing techniques and their roles in building intelligent machines.

CO2: Recognize the feasibility of applying a soft computing methodology for a particular problem.

CO3: Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.

CO4: Apply genetic algorithms to combinatorial optimization problems.

CO5: Apply neural networks to pattern classification and regression problems .

TOPICS COVERED:

UNIT 1 - Introduction 10 Hours

Artificial neural network: Introduction, characteristics- learning methods – taxonomy – Evolution of neural networks- basic models – important technologies – applications. Fuzzy logic: Introduction – crisp sets- fuzzy sets crisp relations and fuzzy relations: Cartesian product of relation – classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Genetic algorithm- Introduction – biological background – traditional optimization and search techniques – Genetic basic concepts.

UNIT 2 - Neural Networks 10 Hours

McCulloch-Pitts neuron – linear separability – hebb network – supervised learning network: perceptron networks adaptive linear neuron, multiple adaptive linear neuron, BPN, RBF, TDNN- associative memory network: auto- associative memory network, hetero-associative memory network, BAM, hopfield networks, iterative autoassociative memory network & iterative associative memory network – unsupervised learning networks: Kohonenself organizing feature maps, LVQ – CP networks, ART network.

UNIT 3 - Fuzzy Logic 10 Hours

Membership functions: features, fuzzification, methods of membership value assignments- Defuzzification: lambda cuts – methods – fuzzy arithmetic and fuzzy measures: fuzzy arithmetic – extension principle – fuzzy measures – measures of fuzziness -fuzzy integrals –

fuzzy rule base and approximate reasoning : truth values and tables, fuzzy propositions, formation of rules-decomposition of rules, aggregation of fuzzy rules, fuzzy reasoning- fuzzy inference systems-overview of fuzzy expert system-fuzzy decision making.

UNIT 4 – Genetic Algorithm 10 Hours

Genetic algorithm and search space – general genetic algorithm – operators – Generational cycle – stopping condition – constraints – classification genetic programming – multilevel optimization – real life problem- advances in GA.

UNIT 5 – Hybrid Soft computing Techniques and Applications 12 Hours

Neuro-fuzzy hybrid systems – genetic neuro hybrid systems – genetic fuzzy hybrid and fuzzy genetic hybrid systems – simplified fuzzy ARTMAP – Applications: A fusion approach of multispectral images with SAR, optimization of traveling salesman problem using genetic algorithm approach, soft computing based hybrid fuzzy controllers.

TUTORIALS:

Solving simple programs using MATLAB in the following areas:

1. FUZZY Logic techniques.
2. Neural networks techniques.
3. Genetic Algorithm techniques.
4. Hybrid Soft Computing Techniques.

TEXT BOOKS / REFERENCES:

Text books:

1. J.S.R.Jang, C.T. Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI / Pearson Education,2004.
2. S.N.Sivanandam and S.N.Deepa, “Principles of Soft Computing”, Wiley India Pvt Ltd, 2011.

Reference books:

1. S.Rajasekaran and G.A.Vijayalakshmi Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis & Applications”, Prentice-Hall of India Pvt. Ltd., 2006.
2. David E. Goldberg, “Genetic Algorithm in Search Optimization and Machine Learning” Pearson Education India, 2013.

ADDITIONAL LEARNING SOURCES:

1. http://www.myreaders.info/html/soft_computing.html
2. <http://www.soft-computing.de/>

Course Code: ET-32

Course Name: Big data Analytics

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, students will be

CO1: Demonstrate the knowledge, significance structure and sources of Big Data.

CO2: Ability to think critically in making decisions based on data analytics, specific to Big Data.

CO3: Apply the technical skills in predicative and perspective modelling to support business decisions.

CO4: Comprehend decision tools and techniques for data streaming using various algorithms.

CO5: Demonstrate the Knowledge gained on mining social network data.

TOPICS COVERED:

UNIT 1 - Introduction to Big Data

12Hours

What is big data? Is the "big" part or the "data" part more important? How is big data different? How is big data more of the same? Risks of big data -why you need to tame big data -the structure of big data- exploring big data, most big data doesn't matter- filtering big data effectively -mixing big data with traditional data- the need for standards-today's big data is not tomorrow's big data. Web data: the original big data -web data overview -what web data reveals -web data in action? A cross-section of big data sources and the value they hold.

UNIT 2 : Data Analysis

08 Hours

Evolution of analytic scalability – convergence – parallel processing systems – cloud computing – grid computing – map reduce – enterprise analytic sand box – analytic data sets – analytic methods – analytic tools – cognos – microstrategy - pentaho. Analysis approaches – statistical significance – business approaches – analytic innovation – traditional approaches – iterative

UNIT 3 - Mining Data Streams

10 Hours

Introduction to streams concepts, stream data model and architecture, stream computing, sampling data in a stream, filtering streams, counting distinct elements in a stream, estimating

moments, counting oneness in a window, decaying window, realtime analytics platform(rtap) applications, case studies, real time sentiment analysis, stock market predictions.

UNIT 4 - Frequent Item sets and Clustering

10 Hours

Mining frequent itemsets - market based model – apriori algorithm – handling large data sets in main memory – limited pass algorithm – counting frequent itemsets in a stream – clustering techniques – hierarchical – k- means – clustering high dimensional data – clique and proclus – frequent pattern based clustering methods – clustering in non-euclidean space – clustering for streams and parallelism.

UNIT 5 : Frameworks and Visualization

10 Hours

Mapreduce – hadoop, hive, mapr – sharding – nosql databases - s3 - hadoop distributed file systems –visualizations - visual data analysis techniques, interaction techniques; systems and applications.

TUTORIALS

Case Studies:

1. Medicare and Medicaid Services : Integrity of health care data and secure payment processing.
2. Tesco PLC.
3. American Express Co.
4. Mobile Telecom Harnesses Big Data with Combined Actuate and Hadoop Solution.
5. Re-engineering a Telecom Market Share Analytical Application.
6. Telco Case Study: Vodafone and Argyle Data on using big data to combat fraud.
7. MTS India relies on HP Vertica in a highly competitive telecom market.
8. McLaren’s Formula One racing team : real time car sensor data during car races.

TEXT BOOKS / REFERENCES:

Text books:

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2013.
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2014

Reference books:

1. Paul Zikopoulos, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill Professional, 2012.
2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, Pete Warden, Big Data Glossary, O’Reilly.

3. Chuck Lam, “Hadoop in Action”, Dreamtech Press.

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/big_data_tutorials.html.
2. <https://www.lynda.com/Big-Data-training-tutorials/2061-0.html>.
3. https://www.tutorialspoint.com/hadoop/hadoop_big_data_overview.html.
4. <https://bigdatauniversity.com>.

Course Code: ET-33

Course Name: SOFTWARE PROJECT MANAGEMENT

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Comprehend software project management basics and approaches

CO2: Analyze different project management initiation techniques

CO3: Apply proper project planning and scheduling techniques

CO4: Execute software projects with efficient control mechanisms

CO5: Decide on closure of projects using standard and agile methodologies

TOPICS COVERED:

UNIT 1 -Software Project Basics

10 Hours

Introduction, Types of Software Projects, Classifications of Software Projects, Based on Software Development Life Cycle, Approach Driven, Maintenance, Web Application, Agile Development, Conclusion

Approaches to Software Project Management:Alignment of Software Engineering Methodology with Project Management Methodology, The Ad Hoc Methods-Based Approach, The Process-Driven Approach, So, What Is the Right Approach?, The Ad Hoc Approach, The Process-Driven Approach, But Is a Process-Driven Approach the Right Choice?, In a Process-Driven Approach: What Process and How Much?

Software Project Acquisition:From an External Client, The Request for Proposal, The Proposal, Negotiation, Contract Acceptance, From an Internal Client, The Feasibility Study, Preparing the Proposal, Finalizing the Proposal, Reference.

UNIT2 -Software Project Initiation

10 Hours

Introduction, Initiation Activities, Project Management Office-Level Activities, Identifying the Software Project Manager, Preparing/Handing Over the Project Dossier to the Software Project Manager, Coordinating Allocation of Project Resources, Assisting the Software Project Manager in Obtaining Necessary Service Level, Agreements from Departments in the Organization, Assisting the Software Project Manager with the Project Kickoff Meeting, Software Project Manager-Level Activities, Ensuring that Project Specifications Are

Complete, Reviewing Estimates and Revisions/Updates of Estimates, Identifying Necessary Resources and Raising Requests, Preparing Project Plans, Setting Up the Development Environment, Arranging for Project-Specific Skill Training, Organizing the Project Team, Training the Project Team on the Project Plans, Conducting a Project Kickoff Meeting, Arranging for a Phase-End Audit, Common Pitfalls in Project Initiation, Identifying the Wrong Software Project Manager, Identifying Inappropriate Resources, Incurring Delays in Software Project Initiation Activities.

UNIT 3 - Software Project Planning 10 Hours

Introduction, Planning Defined, Plans Prepared in Software Project Management, The Project Management Plan, Resources, Skill Sets, Computer Systems, Project Management Method, The Configuration Management Plan, Naming Conventions, Change Management, The Quality Assurance Plan, The Schedule Plan, The Induction Training Plan, The Risk Management Plan, The Build Plan, The Deployment Plan, The User Training Plan, The Handover Plan, The Software Maintenance Plan, The Documentation Plan, Roles in Planning.

Scheduling: Introduction, The Initial Work Breakdown Structure, A Work Breakdown Structure with Predecessors Defined, A Work Breakdown Structure with Initial Dates, A Work Breakdown Structure with Resource Allocation, Scheduling in Practice, Graphic Representation of a Schedule

UNIT 4 - Software Project Execution 10 Hours

Introduction, Work Management, Work Registers, De-allocation, Configuration Management, Information Artifacts, Code Artifacts, Configuration Registers, Configuration Management Tools, Quality Management, Verification Techniques, Validation Techniques, Product Testing, Allocation of Quality Assurance Activities, Productivity Management, Stakeholder Expectations Management, Product Integration Management.

Software Project Execution Control: Introduction, Aspects of Control in Project Execution, Scope Control, Cost Control, Schedule/Progress Control, Quality Control, Effort Control, Productivity Monitoring, Control Mechanisms, Progress Assessment: Earned Value Analysis.

UNIT 5 - Software Project Closure 12 Hours

Introduction, Identifying Reusable Code Components, Documenting the Best Practices, Documenting the Lessons Learned, Collecting/Deriving and Depositing the Final Project Metrics in the Organizational Knowledge Repository, Conducting Knowledge-Sharing Meetings with Peer Software Project Managers, Depositing Project Records with the Project Management Office, Depositing Code Artifacts in the Code Repository, Conducting the Project Postmortem, Releasing the Software Project Manager, Closing the Project, The Role of the Organization in Project Closure, The Project Management Office, The Configuration Control Board, The Systems Administration Department, Reference.

Agile Project Management: Introduction, Project Management Roles, Agile Project Management Characteristics, Metaphor, Teamwork and Collaboration, Guiding Principles, Open Information, Use a Light Touch, Monitoring and Adjustment, The Nuts and Bolts of Agile Project Management, Planning the Work, Controlling the Work, Process Improvement, Reference.

TUTORIALS:

Writing Cases for the following.

1. Writing requirement Proposal.
2. Writing Negotiation Proposal.
3. Writing Feasibility Study Proposal.
4. Software Project Planning Proposal.
5. Software Project Execution Control Proposal.
6. Writing Schedules
7. Software Project Closure

TEXT BOOKS / REFERENCES:

Text books:

1. “Mastering Software Project Management: Best Practices, Tools and Techniques”, Murali Chemuturi, Thomas M. Cagley, J. Ross Publishing, 2010,

Reference books:

1. “IT Project Management – On track from Start to Finish”, Book by Joseph Phillips, 2002.
2. “Managing the unmanageable” by Mantle and Lichty, 2012.
3. Making Things Happen: Mastering Project Management by Scott Berkun, 2008.

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/software_engineering/software_project_management.htm
2. <http://searchsoftwarequality.techtarget.com/tutorials/Software-Project-Management-Process>

Course Code: BM-41

Course Name: BUSINESS INTELLIGENCE

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
4 Hrs./Week	-	4	30		-	70	100

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,
 CO1: Comprehend the basics and fundamentals of BI with its business and technical needs
 CO2: Use the requirements and architectural framework of BI
 CO3: Know and differentiate different components of the BI framework
 CO4: Design BI concepts by understanding the requirement needs
 CO5: Analyze and implement advanced BI techniques and analytics

TOPICS COVERED:

UNIT 1-The Business Demand for Data, Information, and Analytics

10 Hours

Just One Word:Data, Welcome to the Data Deluge, Data Volume, Variety, and Velocity, Taming the Analytics Deluge, The Importance of Analytics, Analytics Challenge, Analytics Strategy, Too Much Data, Too Little Information, The Difference Between Data and Information, The Role of BI in Creating Actionable Information, The Information Backbone, Data Capture versus Information Analysis, The Roles of BI and Operational Systems, Operational BI Blurs the Lines, Where Data Warehousing Fits in, The Five Cs of Data, Common Terminology from Our Perspective, References.

Justifying BI: Building the Business and Technical Case:Why Justification is Needed, Building the Business Case, Review Organization’s Business Initiatives and Processes, Solicit BI Sponsorship, Enlist BI Stakeholders, Identify Business Processes Affected by BI, Document Business Benefits, Determine Business Value(Tangible Benefits), Business the Technical Case, Technology and Product Short Lists, Convincing Business People, Convincing the Technologists, Assessing Readiness, Data and Data Quality, Expertise and Experience, Organizational and Cultural Change, Financial and Resource Commitment, Creating a BI Road Map, Developing Scope, Preliminary Plan and Budget, Project Scope, Project Plan, Project Budget, Calculating Benefits and ROI, Obtaining Approval, Common Justification Pitfalls, Overzealous Business Sponsor, CIO is Sole Sponsor, Intangible or Too High-Level Benefits, Confusion Between BI Technology and Business Value.

UNIT 2-Defining Requirements-Business, Data and Quality

10 Hours

The Purpose of Defining Requirements, Goals, Deliverables, Roles, BI Team Participants, Business Participants, Other IT Participants, Defining Requirements Workflow, Business Requirements, Data(and Data Quality) Requirements,Functional Requirements, Regulatory/Compliance Requirements, Technical Requirements, Reverse Engineering(When Necessary), Putting It All Together, Prioritizing Requirements, Interviewing, Preparation for Interviews, Conducting the Interviews, Reviewing Interview Content, Interview Follow-ups, Documenting Requirements.

Architecture Framework:The Need for Architectural Blueprints, Architectural Framework, Information Architecture, Data Architecture, The Rise of the Enterprise Data Warehouse, Data Warehousing Replaces the Data Warehouse, Technical Architecture, Business Intelligence, Data Warehouse and BI Data Stores, Data Integration, Source Systems, BI Technology Keeps Evolving, Product Architecture, Metadata, What is It?, What to do About It, Security and Privacy, Getting Started, Implementing the Plan, Avoiding Accidents with Architectural Planning, The Signs of Accidental Architectural Planning, Recovering from an Accidental Architecture, Do Not Obsess over the Architecture.

UNIT 3-Information Architecture

10 Hours

The Purpose of an Information Architecture, Data Integration Framework, DIF Information Architecture, Data Preparation, Data Franchising, BI and Analytics, Data Management, Metadata Management, Operational BI versus Analytical BI, Shift All Reporting to the Application-Specific Environment, Shift All Reporting to the DW- Based BI Environment, Blend Application-Specific and DW BI Environments, Master Data Management, Identify the Data, Find the Problem Areas, Assess a Solution.

Data Architecture: The Purpose of a Data Architecture, History, Prehistory, In the Beginning, Data Warehousing Goes Public, The Data Mart, Multiple Data Marts, Operational Data Store(ODS), Federated DWs, BI Accidental Architecture, Hub-and-Spoke, Data Architectural Choices, Data Categories, Selecting a Data Architecture, The Same But Different, Analytical Data Architecture(ADA),Data Integration Workflow, Data Integration Workflow— Hub-and-Spoke, Data Workflow of the System of Integration(SOI), Data Workflow of the System of Analysis(SOA), Data Workflow—Rise of EDW Again, Operational Data Store, The Relational for an ODS, ODS Reexamined, ODS is Dead, Long Live ODS, References.

UNIT 4-Technology & Product Architectures

10 Hours

Where are the Product and Vendor Names?, Evolution Not Revolution, Technology Platforms, Enterprise Applications, Data Management, Technology Architecture, Business Intelligence and Analytics, Information Access and Data Integration, Databases, Product and Technology Evaluations, BI Product Vendors, Dazed and Confused, Technology and Product Evaluations, Product Migration.

Business Intelligence Applications: BI Content Specifications, Revise BI Applications List, BI Personas, Casual Consumers, Analyst, Power Users, Data Scientists, BI Design Layout—

Best Practices, Focus on the Purpose, Design Layout, Data Design for self-Services BI, The Last Data Preparation Step, When Inconsistency is Reintroduced, OLAP Cubes and In-Memory Columnar Databases, Matching types of analysis to Visualizations, Comparative Analysis, Time-series or Trending Analysis, Contribution Analysis, Correlation Analysis, Geographic Data, Distribution Analysis.

UNIT 5-BI Design and Development

12 Hours

BI Design, BI User Interface(UI) Standards, Create Privacy, Security and Access Standards, Designing Each BI Application, BI Development, Prototyping Lifecycle, BI Application Development Tasks, BI Application Testing.

Advanced Analytics: Advanced Analytics Overview and Background, The Window to the Future, Don't Ignore the Past, Advanced Analytics in Action, Predictive Analytics and Data Mining, Setting Up a Predictive Analytics or Data Mining Program, Tasks for Developing and Using Models, Selecting Tools, Architecture for Predictive Analytics and Data Mining, Techniques for Predictive Analytics and Data Mining, Resources and Skills, Roadblocks to Success, Analytical Sandboxes and Hubs, Analytical Sandboxes, Analytical Hubs, Hub and Sandbox Design Principles, Hub and Sandbox Architecture Options, Advice for Hubs and Sandboxes, Big Data Analytics, Scope, The Program, Hybrid Architecture, The Big Data Team, Big Data Analytics Worst Practices, Data Visualization, Why Data Visualization is Needed, Why Data Visualization is Not, References.

TUTORIALS:

1. Case study on requirement specification.
2. Defining a requirement workflow.
3. Writing technical requirement specification.
4. Prioritizing the requirements.
5. Writing a BIE roadmap.
6. Writing & Defining scope objectives & outcomes.
7. Writing a plan & budget.
8. Writing Data Management techniques.
9. Creating data marts & operational data stores.
10. Creating OLAP Cubes.

TEXT BOOKS / REFERENCES:

Text books:

1. "Business Intelligence Guidebook: From Data Integration to Analytics" Book by Rick Sherman, 1st Edition, 2014.

Reference books:

1. Business Intelligence Roadmap: The Complete Project Lifecycle for Decision-Support Applications by Larissa T. Moss and ShakuAtre, February 25th 2003.

2. Successful Business Intelligence, Second Edition: Unlock the Value of BI & Big Data Hardcover– Import, 1 Nov 2013.
3. Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die, Revised and Updated Paperback– 22 Feb 2016.

ADDITIONAL LEARNING SOURCES:

1. <https://thebipalace.com/>
2. <https://www.analyticsvidhya.com/learning-paths-data-science-business-analytics-business-intelligence-big-data/tableau-learning-path/>