KAKATIYA UNIVERSITY, WARANGAL

DEPARTMENT OF COMPUTER SCIENCE
MCA COURSE STRUCTURE UNDER CBCS
WITH EFFECT FROM 2020-22

MCA I YEAR I SEMESTER:

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA111	C and Data Structures	T (4)	20	80	100	4
MCA112	Operating System	T (4)	20	80	100	4
MCA113	Java Programming	T (4)	20	80	100	4
MCA114	Computer Networks	T (4)	20	80	100	4
MCA115	Probability and Statistical Methods	T (4)	20	80	100	4
MCA116	C and DS Lab	L (4)	--	50	50	2
MCA117	OS Lab	L (4)	--	50	50	2
MCA118	Java Programming Lab	L (4)	--	50	50	2
Grand total (Marks and Credits)					**650**	**26**

KAKATIYA UNIVERSITY, WARANGAL

DEPARTMENT OF COMPUTER SCIENCE
MCA COURSE STRUCTURE UNDER CBCS
WITH EFFECT FROM 2020-22

MCA IYEAR IISEMESTER

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA121	Python Programming	T (4)	20	80	100	4
MCA122	Database Management Systems	T (4)	20	80	100	4
MCA123	Software Engineering	T (4)	20	80	100	4
MCA124	Cryptography and Network Security	T (4)	20	80	100	4
MCA125	Principles and Practice of Management	T (4)	20	80	100	4
MCA126	Python Programming lab	L (4)	--	50	50	2
MCA127	DBMS Lab	L (4)	--	50	50	2
MCA128	Software Engineering Lab	L (4)	--	50	50	2
Grand total (marks and credits)					**650**	**26**

KAKATIYA UNIVERSITY, WARANGAL

DEPARTMENT OF COMPUTER SCIENCE
MCA COURSE STRUCTURE UNDER CBCS
WITH EFFECT FROM 2020-21

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA211	Data Mining	T (4)	20	80	100	4
MCA212	Web Technologies	T (4)	20	80	100	4
MCA213	Theory of Computation	T (4)	20	80	100	4
MCA214	Elective – I	T (4)	20	80	100	4
MCA215	Elective – II	T (4)	20	80	100	4
MCA216	Data Mining Lab	L (4)	--	50	50	2
MCA217	Web Technologies Lab	L (4)	--	50	50	2
MCA218	Advanced Programming Lab (with respect to Elective – I)	L (4)	--	50	50	2
Grand total (marks and credits)					**650**	**26**

MCA II YEAR I SEMESTER:

Elective –I

a. Mobile Application Development
b. Cloud Computing
c. R-Programming

Elective – II

a. Internet of Things
b. Big Data Analytics
c. Mobile Computing

KAKATIYA UNIVERSITY, WARANGAL

DEPARTMENT OF COMPUTER SCIENCE
MCA COURSE STRUCTURE UNDER CBCS
WITH EFFECT FROM 2020-21

MCA II YEAR II SEMESTER:

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA221	Artificial Intelligence	T (4)	20	80	100	4
MCA222	Elective-III	T (4)	20	80	100	4
MCA223	Elective-IV	T (4)	20	80	100	4
MCA224	Project	T (8)	50	200	250	10
Grand total (marks and credits)					**550**	**22**

Elective – III

a. Foundations of Block Chain Technologies
b. Cyber Security
c. E-Commerce

Elective – IV

a. Digital Image Processing
b. Machine Learning
c. Language Processors

KAKATIYA UNIVERSITY, WARANGAL

DEPARTMENT OF COMPUTER SCIENCE
MCA COURSE STRUCTURE UNDER CBCS
WITH EFFECT FROM 2020-22

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA111	C and Data Structures	T (4)	20	80	100	4
MCA112	Operating System	T (4)	20	80	100	4
MCA113	Java Programming	T (4)	20	80	100	4
MCA114	Computer Networks	T (4)	20	80	100	4
MCA115	Probability and Statistical Methods	T (4)	20	80	100	4
MCA116	C and DS Lab	L (4)	--	50	50	2
MCA117	OS Lab	L (4)	--	50	50	2
MCA118	Java Programming Lab	L (4)	--	50	50	2
Grand total (Marks and Credits)					**650**	**26**

MCA I YEAR I SEMESTER:

MCA111	C and Data Structures		CDS
WORK LOAD: 4 PPW	Credits:4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT-I

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Algorithms, Pseudo code, flow charts, **Introduction to C Language:** Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, operators.

Statements: if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to

UNIT-II

Designing Structured Programs: Functions, basics, user defined functions, inter function communication, Scope, Storage classes-auto, register, static, extern, scope rules, recursion- recursive functions, Pre-processor commands

Arrays and Strings: Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, C Strings, String Input / Output functions, arrays of strings, string manipulation functions.

Pointers: Introduction to Pointers, Pointers for inter function communication, pointers to pointers, memory allocation functions, array of pointers, command –line arguments.

Derived Types: Structures – Declaration, definition and initialization of structures, Accessing structures, and nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef, and enumerated types.

UNIT-III

Input and Output: Concept of a file, streams, input / output functions, text files and binary files, file input / output operations.

Sorting and Searching: selection sort, bubble sort, insertion sort, linear and binary search methods.

Data Structures: Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications,

UNIT-IV

Queues-operations, array and linked representations,

Trees:Introduction to Trees: Binary Trees – Binary Tree Traversals – Expression Trees – General Trees, Binary Search Tree-traversals Algorithms,

Graphs :Graph Storage Structures – Graph Traversals.

TEXTBOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Cengage Learning.
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCES:

1. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI

3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
4. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 5th Edition, Pearson Education

MCA112	Operating Systems		OS
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT -I

Introduction: Operating System Structure- Layered structure, system components, operating system functions, Classification of Operating Systems- Batch, Time-sharing, Real-Time Systems, Multiuser Systems, Multi-Processor System, Distributed Systems , Operating System services, System Boot, System Calls, Kernels, Virtualization

Process Management: Process concepts, Process State, Process Control Block (PCB), Cooperating Processes, and Inter Process Communication: Shared Memory, Message Passing, and Multithreaded Programming.
System call interface for process management: fork, exit, wait, waitpid, exec

UNIT- II

CPU Scheduling: Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, **Process Synchronization:**Principle of Concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Peterson's solution, Semaphores, Classical Problem in Concurrency- Bounded-Buffer Problem, Readers-Writers Problem, Dining Philosopher Problem, Sleeping Barber Problem **Deadlock**: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock

UNIT -III

Memory Management: Swapping, Multiprogramming with fixed partitions, dynamic partitions, Paging, Segmentation, Virtual Memory Concepts, Demand Paging, Page fault, Page Replacement Algorithms, Thrashing. Cache memory organization, Locality of reference

UNIT- IV

Storage Management: File System: File attributes, File operations, Access Methods, Directory Implementation, Allocation Methods, Free-Space Management, and Recovery
I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID

TEXTBOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 9th Edition, John Wiley
2. Advanced programming in the UNIX environment, W.R.Stevens, Pearson education.

REFERENCES:

1. SibsankarHalder and Alex A Arvind, "Operating Systems", Pearson Education.
2. Harvey M Dietel, "An Introduction to Operating System", Pearson Education.
3. William Stallings, "Operating Systems: Internals and Design Principles", 6th Edition, Pearson Education.
4. Harris, Schaum's Outline Of Operating Systems, McGraw Hill
5. Operating Systems – Internals and Design Principles Stallings, 5th Edition–2005, Pearson Education/PHI
6. Operating System A Design Approach-Crowley,TMH.
7. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI
8. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
9. Unix Internals The New Frontiers, U.Vahalia, Pearson Education.

MCA113	Java Programming		JPM
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT –I

Object-Oriented Programming: Object Oriented Paradigm – Features of Object Oriented Programming Class Fundamentals, How Objects Are Created, Reference Variables and Assignment, Methods, Returning from a Method, Constructors, Parameterized Constructors, Adding a Constructor to the Vehicle Class, The new Operator Revisited, Garbage Collection and Finalizers, The finalize( ) Method, The this Keyword.
A Closer Look at Methods and Classes: Controlling Access to Class Members, Pass Objects to Methods, Returning Objects, Method Overloading, Overloading Constructors, Recursion, understanding static, Introducing Nested and Inner Classes, Varargs: Variable-Length Arguments
Inheritance: Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Using super to Call Superclass Constructors, Using super to Access Superclass Members, Creating a Multilevel Hierarchy, Superclass References and Subclass Objects, Method Overriding, Overridden Methods Support Polymorphism, Using Abstract Classes & final. *(Chapter 4, Chapter 6, Chapter 7)*

UNIT –II

Packages and Interfaces: Packages, Packages and Member Access, Understanding Protected Members, Importing Packages, Implementing Interfaces, Using Interface, References, Variables in Interfaces, Interfaces Can Be Extended.
Exception Handling: The Exception Hierarchy, Exception Handling, Fundamentals, The Consequences of an Uncaught Exception, Using Multiple catch Statements, Catching Subclass Exceptions, Nested Try Blocks, Throwing an Exception, Using finally, Using throws, New Exception Features Added by JDK 7, Java's Built-in Exceptions, Creating Exception Subclasses.
Multithreaded Programming: Multithreading Fundamentals, The Thread Class and Runnable Interface, Creating Multiple Threads, Thread Priorities, Synchronization, The synchronized Statement, Thread Communication Using notify( ), wait( ), and notifyAll( ), Suspending, Resuming, and Stopping Threads. *(Chapter 8, Chapter 9, Chapter 11)*

UNIT - III

Enumerations, Autoboxing, Static Import, and Annotations: Java Enumerations, The values( )&valueOf( ) Methods, Instance Variables and Enumerations, Auto boxing, Type Wrappers, Auto boxing and Methods, Autoboxing/Unboxing Occurs in Expressions, Static Import, Annotations.
Using I/O: Java's I/O Is Built upon Streams, Byte Streams and Character, Streams, The Byte Stream Classes, The Character Stream Classes, The Predefined Streams, Reading and Writing Files Using Byte Streams, Automatically Closing a File, Reading and Writing Binary Data. Random-Access Files, File I/O Using Character Streams, Using Java's Type Wrappers to Convert Numeric Strings.
Generics: Generics Fundamentals, Bounded Types, Using Wildcard Arguments, Bounded Wildcards, Generic Methods, Generic Constructors, Generic Interfaces, Raw Types and Legacy Code, Type Inference with the Diamond Operator, Erasure, Ambiguity Errors, Some Generic Restrictions, Continuing Your Study of Generics. *(Chapter 12, Chapter 10, Chapter 13)*

UNIT – IV

Applets, Events, and Miscellaneous Topics: Applet Basics, Applet Organization and Essential Elements, The Applet Architecture, A Complete Applet Skeleton, Applet Initialization and Termination, Requesting Repainting, Using the Status Window, Passing Parameters to Applets, The Applet Class, Event Handling, The Delegation Event Model, Events, Using the Delegation Event Model, More Java Keywords.
Introducing Swing: The Origins and Design Philosophy of Swing, Components and Containers, Layout Managers, a First Simple Swing Program, Use JButton , Work with JTextField, Create a JCheckBox, Work with JList, and Use Anonymous Inner Classes to Handle Events, Create a Swing Applet. *(Chapter 14, Chapter 15)*

Text Book:

1. Java, A Beginner's Guide, 5th Edition, by Herbert Schildt, 2011, Oracle Press, Tata McGRAW-HILL

References:

1. Beginning Java, Java 7th Edition, Ivor Horton’s, Wiley India Edition. Java,
2. A Beginner's Guide, 8th Edition, by Herbert Schildt, 2018, Oracle Press
3. Java the Complete Reference 8th Edition, Herbert Schildt, Tata McGrawHill Edition.

MCA114	Computer Networks		CN
WORK LOAD: 4 PPW	Credits:4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

U N I T - I

Computer Networks and the Internet: What is the Internet? What is a Protocol? The Network Edge, The Network Core, Access Networks and Physical Media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, Protocol Layers and Their Service Models, A Brief History of Computer Networking and the Internet.
Application Layer: Principles of Application Layer Protocols, The World Wide Web: HTTP, File Transfer: FTP, Electronic Mail in the Internet, SMTP, DNS - The Internet's Directory Service, Socket Programming with TCP and UDP

U N I T - II

Transport Layer: Transport-Layer Services and Principles, Multiplexing and De-multiplexing, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control.

U N I T - III

Network Layer And Routing: Network-Layer Services and Principles, Introduction and Network Service Models, Routing Principles and Routing Algorithms, Hierarchical Routing, Inter Protocol (IP) - IPv4 Addressing, Datagram Format, IPv6 Addressing and Format, Routing in the Internet, What's Inside a Router?

U N I T - IV

Link Layer And Local Area Networks: Data Link-Layer Services and Principles, Introduction, Error-Detection and Correction Techniques, Multiple Access Protocols, LAN Addresses and ARP, Ethernet, Hubs, Bridges, Switches, wireless Links: IEEE 802.11, Bluetooth, PPP: The Point-to-Point Protocol, Asynchronous Transfer Mode (ATM), X.25 and Frame Relay.

Text Book:

1. Computer Networking A Top-Down Approach Featuring The Internet By –James F. Kurose And Keith W. Ross (Pearson)
2. Computer Networks By- Andrew S. Tanenbaum (Prentice Hall India)

Reference books:

1. Business Data Communication & Networks By - Fitz Gerald (John Wiley)
2. Data & Computer Communications - W Stallings (Pearson, Phi)
3. Computer Communications&Networking Topologies-Magallo, V.M.Hancock (Thomson)
4. Data Communication & Computer Networks - R. Agarwal, Bb Tiwari (Vikas)
5. Computer Networks - As Tanenbaum (Phi)
6. Computer Networks - Black (Phi)
7. Under Standing Communications & Networks - Wa Shay (Thomson)

8.

MCA115	Probability and Statistical Methods		PSM
WORK LOAD: 4 PPW	Credits : 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

U N I T - I

Introduction to Statistics: Data Collection and Tabulation, Graphical Representation of Data Measures of Central Tendency and Dispersion, Moments, Skewness and Kurtosis.

Probability: Basic concepts and Basic terms of probability, Addition, Multiplication and Baye's theorem, Random variables, Definition of Mathematical Expectation and moment generating function.
Probability Distributions: Statement, mean, variance and applications of Binomial, Poisson and Normal distributions.

U N I T – II

Correlation and Regression: Concept of correlation, computation of Karl-Pearson correlation coefficient, Spearman's rank correlation coefficient, multiple correlations and partial correlation with simple applications. Simple linear regression, regression coefficient, lines of regression with simple applications.

U N I T - III

Testing of Statistical Hypothesis: Concepts of Population, Sample, Parameter, Statistic, Null and Alternative hypotheses, Critical region, two types of errors, Level of significance. Chi-Square (χ^2) tests for single variance, goodness of fit and independent of two attributes, t-test for single mean, difference of two sample means (independent and paired samples) F- test for difference of two independent sample variances.

U N I T - IV

Analysis of Variance: Analysis of variance one way and two way classified data with one observation per cell.

Text Books

1. Fundamental of Mathematical Statistics-S.C.Gupta and V.K.Kapoor

2. Fundamentals of Applied Statistics -S.C.Gupta and V.K.Kapoor

Reference books

1. Statistical Methods-S.P.Gupta.
2. Fundamental of mathematical statistics by - v k kapoor and guptasc
3. Statistics (phi) by - freud
4. Progability statistics and random process by - r veerarajan (tmh)
5. Introduction to probability & statistics by - j.s. Milton &jcarnold (tmh)
6. Miller &ferunds probability & statistics froenginner by - johnson (pearson)
7. Probability & statistics fro engineers &statisticsts by - walpose (pearson)

MCA116	**C and Data Structures Lab**	
WORK LOAD: 4 PPW	**Credits : 2**	**EXTERNAL MARKS: 50**

1. Write a c-program to find the Reverse of a given number.
2. Write a C program to find the sum of individual digits of a positiveinteger.
3. Write a C-program to find the Fibonacci Series.
4. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by theuser.
5. Write a C program to find the roots of a quadraticequation.
6. Write a C program to find the factorial of a giveninteger.
7. Write a C program to find the GCD (greatest common divisor) of two givenintegers.
8. WriteaCprogramwhichtakestwointegeroperandsandoneoperatorfromtheuser,performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
9. Write a C program to find both the largest and smallest number in a list ofintegers.
10. Write a C program that uses functions to perform thefollowing:
    i) Addition of TwoMatrices
    ii) Multiplication of TwoMatrices
11. Write a C program that uses functions to perform the followingoperations:
    i) To insert a sub-string in to a given main string from a givenposition.
    ii) To delete n Characters from a given position in a givenstring.
12. Write a C program to determine if the given string is a palindrome ornot
13. Write a C program to count the lines, words and characters in a giventext.
14. Write a C program to generate Pascal'striangle.
15. Write a C program that uses functions to perform the followingoperations:
    i) Reading a complexnumber
    ii) Writing a complexnumber
    iii) Addition of two complexnumbers
16. Write a C program which copies one file toanother.
17. i) Write a C program to display the contents of afile.
    ii) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)
18. Write a C program that uses functions to perform the following operations on singly linkedlist.
    i) Creation ii)Insertion iii)Deletion iv)Traversal
19. Write C programs that implement stack
20. Write C programs that implement Queue
21. WriteaCprogramthatimplementsthefollowingsortingmethodstosortagivenlistofintegers in ascendingorder
    i) Bubblesort ii) Selectionsort iii) insertion sort
22. Write C programs for Linearsearch and Binarysearch
23. Write C- program for binary search Tree implementation and Traversals
24. Write C-programs on to implement the Graph and Traversal of a Graph

Note:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

MCA117	Operating System Lab	
WORK LOAD: 4 PPW	Credits : 2	EXTERNAL MARKS: 50

1. Use vi editor to create a file with some text and save the file.
2. Add and Delete content to the file created above.
3. Write programs that use the following processing utilities.
   i. wc, od, cmp, comm, diff, head, tail, cut, paste, sort, grep, uniq
   ii. Disk backup utilities
   iii. du, df, tar, cpio, ps, who
4. Write a shell script to generate a multiplication table.
5. Write a shell script that copies multiple files to a directory.
6. Write a shell script which counts the number of lines and words present in a given file.
7. Write a shell script which displays the list of all files in the given directory.
8. Write a shell script (of small calculator) that adds, subtracts, multiplies and divides the given two integers.
9. Write a C program that counts the number of blanks in a text file.
   i. Using standard I/O
   ii. Using system calls.
10. Write a C program that illustrates how to execute two commands concurrently with a command pipe.
11. Write a C program that illustrates file locking using semaphores.
12. Write a C program that implements a producer-consumer system with two processes.(using semaphores)
13. Write a C program that illustrates inter process communication using shared memory system calls.
14. Write a C program that illustrates the following.
    i. Creating a message queue
    ii. Writing to a message queue.
    iii. Reading from a message queue.
15. Write C programs to implement the various CPU Scheduling Algorithms
    a. FCFS
    b. SJF
    c. Priority
    d. Round Robin
16. Bankers Algorithm for Deadlock Avoidance
17. Implementation of Deadlock Detection Algorithm
18. Implementation of the following Memory Allocation Methods for fixed partition
    a. First Fit
    b. Worst Fit
    c. Best Fit
19. Implementation of the following Page Replacement Algorithms
    a. FIFO
    b. LRU
    c. LFU
20. Implementation of the following File Allocation Strategies
    a. Sequential
    b. Indexed
    c. Linked

NOTE:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

MCA118	Java Programming Lab	
WORK LOAD: 4 PPW	Credits : 2	EXTERNAL MARKS: 50

Case study exercises:

- Creating a Help Class
- Demonstrate Garbage Collection and Finalization
- Improving the Queue Class
- Overloading the Queue Constructor
- The Quicksort
- Extending the Vehicle Class
- Creating a Queue Interface
- Adding Exceptions to the Queue Class
- Extending Thread
- Using the Main Thread
- A Computer-Controlled Traffic Light
- A File Comparison Utility
- Creating a Disk-Based Help System
- Create a Generic Queue
- A Simple Banner Applet
- A Swing-Based File Comparison Utility

NOTE:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

KAKATIYA UNIVERSITY, WARANGAL

DEPARTMENT OF COMPUTER SCIENCE
MCA COURSE STRUCTURE UNDER CBCS
WITH EFFECT FROM 2020-21

MCA I YEAR II SEMESTER:

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA121	Python Programming	T (4)	20	80	100	4
MCA122	Database Management Systems	T (4)	20	80	100	4
MCA123	Software Engineering	T (4)	20	80	100	4
MCA124	Cryptography and Network Security	T (4)	20	80	100	4
MCA125	Principles and Practice of Management	T (4)	20	80	100	4

MCA126	Python Programming lab	L (4)	--	50	50	2
MCA127	DBMS Lab	L (4)	--	50	50	2
MCA128	Software Engineering Lab	L (4)	--	50	50	2
	Grand total (marks and credits)				**650**	**26**

MCA121	Python Programming		PYP
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT-1

Introduction: History of Python Features of Python, Python Installation, Variables in Python, Keywords and their usage, Operators, members operators, Identity Operators, Input-Output Statements, Indentation, Expressions and order of evaluations.
Conditional Statements: if, elif, else; Loops: for, while; break, continue, pass.
Functions: Positional arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions.

UNIT-2

Modules: Predefined modules along with the functions, importing modules, Creation of User defined modules, packages in python
Exception Handling: try, catch, except, finally, else, raise, Handling different types of Exceptions
File handling: Read and write operations on different types of files

UNIT-3
Object Oriented Programming in Python: Classes, Methods, Constructors, Inheritance, Overriding Methods, Data hiding.
Python data structures: Strings, List, Tuples, Dictionaries, Sets (Creation, Access, Functions), Comprehensions.
Packages: Working with Numpy package, Pandas data structures: Series, Data Frames.

UNIT-4
Data Input: Input from Text Files: Visual Inspection, Reading ASCII-Data into Python, Input from MS Excel.
Data types: Categorical, Numerical.
Plotting data: scalar plots, bar charts, pie charts, line graphs, error plots, box plots, 3D plots
Statistics operations: Mean, Median, Standard deviation, Web frame work for python- different stack frame works , Django package - introduction and applications.

Text Books :

1. Python Programming: A Modern Approach, VamsiKurama, Pearson
2. Python Data Science Handbook: Jake VanderPlas Orielly
3. Learning Python, Mark Lutz, Orielly

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage

MCA122	Database Management Systems		DBMS
WORK LOAD: 4 PPW	Credits : 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

U N I T – I

The Relational Data Model and Relational Database Constraints- Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, update operations, Transactions and dealing with constraint violation.
The Relational Algebra and Relational Calculus- Unary Relational Operations: SELECT and PROJECT – Relational Algebra Operations from Set Theory – Binary Relational Operations: JOIN and DIVISION – Additional Relational Operation – The Tuple Relational Calculus – The Domain Relational Calculus.
(Chapters 5, 6)

U N I T – II

Functional Dependencies and Normalization for Relational Databases- Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.
Relational Database Design Algorithms and Further Dependencies- Properties of Relational Decompositions, multivalued dependencies and fourth normal form, Join Dependencies and Fifth Normal Form. (Chapters 10 and 11)

U N I T – III

Introduction to Transaction Processing Concepts and Theory- Introduction to Transaction Processing, Transaction and System Concept, Desirable Properties of Transactions, characterizing Schedules Based on Recoverability, Characterizing schedules Based on Serializability.
Concurrency Control Techniques- Two-Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering.
Database Recovery Techniques- Recovery Concepts, Recovery Techniques Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow paging.
(Chapters 17.1 to 17.5, 18.1, 18.2, 19.1 to 19.4)

U N I T – IV

Database Security- Introduction to Database Security Issues, Discretionary Access Control Based on Granting and Revoking Privileges, Mandatory Control and Role-based control for multilevel security, challenges to Database Security.
Distributed Databases and client-Server Architecture- Distributed Database Concepts, Data Fragmentation, replication, and allocation techniques for distributed database design, types of Distributed database system, query processing in Distributed Databases, overview of concurrency control and recovery in distributed databases, overview of 3-tier client-server architecture, Distributed databases in oracle.(Chapter 23, chapter 25)

Text Book:
1. Fundamentals of Database Systems by – RamezelmasriShamkant b. Navathe v edition (Pearson)

Reference Books:

1. Database System Concepts (iv edition) by - Silber Schatz, Korth g. Sudarshan (tmh)

MCA123	Software Engineering		SE
WORK LOAD: 4 PPW	Credits : 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT-I:

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT-II:

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements Engineering Process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System Models: Context models, behavioral models, data models, object models, structured methods.

UNIT-III:

Design Engineering: Design process and design quality, design concepts, the design model. Creating an **Architectural Design**: Software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

UNIT-IV:

Product Metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk Management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXTBOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc GrawHill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCES:

1. Software Engineering, an Engineering approach- James F. Peters, WitoldPedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object oriented design using UML Meiler page-Jones: Pearson Education.

MCA124	Cryptography and Network Security		CNS
WORK LOAD: 4 PPW	Credits : 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT - I

Introduction: Attacks, security Services, Mechanisms, A Model for Network Security
Introduction to Number Theory: Divisibility and the Division Algorithm, the Euclidean Algorithm, Modular Arithmetic, Fermat's and Euler's Theorem, theChinese Remainder Theorem, Discrete Logarithms.

Symmetric Cipher: Classical Encryption Techniques, Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography.

UNIT - II

Block Cipher and the Data Encryption: Block Cipher Principles, the Data Encryption Standard, Multiple Encryption and Triple DES, Stream Cipher-RC4, Block Cipher Modes of Operation, Advanced Encryption Standard.
Asymmetric Cipher: Principles of Public-Key Cryptosystems,the RSA Algorithm, Diffie-Hellman Key Exchange, Elgamal cryptographic system, Elliptic Curve Cryptography, Traffic Confidentiality: link encryption, end to end encryption.

UNIT –III

Cryptographic Data Integrity Algorithms and Message Authentication: Message Authentication Requirements, Message Authentication Function, Message Authentication Codes, Hash Functions, simple Hash functions, Hash function properties, Secure Hash Algorithm, SHA-512, HMAC,
Digital Signatures: Properties, Attacks and forgeries, Digital signature Requirements, Kerberos

UNIT –IV

Electronic Mail Security: Email Components, email format, Email Threats and security, S/MIME,
IP Security: IP Security Overview, IP Security Architecture, EncapsulatingSecurity Payload.
Web andSystem Security: malicious software, Intruders, Viruses, firewalls, Secure Electronic Transaction, HTTPS

TEXT BOOK:

1. Cryptography and Network Security principles and Practice 7th Edition By William Stallings (Pearson Asia)

REFERENCE BOOKS:

1. Davies &Price: Security for Computer Networks - Wiley
2. Mayer &Matyas: Cryptography - Wiley B. Schneider: Applied Cryptography - (John Wiley)

MCA125	Principles and Practice of Management		PPM
WORK LOAD: 4 PPW	Credits : 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT – I

Management: Meaning - Nature - Significance of Management Principles of Management - Approaches to Management, Development of Management Thought, Management Process and Skills, Managers and Environment, Social Responsibilities of Management.
Planning: Concept, Characteristics - Importance and Limitations Steps in Planning Process - Strategic Planning - Decision Making.

UNIT – II

Organising: Concept - Importance - Steps in Organizing Process Base and Problems of Depart mentation - Delegation of Authority - Centralization and Decentralization - Line and Staff Relations - Span of Management.

UNIT – III

Directing: Nature and Importance - Communication - Concept Elements - Process - Patterns of Communication Barriers to Communication.
Motivation: Nature and Significance - Types of Motivation, Determinants of Motivation - A Brief Discussion on Theories of Motivation (MASLOW's Theory, McCLLELAND FNEED THEORY, THEORY X AND THEORY Y).
Leadership: Concept - Importance - Leadership Styles - Autocratic, Democratic and Free Rein.

UNIT – IV

Staffing: Concept - Human Resource Planning - A Brief Description of Recruitment - Selection - Training and Appraisal Methods Controlling: Meaning - Importance - Steps in Control Process - Problems of Controlling - A Brief Description of Control Techniques.
Coordination: Need for Coordination - Approaches to Effective Coordination - Techniques of Coordination.

TEXT BOOKS:

1.Principles and Practice of Management by L.M. Prasad.

REFERENCE BOOKS

1. Management, James A.F. Stoner And Charles Wankel
2. Management, Koontz Harold AndO'donnel Cyril
3. OrganisationAnd Management, Louis Allen
4. Management - Tasks And Responsibilities, Peter F Drucker

1.

MCA126	Python Programming Lab	
WORK LOAD: 4 PPW	**Credits : 2**	**EXTERNAL MARKS: 50**

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 Pattern finding should be covered.
7. Programs covering all the aspects of Exception handling, user defined exception, Multithreading should be covered.
8. Programs demonstrating the IO operations like reading from file, writing into file from different file types like data file, binary file, etc.
9. Programs to perform searching, adding, updating the content from the file.
10. Basic programs with NumPy as Array, Searching and Sorting, date & time and String handling
11. Programs for series and data frames should be covered.
12. Programs to demonstrate data pre-processing and data handling with data frame
13. Program for data visualization should be covered.

Note:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

MCA127	Database Management Systems Lab	
WORK LOAD: 4 PPW	**Credits : 2**	**EXTERNAL MARKS: 50**

DDL, DML and DCL Commands, SQL constraints,

MySQL Clauses, Using Joins, Indexes, Creating Views, SQL Transactions,

Aggregate Functions, Programming in PL/SQL, Procedures, Functions

Note:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

MCA128	Software Engineering Lab	
WORK LOAD: 4 PPW	Credits : 2	EXTERNAL MARKS: 50

The following Tasks has to be done for various Applications

- To assign the requirement engineering tasks
- To perform the system analysis : Requirement analysis, SRS
- To perform the function oriented diagram : DFD and Structured chart
- Write the software requirement specification Document
- Draw the entity relationship diagram
- To perform the user's view analysis : Use case diagram
- To draw the structural view diagram : Class diagram, object diagram
- To draw the behavioral view diagram : Sequence diagram, Collaboration diagram
- To draw the behavioral view diagram : State-chart diagram, Activity diagram
- To draw the implementation view diagram: Component diagram
- To draw the environmental view diagram : Deployment diagram
- To perform various testing using the testing tool unit testing, integration testing

Note:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

KAKATIYA UNIVERSITY, WARANGAL

DEPARTMENT OF COMPUTER SCIENCE
MCA COURSE STRUCTURE UNDER CBCS
WITH EFFECT FROM 2020-21

MCA IIYEAR ISEM

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA211	Data Mining	T (4)	20	80	100	4
MCA212	Web Technologies	T (4)	20	80	100	4
MCA213	Theory of Computation	T (4)	20	80	100	4
MCA214	Elective – I	T (4)	20	80	100	4
MCA215	Elective – II	T (4)	20	80	100	4
MCA216	Data Mining Lab	L (4)	--	50	50	2
MCA217	Web Technologies Lab	L (4)	--	50	50	2
MCA218	Advanced Programming Lab (with respect to Elective – I)	L (4)	--	50	50	2
Grand total (marks and credits)					**650**	**26**

Elective –I

a. Mobile Application Development
b. Cloud Computing
c. R-Programming

Elective – II

a. Internet of Things
b. Big Data Analytics
c. Mobile Computing

MCA211	Data Mining		DMI
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

Unit – I

Data Mining- Data Mining Overview, Kinds of Data can be mined, Kinds of patterns can be mined, Data Mining Functionalities, Technologies used, Data Mining Applications, Major issues in Data Mining, Data objects and attribute types, Basic statistical descriptions of data, Measuring Data Similarity and Dissimilarity.

Unit – II

Data Pre-Processing: Data Cleaning, Data Integration - Data reduction: Overview, Attribute subset selection, clustering, sampling, Data cube Aggregation, Histograms. Data Transformation and Data Discretization and concept Hierarchy Generation.

Data Warehouse: Basic Concepts, Data Warehouse modeling, Data Warehouse Design. Data Warehouse implementation- Data cube implementation overview and OLAP server architecture, Attribute oriented induction

Unit – III

Basic Concepts of frequent patterns- Frequent Item sets, Mining methods, Apriori and FP-Growth, Association rules. Classification and Prediction: Classification by Decision Tree **Induction**: Information gain, Gini Index, Tree Pruning. Classification methods: Bayesian Classification, Rule Based Classification, Model evolution and Selection: Metrics for evaluating, Other Classification Methods

Unit-IV

Cluster Analysis: Overview of Clustering Analysis Methods, Partitioning Methods- K-Means, K-Medoids. Hierarchical methods- BRICH. Density-based methods- DB-SCAN, DENCLUE. Grid Based methods- STING. Evolution of Cluster Analysis Overview. Outliers, Outlier Analysis.

Text Book:

1. Data Mining: Concepts and Techniques, 3nd Edition, Jiawei Han, MichelineKamber, Morgan Kaufmann Publishers

References:

1. Data Mining Introductory And Advanced Topics-Margaret H Dunham, Pearson Education
2. Data Mining Techniques - Arun K Pujari, University Press.
3. Data Warehousing, Data Mining &Olap By Alex Berson And Stephen J. Smith (Tmh)

MCA212	WEB TECHNOLOGIES		WT
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT I:

HTML Common tags: List, Tables, images, forms, frames, Basics of CSS and types of CSS.
Client-Side Programming (Java Script): Introduction to Java Script, prompt dialog box, operators, Control Structures, functions, Event handlers (onclick, onsubmit, etc.,).
Introduction to XML: XML basics, structuring data, Document type definition, XML name spaces, Document Object Model (DOM),(TextBook - 1)

UNIT II:

Server-Side Programming (PHP): Declaring Variables, Data types, Operators, Control Structures, strings and arrays, Functions, reading data from web form controls (like text buttons, radio buttons, list, etc.), working with databases, Handling Sessions & Cookies. (TextBook - 2)

UNIT III:
Introducing JDBC, JDBC drivers, features of JDBC, JDBC APIs, major classes and Interfaces, JDBC processes with the java.sql package, processes with the javax.sql package, working with transactions.

Web applications: exploring the HTTP protocol, web architecture models, the MVC architecture.
Working with Servlets: the features of servlets, exploring servlet API, the servlet life cycle, creating a servlet, the HttpServletRequest and HttpServletResponse interfaces, request delegation and request scope.(TextBook - 3)

UNIT IV:

Handling sessions: introducing session tracking mechanism, the java servlet API for session tracking.
Introducing JSP, advantages, the architecture, life cycle of JSP, JSP basic tags and implicit objects, action tags.
Implementing Filters: working with filters, filter API configuring filters, initializing parameter in filter.(TextBook - 3)

Text Book:

1. Internet & World Wide Web How To Program By P.J. Deitel, H.M. Deitel, 4th Edition, Person Publication.
2. PHP: The complete reference by Steven Holzner, McGraw Hill Education.
3. Java Server Programming (J2EE1.7) black book by DT Editorial Services, DreamTech Press.

References:

1. Web Technologies, Uttam K Roy, Oxford University Press
2. Programming world wide web-Sebesta, Pearson Education ,2007.
3. Core Servlets Andjavaserver Pages Volume 1: Core Technologies By Marty Hall And Larry Brown Pearson
4. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education
5. Asia.
6. An Introduction to Web Design and Programming –Wang-Thomson

MCA213	Theory Of Computation		TOC
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT I

Finite Automata and formal languages: Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages,
Finite Automata: Applications, Deterministic finite automata, (DFA), Non deterministic finite automaton (NFA), Equivalence of Deterministic and Nondeterministic Finite Automata, transition diagrams and Language recognizers, Finite Automata with Epsilon Transitions and eliminations, Finite automata with output (Moore and Mealy machines) and Inter conversion.

UNIT II

Regular Expressions: Regular sets, regular expressions, pumping lemma and closure properties of regular sets. Identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions.
Regular Grammars: definition, right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar(CFG) - derivation trees, Right most and left most derivation of strings, ambiguity, Normal forms for CFG, Chomsky normal form, Greibach normal form, Pumping Lemma for Context Free Languages, Enumeration of properties of CFL

UNIT III

Pushdown Automata (PDA): Definition, Model, transition in PDA, Acceptance of CFL, Acceptance by Final State and Acceptance by Empty stack and its Equivalence, Equivalence of CFG and PDA.
Turing Machines (TM):definition of Turing machine, model of TM, design of TM, language acceptance and Moves in a TM, difference between PDA and TM, Types of TMs.

UNIT IV

Computability Theory: Chomsky hierarchy, decidability of problems - Properties of recursive and recursively enumerable languages, linear bounded automata, Universal Turing Machine, Un-Decidability, undecidability inPost's Correspondence problem, Definition of P and NP problems, NP-complete, NP-hard problems

Text Books :

1. Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education.
2. Introduction to Theory of Computation –Sipser 2nd edition Thomson.

References :

1. Introduction to Formal Languages , Automata Theory and Computation – Kamala Krithivasan, Rama R
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. Theory of Computation : A Problem – Solving Approach- Kavi Mahesh, Wiley India Pvt. Ltd.
4. "Elements of Theory of Computation", Lewis H.P. &Papadimition C.H. Pearson /PHI.
5. Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI.
6. Introduction to languages and the Theory of Computation, John C Martin, TMH.

MCA214	Elective-I : A- Mobile Application Development		MAD
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT I

J2ME Overview 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

UNIT II

J2ME Architecture and Development Environment

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 J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices

UNIT III

Commands, Items, and Event Processing, J2ME User Interfaces, Display Class, The Palm OS Emulator, 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 IV

Record Management System: 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, Exceptions. JDBC and Embedded SQL: Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data form a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Subqueries, VIEWs

TEXT BOOK

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill.

REFERENCE BOOKS

1. Enterprise J2ME: Developing Mobile Java Applications – Michael Juntao
2. Yuan, Pearson Education, 2004
3. Beginning Java ME Platform, Ray Rischpater, Apress, 2009
4. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005
5. Kicking Butt with MIDP and MSA:Creating Great Mobile Applications,1st edition,J.Knudsen,Pearson.

MCA214	Elective-I : B- Cloud Computing		CC
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

U N I T – I

Introduction: Essentials, Benefits and need for Cloud Computing - Business and IT Perspective - Cloud Services Requirements - Cloud and Virtualization - Cloud and Dynamic Infrastructure NIST model - Cloud Computing Characteristics Cloud Adoption. cloud models: Cloud deployment Models, Characteristics - Security in a Public Cloud Public versus Private Clouds, cloud as a service: cloud service models, Gamut of Cloud Solutions - Principal Technologies - Cloud Strategy Cloud Design and Implementation using SOA - Service Level Agreements SLA- Conceptual Cloud Model

U N I T – II

Cloud Offers Management and Solutions: Cloud Ecosystem - Cloud Business Process Management - Cloud Service Management - Cloud Stack - Computing on Demand (CoD) – Cloud is sourcing. Cloud Offerings: Information Storage, Retrieval, Archive and Protection - Cloud Analytics, Testing under Cloud - Information Security - Storage Cloud. Cloud Management: Resiliency – Provisioning - Asset Management - Cloud Governance - High Availability and Disaster Recovery - Charging Models, Usage Reporting, Billing and Metering.

U N I T – III

Cloud Virtualization Technology: Virtualization Defined - Virtualization Benefits –Cloud Server Virtualization - Virtualization for x86 Architecture - Hypervisor Management Software - Logical Partitioning (LPAR)- VIO Server - Virtual Infrastructure Requirements. Cloud Virtualization: Storage virtualization - Storage Area Networks - Virtualized Data Center.

UNIT-IV

Cloud Service Providers:EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue, service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit.

Text Book:

1. Cloud Computing – Insight into New Era Infrastructure, Dr. Kumar Saurabh, Wiley India.
2. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

References:

1. Cloud Computing, Roger Jennings, Wiley India
2. Cloud Computing Explained, John Rhoton, Recursive Press
3. Cloud Computing Bible, Barry Sosinsky, Wiley
4. Cloud Computing: Principles and Paradigms, RajkumarBuyya, James Broberg, Wiley
5. Cloud Computing for Dummies, Judith Hurwiz, Wiley Publishing.
6. The Cloud at your service, Rosenberg and Matheos, Manning Publications

MCA214	Elective-I : C- R-Programming		R-Prg
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

Unit- I

Introduction- What Is R?, Installing R, Choosing an IDE, Your First Program, Installing Extra Related Software, Scientific Calculator- Mathematical Operations and Vectors, Assigning Variables, Special Numbers, Logical Vectors; Inspecting Variables- Classes, Different Types of Numbers, Other Common Classes, Checking and Changing Classes, Examining Variables, Workspace

Unit II

Vectors, Matrices, and Arrays; Lists and Data Frames-Lists, NULL, Pairlists, Data Frames; Environments and Functions

Unit III

Strings and Factors, Flow Control and Loops, Advanced Looping; Packages- Loading Packages, Installing Packages, Maintaining Packages; Dates and Times-Date and Time Classes, Conversion to and from Strings, Time Zones, Arithmetic with Dates and Times, Lubridate.

Unit IV

Getting Data-Built-in Datasets, Reading Text Files, Reading Binary Files, Web Data, Accessing Databases; Cleaning and Transforming- Cleaning Strings, Manipulating Data Frames, Sorting, Functional Programming; Exploring and Visualizing- Summary Statistics, Three Plotting Systems, Scatterplots, Line Plots, Histograms, Box Plots, Bar Charts, Other Plotting Packages and Systems

Text Book:

1. Richard cotton “A step-by-step function guide to data analysis: Learning R” First edition, O‟REILLY, 2013

References:

1. Michael J. Crawley “The R Book” Second Edition A John Wiley & Sons, Ltd., Publication, 2013.

2. Garrett Grolemund “Hands-On Programming with R” First Edition, O‟Reilly Media, 2014

3. Roger D. Peng “R Programming for Data Science” Leanpub, 2014-15

MCA215	Elective-II : A- Internet Of Things		IOT
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT-I:

Introduction to Internet of Things: Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoTenabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT-II:

IoT and M2M: Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT-III:

Introduction to Python: Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT-IV:

IoT Physical Devices and Endpoints: Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins. IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT

TextBooks:

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

References:

1. Programming world wide web, R.W.Sebesta,4th Edition, Pearson.
2. Internet and World Wide Web — How to program. Dietel and Nieto, Pearson.

MCA215	Elective-II : B- Big Data Analytics		BDA
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT-I

Introduction: What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data, mobile business intelligence, Crowd sourcing analytics, inter and trans firewall analytics.

UNIT-II :

Hadoop: Data format, analyzing data with Hadoop, scaling out, Hadoop streaming, Hadoop pipes, design of Hadoop distributed file system (HDFS), HDFS concepts, Java interface, data flow, Hadoop I/O, data integrity, compression, serialization, Avro, file-based data structures .

UNIT-III :

MapReduce : MapReduce workflows, unit tests with MRUnit, test data and local tests, anatomy of MapReduce job run, classic Map-reduce, YARN, failures in classic Map-reduce and YARN, job scheduling, shuffle and sort, task execution, MapReduce types, input formats, output formats.

UNIT-IV :

Big Data Analysis :Hbase, data model and implementations, Hbase clients, Hbase examples, praxis. Cassandra, Cassandra data model, Cassandra examples, Cassandra clients, Hadoop integration, Hive, data types and file formats, HiveQL data definition, HiveQL data manipulation, HiveQLqueries .

TEXT BOOKS

1. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj kamal,PreetiSaxena, McGraw Hill, 2018.
2. Big Data, Big Analytics: Emerging Business intelligence and Analytic trends for Today's Business, Michael Minelli, Michelle Chambers, and AmbigaDhiraj, John Wiley & Sons,2013.

REFERENCE BOOKS

1. Business Intelligence and Analytic Trends for Today's Businesses'', Wiley, 2013
2. Hadoop: The Definitive Guide, Tom White ,Third Edition, O'Reilley, 2012.
3. Hadoop Operations, Eric Sammer, O'Reilley, 2012.
4. Programming Hive, E. Capriolo, D. Wampler, and J. Rutherglen, O'Reilley, 2012.
5. HBase: The Definitive Guide, Lars George, O'Reilley, 2011.
6. Cassandra: The Definitive Guide, Eben Hewitt, O'Reilley, 2010.
7. Programming Pig, Alan Gates, O'Reilley, 2011.

MCA215	Elective-II : C- Mobile Computing		MC
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT-I:

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Mobile Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT-II:

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)
Mobile Network Layer: Mobile IP, IP Packet Delivery, agent discovery, registration, tunneling and encapsulation, Route Optimization, DHCP.

UNIT-III:

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.
Database Issues data dissemination and synchronization: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models. Data Dissemination and Synchronization:Communications Asymmetry, Classification of Data Delivery Mechanisms, Broadcast Models, Selective Tuning and Indexing Methods.

UNIT- IV:

Mobile Ad hoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, protocols and tools: WAP, Bluetooth, J2ME

Text Book:

1. JochenSchiller,"Mobile Communications", Addison-Wesley,second edition, 2018.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002 (Chapters 11, 15, 17, 26 and 27)

References:

1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October 2004.
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden ,Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition, 2003.
4. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley DreamTech, 2003.

5.

MCA216	Data Mining Lab	
WORK LOAD: 4 PPW	Credits : 2	EXTERNAL MARKS: 50

All the mining concepts discussed as a part of the course should be implemented using a mining package like WEKA or packages of Programming Languages like Python.

Note:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

MCA217	Web Technologies Lab	
WORK LOAD: 4 PPW	Credits : 2	EXTERNAL MARKS: 50

Note:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

MCA218	Elective – I – Lab (Mobile Application Development)	
WORK LOAD: 4 PPW	Credits : 2	EXTERNAL MARKS: 50

Note:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

1. Write a program to implement and display a greeting message on MIDlet.
2. Write a program to design and implement Multiple MIDlets on MIDlet.
3. Write a program to implement MIDlet Life Cycle Contraction operations.
4. Write a program to design and implement MENU creation using Command<class> on Mobile Information Device Profile.
5. Write a program to implement LogIn<Form> on MIDlet.
6. Write a program to design and implement Phone Book MIDlet.
7. Write a program to design and implement CheckBoxMIDlet.
8. Write a program to display the current date and time.
9. Write a program to display the Calendar of current month.
10. Write a program to design and implement different types of Alert Messages.
11. Write a program to design and implement List of Radio Buttons.
12. Write a program to design and implement Ticker<class> on MIDlet.
13. Write a program to design and implement non-interactive for Mobile Signal status usin Gauge<class>.
14. Write a program to design and implement Draw Arc on MIDlet.
15. Write a program to design and implement KeyCode actions on MIDlet.
16. Write a program to design and implement interactive Mobile Volume Bar using Gauge<class>.
17. Write a program to design and implement Clipping Region on MIDlet.
18. Write a program to design and implement Image Slide show on MIDlet.

19. Write a program to design and implement which examine the Phone Number should be 6 - 8 numbers in telephone number with (+area code: 040, 041, 050, 0400, 044) on MIDlet.

20. Write a program to design and implement Sample Quiz for user on MIDlet.

21. Write a program to design and implement the Draw Bar Graph on MIDlet by passing the input values.

22. Write a program to design and implement the RMS Listener.

23. Write a program to design and implement the RMS Sorting

24. Write a program to design and implement the RSM Search.

25. Write a program to design and implement Login process with help of Users (uname, password) table in login database in MySQL.

MCA218	Elective-I – Lab : Cloud Computing	
WORK LOAD: 4 PPW	Credits : 2	EXTERNAL MARKS: 50

Note:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.
- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

1. Installation and configuration of Virtual Machine using VMware.
2. Study and Implementation of Infrastructure as a Service.
3. Installation and Configuration using Microsoft Azure Virtual Machine.
4. Install Google App Engine. Create hello world app and other simple web applications using Python/Java.
5. Create an Amazon EC2 Instance and Set up a Web Server on the Instance and Associate IP Address with the Instance.
6. Create a Database Instance in the Cloud using RDS.
7. Create a Database Instance in the Cloud using Google Cloud SQL.
8. Register with AWS and Create Windows/Linux Instance.
9. Create a S3 Storage Bucket and Store documents in Bucket.
10. Create a Static Web Hosting on S3 with name kakatiyauniversity.
11. Build a Serverless Web Application on AWS Cloud to GET KU employee details with email id only.
12. Build a Serverless Web Application on AWS Cloud to POST KU employee details with email id only.

MCA218	Elective-I – Lab : R-Programming	
WORK LOAD: 4 PPW	Credits : 2	EXTERNAL MARKS: 50

Note:

- All the concepts of syllabus and exercises from Text Book must be translated into programs which must be practiced, executed and written down in the practical record book.

- In the external lab examination, the student has to compile and execute at least two programs.
- External Viva-voce is compulsory.

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS			Credits
			Internal	External	Total	
MCA221	Artificial Intelligence	T (4)	20	80	100	4
MCA222	Elective-III	T (4)	20	80	100	4
MCA223	Elective-IV	T (4)	20	80	100	4
MCA224	Project	T (8)	50	200	250	10
Grand total (marks and credits)					**550**	**22**

KAKATIYA UNIVERSITY, WARANGAL

DEPARTMENT OF COMPUTER SCIENCE
MCA COURSE STRUCTURE UNDER CBCS
WITH EFFECT FROM 2020-21

MCA II YEAR II SEMESTER:

Elective – III

a. Foundations of Block Chain Technologies
b. Cyber Security
c. E-Commerce

Elective – IV

a. Digital Image Processing
b. Language Processors
c. Machine Learning

MCA221	Artificial Intelligence		AI
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

Unit I:

Concepts in AI, problem solving in AI, Defining an AI Problem as state space search, production systems, AI problem characteristics. Search techniques: Breadth first search, depth first search.

Unit II:

Heuristic Search Techniques: Generate and test, hill climbing, best first search, Heuristic function applications, problem Reduction, simulated annealing. Knowledge Representation in AI: knowledge representations approaches & issues in knowledge representation, Knowledge Representation using predicate logic, forward and backward reasoning, semantic nets, frames, scripts & conceptual Dependency.

Unit III:

Game Playing: The Minimax Search procedure, Adding Alpha-Beta Cutoffs, Additional Refinements, Iterative Deepening. Expert systems: Architecture, the knowledge base, inference engine, Knowledge acquisition Expert system development process MYCIN as an example. Types of Expert Systems – Rule Based, Case Based, Model Based Reasoning in Uncertain Situations: Introduction to Non monotonic Reasoning, Logic-Based Abductive Inference

Unit IV:

Uncertainty Measures: Stochastic Approach to Uncertainty, Bayesian Belief Networks, Certainty Factor Theory, Dempster – Shafer Theory.
Artificial Neural Networks: Introduction, Single Layer and Multilayer Feed Forward Networks, Radial Basis Function, and Design Issues of ANN.

Text Books:

1. E. Rich and Knight, “Artificial Intelligence”, 3rd Edition, 2009, TMH.
2. S. J. Russel and P. Norvig, “Artificial Intelligence: A Modern Approaches”, Prentice Hall.
3. George F Luger, “Artificial Intelligence”, Fourth Edition, Pearson Education Asia, ISBN No: 81-7808-491-0.

MCA222	Elective-I : A- Foundation of Block Chain Technologies		FBT
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT I

Blockchain: The growth of blockchain technology, Distributed systems, The history of blockchain and Bitcoin, Types of blockchain, Consensus, AP theorem and blockchain

Decentralization: Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Blockchain and full ecosystem decentralization, Smart contracts, Decentralized Organizations, Platforms for decentralization.Introducing Bitcoin: Bitcoin, Digital keys and addresses, Transactions, Blockchain, Mining

UNIT II

Introduction to Cryptography & Cryptocurrencies: Cryptographic Hash Functions, Hash Pointers and Data Structures, Digital Signatures, Public Keys as Identities, A Simple Cryptocurrency,How Bitcoin Achieves Decentralization: Centralization vs. Decentralization, Distributed consensus, Consensus without identity using a block chain, Incentives and proof of work.

Mechanics of Bitcoin: Bitcoin transactions, Bitcoin scripts, Applications of Bitcoin scripts, Bitcoin blocks, The Bitcoin network, Limitations and improvements

UNIT III

How to Store and Use Bitcoins: Simple Local Storage, Hot and Cold Storage, Splitting and Sharing Keys, Online Wallets and Exchanges, Payment Services, Transaction Fees, Currency Exchange Markets. Bitcoin Mining: The task of Bitcoin miners, Mining Hardware, Energy consumption and ecology,Mining pools, Mining incentives and strategies

Bitcoin and Anonymity: Anonymity Basics, How to De-anonymize Bitcoin, Mixing, Decentralized Mixing,Zerocoin and Zerocash

UNIT IV

The Future of Bitcoin: The Block Chain as a Vehicle for Decentralization, Routes to Block Chain Integration, Template for Decentralization,when is Decentralization a Good Idea?

Hyperledger: Hyperledger, Hyperledger as a protocol, the reference architecture, Fabric: Hyperledger Fabric, Sawtooth Lake, Corda, writing smart contract using Hyperledger,writing smart contract using Ethereum, Alternative Blockchains ,alternativeBlock chains: Block chains, Platforms and frameworks

Text Book:

1. Imran Bashir, “Mastering Block Chain: Distributed Ledger Technology, Decentralization and Smart Contracts Explained”, Packt Publishing (Free download available)

2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press, 2016. (Free download available)

References:

1. Melanie Swan, “Block Chain: Blueprint for a New Economy”, O’Reilly, 2015

2. Josh Thompsons, “Block Chain: The Block Chain for Beginners- Guide to Block chain Technology and Leveraging Block Chain Programming”

3. Daniel Drescher, “Block Chain Basics”, Apress; 1stedition, 2017

4. Anshul Kaushik, “Block Chain and Crypto Currencies”, Khanna Publishing House, Delhi.

5. Ritesh Modi, “Solidity Programming Essentials: A Beginner’s Guide to Build Smart Contracts for Ethereum and Block Chain”, Packt Publishing

6. Salman Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O’Dowd, Venkatraman Ramakrishna, “Hands-On Block Chain with Hyperledger: Building Decentralized Applications with Hyperledger Fabric and Composer”, Import, 2018

7. Wattenhofer, The Science of the Blockchain

MCA222	Elective-I : B - Cyber Security		CS
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT-I:

Introduction to Cybercrime: Introduction, Cybercrime, and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, And Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

UNIT-II:

Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT-III:

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in Mobile Computing Era, Laptops.

UNIT-IV:

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

Cyber Security: Organizational Implications Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

TextBooks:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.

References:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security, Chwan-Hwa(John), Wu,J.DavidIrwin.CRC Press T&F Group

MCA222	Elective-I : C - E-Commerce		E-com
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

Unit – I

Introduction To E-Commerce: E-commerce: The Revolution Is Just Beginning, E-commerce: A Brief History ,Understanding E-commerce: Organizing Themes.
E-Commerce Business Models: E-commerce Business Models, Major Business-to-Consumer (B2C) Business Models, Major Business-to-Business (B2B) Business Models, E-commerce Enablers: The Gold Rush Model, How E-Commerce Changes Business: Strategy, Structure, and Process.

Unit –II

E-Commerce Infrastructure: The Internet, Web, And Mobile Platform - The Internet: Technology Background, The Internet Today, The Future Internet Infrastructure, The Web, The Internet ant the Web, Mobile Apps: The Next Big Thing Is Here
Building An E-Commerce Presence: Web Sites, Mobile Sites, And Apps - Imagine Your E-commerce Presence, Building an E-commerce Presence: A Systematic Approach, Choosing Software and Hardware, Other E-Commerce Site Tools, Developing a Mobile Web Site and Building Mobile Applications.
E-Commerce Security And Payment Systems - The E-commerce Security Environment, Security Threats in the E-commerce Environment, Technology Solutions, Management Policies, Business Procedures, and Public Laws, Payment Systems, E-commerce Payment Systems, Electronic Billing Presentment and Payment.

Unit –III

E-Commerce Marketing And Advertising -Consumers Online: The Internet Audience and Consumer Behavior, Digital Commerce Marketing and Advertising Strategies andTools, Internet Marketing Technologies, Understanding the Costs and Benefits of Online Marketing Communications.
Social, Mobile, And Local Marketing - Introduction to Social, Mobile, and Local Marketing, Introduction to Social, Mobile, and Local Marketing, Mobile Marketing, Local and Location-Based Marketing.

Unit –IV

Ethics, Law, And E-Commerce - Understanding Ethical, Social, and Political Issues in E-commerce, Privacy and Information Rights, Intellectual Property Rights, Governance, Public Safety and Welfare.
Online Media :Online Content, The Online Publishing Industry, The Online Entertainment Industry.
Social Networks And Communities :Social Networks and Online Communities, Online Auctions, E-commerce Portals.

Text Book:

1. E-commerce 2014 business. technology. society. TENTH EDITION - Kenneth C. Laudon • Carol Guercio Traver.

Reference Books:

1. The Complete E-Commerce Book: Design, Build, & Maintain a Successful Web-based Business, Second Edition by Janice Reynolds.
2. E.M. Awad, Electronic Commerce From Vision to Fulfillment (3rd ed.), Prentice-Hall of India, 2006.
3. P.T. Joseph, E-Commerce An Indian Perspective, Prentice-Hall of India, 2007

MCA223	Elective-II : A - Digital Image Processing		DIP
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT I

Digital Image Fundamentals : Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels – color models: RGB, CMY, HIS color model.

UNIT II

Image Enhancement : Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering – Frequency Domain: Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters. Homomorphic filtering, Color image enhancement.

UNIT III

Image Restoration and Segmentation : Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities– Point, Line, Edge detection, edge Linking and Boundary detection – Region based segmentation, Region growing, splitting, merging- Morphological processing- erosion and dilation, boundary extraction, Region filling, thinning, thickening.

UNIT IV

Image Compression and Recognition : Need for data compression, Image Compression model, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

TEXT BOOK:

- Rafael C. Gonzales, Richard E. Woods, “Digital Image Processing”, Third Edition, Pearson Education.
- Anil K. Jain,Fundamentals of Digital Image Processing Pearson,

REFERENCES:

- Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, “Digital Image Processing Using MATLAB”, Third Edition Tata Mc Graw Hill Pvt. Ltd., 2011.
- Anil Jain K. “Fundamentals of Digital Image Processing”, PHI Learning Pvt. Ltd., 2011.
- Willliam K Pratt, “Digital Image Processing”, John Willey, 2002.
- Malay K. Pakhira, “Digital Image Processing and Pattern Recognition”, First Edition, PHI Learning Pvt. Ltd., 2011

MCA223	Elective-II : B - Language Processors		LP
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT-I

Introduction to compiling: Compilers, Analysis of the source program, Phases of a compiler, Cousins of the compiler, Grouping of phases, Compiler construction tools. **Lexical analysis:** Role of lexical analyzer, Input buffering, Specification of tokens, Recognition of tokens, A language for specifying lexical analyzers, Finite automata, Design of a lexical analyzer, Optimization of deterministic finite automata based pattern matchers.

UNIT-II

Syntax analysis: Role of the parser, Writing grammars, Context free grammars, Top down parsing, Bottom up parsing, Operator precedence parsing, LR parsers, Using ambiguity grammars, Parser generators.
Syntax directed translation: Syntax directed definitions, Construction of syntax trees, Bottom up evaluation of *S attributed* definitions, *L attributed* definitions, Top down translation, Bottom up evaluation of inherited attribute, Space for attribute values at compile time, Analysis of syntax directed definition.

UNIT-III

Type checking: Type systems, Specification of a simple type checker, Equivalence of type expressions, Type conversions.
Runtime environments: Source language issues, Storage organization, Storage allocation strategies, Symbol tables, Language facilities for dynamic storage allocation, Dynamic storage allocation techniques.
Intermediate code generation: Intermediate languages, Declarations, Assignment statements, Boolean expressions, Back patching**.**

UNIT-IV

Code generation: Issues in the design of code generator, The target machine, Runtime storage management, Basic blocks and flow graphs, Next use information, A simple code generator, Register allocation and assignment, Directed acyclic graph (*DAG*) representation of basic blocks, Peephole optimization, Generating code from directed acyclic graphs, Code generation algorithm.
Code optimization: Introduction, The Principal sources of optimization, Optimization of basic blocks, Loops in flow graphs, Introduction to global data flow analysis, Code improving transformations.

Text Books:

1.AlfredAho, Ravi Sethi, Jeffrey D Ullman, ― Compilers: Principles, Techniques and Tools, *2nd Edition, Pearson Education Asia*, ISBN-13: 978-8131721018, 2008

MCA223	Elective-II : C - Machine Learning		ML
WORK LOAD: 4 PPW	Credits: 4	INTERNAL MARKS: 20	EXTERNAL MARKS: 80

UNIT I:

Introduction: Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning. Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find- S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

UNIT II:

Linear Regression & Logistic Regression: Predicting numeric values: regression – Finding the best fit lines with linear regression, Locally weighted linear regression, Shrinking Coefficients, The bias / Variance tradeoff. Logistic Regression: Classification with logistic regression and the sigmoid function, Using optimization to find the best regression coefficients.**:**

Artificial Neural Networks: Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition.

UNIT III:

Evaluation Hypotheses: Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

Support vector machines & Dimensionality Reduction techniques: Separating data with the maximum margin, finding the maximum margin, efficient optimization with SMO algorithm, speeding up optimization with full platt SMO, Using Kernels for more Complex data. Dimensionality Reduction techniques: Principal Component analysis.

UNIT IV:

Instance-Based Learning- Introduction, k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.Genetic Algorithms: Representing Hypotheses, Genetic Operators, Fitness Function and Selection, Illustrative Example.

TEXT BOOKS

1. Machine Learning ,Tom M. Mitchell, MGH
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

REFERENCE BOOKS

1. Introduction to Machine Learning, EthemAlpaydin, PHI, 2004
2. Machine Learning , SaikatDutt, Subramanian Chandramouli, First Edition, Pearson
3. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006
4. Introduction to Machine Learning with Python: A Guide for Data Scientists 1st Edition by Andreas C. Müller **,** Sarah Guido.
5. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.

MCA224	Project		Proj
WORK LOAD: 8 PPW	Credits: 10	INTERNAL MARKS: 50	EXTERNAL MARKS: 200

Note:

- **The project work should be carried out by the Student groups and the number of students in each group should not exceed three.**
- **Two Seminars must be delivered by all the student groups before the final project viva, one on the design part and the other on the implementation.**
- The Project work, being the vital component of this professional programme, needs to be carried out with due care and dedication by all the student groups.
- The project workis not just the partial fulfilment of the course requirements, but it provides a mechanism to demonstrate the ASK (Attitude, Skills, and Knowledge) elements with specialization.
- The students are expected to work on a real-time project on latest platforms preferably in some industrial unit/ R&D Laboratories / Educational Institution / Software Company.
- Students are encouraged to work in their interested area.
- The student groups can formulate a project problem by a thorough interaction with his / her Guide of the concerned college.
- Approval of the project proposal is mandatory by his/her Guide, then only the student group is expected to commence working on and complete it.
- The student groups must make use of the latest software packages for the development of the project.
- The problem domain and the specifications chosen should be genuine and feasible for the implementation.