DETAILED SYLLABUS
FOR
MASTER OF COMPUTER APPLICATIONS
(MCA)

(EFFECTIVE FROM BATCH 2020-22)
[UNDER CBCS SYSTEM]

MAKHANLAL CHATURVEDI NATIONAL UNIVERSITY OF JOURNALISM & COMMUNICATION
B-38, Vikas Bhawan, Press Complex, M.P. Nagar, Zone-I, Bhopal – 462011
Web : **www.mcu.ac.in** e-mail : **computer@mcu.ac.in**

ABOUT UNIVERSITY

Makhanlal Chaturvedi National University of Journalism and Communication (MCNUJC) was established 29 years ago. Carrying forward the legacy of excellence, it is a leader and pioneer in Mass Communication, Media, Journalism, Computer Applications, Digital media, and Management Education.

Established in 1990 by the Madhya Pradesh Government, MCNUJC is named after Pt. Makhanlal Chaturvedi, the great editor, poet, litterateur and freedom fighter. It is the first academic centre of excellence in the entire Asian sub-continent where professionals are developed in Communication, Media, and IT disciplines through traditional and modern methods of communication relevant to the current media needs. The University is also recognised under section 12(B) of UGC.

Sticking to the newest trends of Media and Information Technology, the University conducts postgraduate, undergraduate as well as skill-oriented diploma courses in Journalism, Broadcast Journalism, Advertising and Public relations, Electronic Media, New Media, Computer Applications Media management and Communication Research.

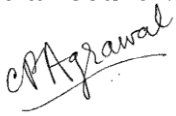
University has been a pioneer in launching many new job-oriented courses of significance, which have received enormous appreciation among employers. The University has a focused approach towards professional education, training and innovative methods of teaching and learning. Students get opportunity to study subjects of their choice under the Choice Based Credit System (CBCS) as per the industry needs. The University is equally appreciated for its research contribution through its research scholars leading to the award of PhD in Media and Computer Applications. Most of the faculty members of the university hold a PhD along with strong research contribution.

MCNUJC is a unique amalgamation of Media and IT professionals and academicians. Today, the university is also providing education to the remote rural areas with a wide network of over more than 1700 associated study institutes, where annually over one lakh students are studying in regular programmes. This is a grand indicator of the university's success, credibility, popularity and recognition.

Our faculty members are renowned for their dynamic approach, research and dedication. They are approachable and enthusiastic teachers who make their disciplines accessible and enjoyable. The university aims to transform dreams and ambitions of students into global opportunities for success. Alumni are placed in renowned print media institutions, channels, advertising agencies, public relations firms, graphic designing and multimedia world, information technology and computer industries and many of them occupy senior positions.

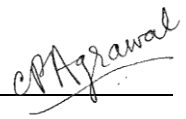
What makes MCNUJC the first choice for media, communication and IT education in the entire country is its comprehensive academics with exceptional industry exposure and quality education on affordable fee structure with the best professional environment.

Hon'ble Vice President of India is the Visitor of our university. The Chief Minister of Madhya Pradesh is the Chairman of the General Council and the Management Committee of the University. General Council is the supreme decision-making body of the university and it directs the academic and administrative activities of the university. Many distinguished people in the media like the Chairman of Press Council of India, representative of Editors' Guild, reputed information technology professionals, renowned teachers and well-known personalities of the country and the state are nominated as the members of the General Council. The



Dr. C.P.Agrawal

Management Committee of the university executes the policy and administrative matters. Leading University through managing, teaching and administering lie with the Vice Chancellor of the university. The Academic Council includes distinguished teachers of media and computers, senior professionals and heads of the university departments. It provides guidance and decides matter related to teaching, training and research activities of the university. The Vice Chancellor is also the Chairman of the Academic Council.



MASTERS OF COMPUTER APPLICATION (MCA)

Level – Postgraduate Duration – 2 years (4 Semesters) Seats – 60

Eligibility Criteria

Passed BCA/Bachelor Degree in Computer Science/Engineering or equivalent Degree
OR
Passed B.Sc./B.Com./B.A. with Mathematics at 10+2 Level or at Graduation Level (with additional bridge Courses as per the norms of the University).

Candidate must Obtained at least 50% marks (45% marks in case of candidate belonging to reserved category) in the qualifying Examination

ABOUT THE PROGRAMME

Master of Computer Applications (MCA) is a two years post graduate programme. The curriculum of MCA is designed to meet the growing demand of qualified professionals in the field of ICT. It comprises of the core subjects like database, networking, data structure, core programming languages like C, C++, .NET and Java. Students also get exposure to advanced topics like cyber security, mobile software, IOT, data science etc. Elective papers help students to have an exposure in Cloud Computing, Big Data and Information Security related subjects.

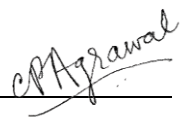
COURSE OBJECTIVE

- To empower students with basic skills of various technologies.
- To develop the ability to identify, analyse, formulate and develop computer applications.
- To enable the students to select modern computing tools and techniques and use them with
  dexterity.

If you are looking for challenging roles in the IT industry, computer science research, web and mobile development, data analysis, information security etc., this programme is for you.

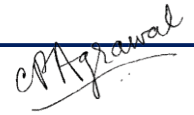
CAREER PATH YOU CAN CHOOSE AFTER THE COURSE

- Software Developer.
- Programmer.
- Systems Analyst.
- Computer Support.
- Engineer.
- Database Administrator.
- Systems Administrator.
- Web Designer & Developer.
- Network Administrator.



Dr. C.P.Agrawal

MCA (2 YEAR) PROGRAMME SCHEME 2020-22				
Semester	**Core Courses Compulsory (CCC)**	**Core Courses Elective (CCE)**	**Skill Enhancement Courses (SEC)**	**Open Electives (OE)**
	2 Professional Core courses of 5 Credits 2*5= 10 Credits	Professional Elective Courses of 5 Credits (Choose 2 Courses) 2* 5 = 10 Credits	Professional Skill Oriented Courses of 3 Credits (Choose 2 Courses) 2*3 = 6 Credits	Choose 1 Course of 3 Credits From University Open Electives for PG in Each Semester 1*3 = 3 Credits
I	▪ Database Management System ▪ Programming with VB.Net and ASP.Net	▪ Operating Systems ▪ Computer Organization & Architecture ▪ Discrete Mathematics	▪ Linux Server Administration ▪ Programming with C++ ▪ Professional Communication Skills	▪ Management Information Systems ▪ Advanced Excel ▪ Multimedia Systems
II	▪ Data Mining and Business Intelligence ▪ Web Technologies	▪ Data Structures and Algorithms ▪ Computer Networks ▪ Computer Graphics	▪ Programming in Python ▪ NOSQL Databases ▪ Digital Marketing	▪ Statistical Methods ▪ Virtual Reality ▪ Angular Java Script
III	▪ Software Engineering ▪ Java Programming	▪ Theory of Computation ▪ Big Data ▪ Development and Operational Tools (DevOps)	▪ Programming with R ▪ Internet of Things ▪ User Interface Design	▪ Social Media Mining ▪ Service Oriented Architecture ▪ Software Testing and Quality Assurance
IV	▪ Cloud Computing ▪ Project Work (5 Credits)	▪ Management Theory & Practices ▪ Artificial Intelligence & Machine learning ▪ Mobile Application Development	▪ Cyber Security ▪ Agile & Scrum ▪ Data visualization	▪ Blockchain Technology ▪ Programming with Go ▪ Software Project Management ▪ Enterprise Resource Planning (ERP) & CRM



Dr. C.P.Agrawal

Semester – I										
CC/CE/SE/OE	Course Code	Course Title	Hours Per Week			Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
			L	T	P					
CC	1MCACCC1	Database Management System	3	0	4	5	50	20	30	100
CC	1MCACCC2	Programming with VB.Net and ASP.Net	3	0	4	5	50	20	30	100
(CE) Select Any 2	1MCACCE(A)	Operating Systems	5	0	0	5	80	20	0	100
	1MCACCE(B)	Computer Organization & Architecture	5	0	0	5	80	20	0	100
	1MCACCE(C)	Discrete Mathematics	5	0	0	5	80	20	0	100
(SE) Select Any 2	1MCASEC(A)	Linux Server Administration	1	0	4	3	0	10	40	50
	1MCASEC(B)	Programming with C++	2	0	2	3	0	10	40	50
	1MCASEC(C)	Professional Communication Skills	2	1	0	3	40	10	0	50
(OE) Select Any 1	1MCAOE(A)	Management Information Systems	3	0	0	3	40	10	0	50
	1MCAOE(B)	Advanced Excel	2	0	2	3	40	10	0	50
	1MCAOE(C)	Multimedia Systems	2	0	2	3	40	10	0	50
SEMESTER TOTAL						**29**				**550**

Definition of Credit	1 Hr. Lecture (L) per week - 1 credit	1 Hr. Practical (P) per week - 0.5 credit
	1 Hr. Tutorial (T) per week - 1 credit	2 Hours Practical(Lab)/week - 1 credit

Semester –II										
CC/CE/SE/OE	Course Code	Course Title	Hours Per Week			Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
			L	T	P					
CC	2MCACCC1	Data Mining and Business Intelligence	4	1	0	5	80	20	0	100
CC	2MCACCC2	Web Technologies	2	0	6	5	50	20	30	100
(CE) Select Any 2	2MCACCE(A)	Data Structures and Algorithms	4	0	2	5	80	20	0	100
	2MCACCE(B)	Computer Networks	4	1	0	5	80	20	0	100
	2MCACCE(C)	Computer Graphics	4	1	0	5	80	20	0	100
(SE) Select Any 2	2MCASEC(A)	Programming in Python	2	0	2	3	0	10	40	50
	2MCASEC(B)	NOSQL Databases	2	0	2	3	0	10	40	50
	2MCASEC(C)	Digital Marketing	2	0	2	3	40	10	0	50
(OE) Select Any 1	2MCAOE(A)	Statistical Methods	2	1	0	3	40	10	0	50
	2MCAOE(B)	Virtual Reality	2	0	2	3	40	10	0	50
	2MCAOE(C)	Angular Java Script	2	0	2	3	40	10	0	50
SEMESTER TOTAL						**29**				**550**

Dr. C.P.Agrawal

Semester –III										
CC/ CE/SE/ OE	Course Code	Course Title	Hours Per Week			Credit	End-Term Theory Exam Marks	Continu-ous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
			L	T	P					
CC	3MCACCC1	Software Engineering	4	1	0	5	80	20	0	100
CC	3MCACCC2	Java Programming	3	0	4	5	50	20	30	100
(CE) Select Any 2	3MCACCE(A)	Theory of Computation	4	1	0	5	80	20	0	100
	3MCACCE(B)	Big Data	3	0	4	5	80	20	0	100
	3MCACCE(C)	Development and Operational Tools (DevOps)	3	0	4	5	50	20	30	100
(SE) Select Any 2	3MCASEC(A)	Programming with R	2	0	2	3	0	10	40	50
	3MCASEC(B)	Internet of Things	2	0	2	3	0	10	40	50
	3MCASEC(C)	User Interface Design	2	0	2	3	0	10	40	50
(OE) Select Any 1	3MCAOE(A)	Social Media Mining	2	0	2	3	40	10	0	50
	3MCAOE(B)	Service Oriented Architecture	2	0	2	3	40	10	0	50
	3MCAOE(C)	Software Testing and Quality Assurance	2	1	0	3	40	10	0	50
SEMESTER TOTAL						**29**				**550**

Definition of Credit	1 Hr. Lecture (L) per week - 1 credit	1 Hr. Practical (P) per week - 0.5 credit
	1 Hr. Tutorial (T) per week - 1 credit	2 Hours Practical(Lab)/week - 1 credit

Semester - IV										
CC/ CE/SE/ OE	Course Code	Course Title	Hours Per Week			Credit	End-Term Theory Exam Marks	Continu-ous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
			L	T	P					
CC	4MCACCC1	Cloud Computing	3	0	4	5	50	20	30	100
CC	4MCACCC2	Project Work	0	2	6	5	0	20	80	100
(CE) Select Any 2	4MCACCE(A)	Management Theory & Practices	5	0	0	5	80	20	0	100
	4MCACCE(B)	Artificial Intelligence & Machine learning	4	0	2	5	80	20	0	100
	4MCACCE(C)	Mobile Application Development	3	0	4	5	80	20	0	100
(SE) Select Any 2	4MCASEC(A)	Cyber Security	2	0	2	3	40	10	0	50
	4MCASEC(B)	Agile & Scrum	2	1	0	3	40	10	0	50
	4MCASEC(C)	Data visualization	2	1	0	3	40	10	0	50
(OE) Select Any 1	4MCAOE(A)	Blockchain Technology	2	0	2	3	40	10	0	50
	4MCAOE(B)	Programming with Go	1	0	4	3	40	10	0	50
	4MCAOE(C)	Software Project Management	2	0	2	3	40	10	0	50
	4MCAOE(D)	Enterprise Resource Planning (ERP) & CRM	3	0	0	3	40	10	0	50
SEMESTER TOTAL						**29**				**550**

Dr. C.P.Agrawal

SEMESTER-I
1MCACCC1 - DATABASE MANAGEMENT SYSTEM

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CC	3	0	4	5	50	20	30	100

Prerequisite: Students are expected to know following topics before learning the syllabus. Theory classes may be organized if required. These topics are prerequisite not to be included for theory exam :- Significance of Databases, Database System Applications, Advantages and Disadvantages of different Database Management systems, Comparison between DBMS, RDBMS, Distributed and Centralized DB, Database design ER Diagram, Relational Databases: Integrity Constraints, Functional Dependency, Multi-valued Dependency, Normalization.

COURSE OBJECTIVES

- To create andmanipulate a database using SQL.
- To know database administration basics and practice commands.
- To Understand File Organization and Indexing in Database.
- To Acquire the Knowledge of Query Evaluation to Monitor the Performance of the DBMS.
- To Impart Knowledge in Transaction Processing, Concurrency Control Techniques and Recovery Procedures.
- To Know Parallel, Distributed, Object relational and XML database basics.

COURSE OUTCOME

- Understand and describe the basic concepts and terminology of Database Management System.
- Apply query language commands using MySQL.
- Understand internal storage mechanism, File Organization and Indexing in Database.
- Understand Concurrency, Transaction and recovery management concepts.
- Know Basic Concepts in parallel, distributed, object relational and XML database.

UNIT-WISE SYLLABUS

UNIT I

Database creation & using through MySQL, Query Language Introduction, DDL, DML and DCL Commands, Integrity Constraints, Query Structure, Basic Operations, SQL Data Types and Schemas, Set Operations, Null Values, Aggregate Functions, Sub queries, Modification of the Database, Join Expressions

UNIT- II

Views, Transactions, Authorization, Trigger, Recursive Queries, Database Administration Basics, Running and Shutting Down, setting up Account, Users Role and privileges, MySQL Show Command, Backup and Restore.(all above are implemented in labusing MySQL)

UNIT III

Overview of Physical Storage Media, RAID, Storage Access, File Organization, Organization of Records in Files, Data-Dictionary Storage, Indexing Basics, Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Hashing, Multiple-Key Access, Query Optimization Basics.

UNIT-IV

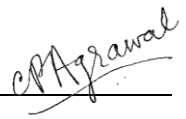
Transaction Concept, Transaction State, Concurrent Executions, Serializability, Recoverability, Concurrency Management, Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Recovery, Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery

UNIT-V

Database system Architecture, Centralized and Client-Server Systems, Server System Architectures Parallel Systems, Distributed SystemsParallel Databases, I/O Parallelism, Design of Parallel SystemsDistributed Databases, Heterogeneous and Homogeneous Databases, Distributed Data, StorageObject Relational Database, XML database.

TEXT & REFERENCE BOOKS

- MySQL 8.0 Reference Manual Available online at https://dev.mysql.com/doc/refman/8.0/en/
- MySQL 8.0 Reference Manual in PDF format available online at https://downloads.mysql.com/docs/refman-8.0-en.pdf
- Learning MySQL by Hugh E. Williams, Seyed M.M. Tahaghoghi, O'Reilly, ISBN-978-596008642
- Beginning MySQL by Geoff Moes, Robert Sheldon Wrox Publictions, ISBN –0764579509
- Creating your MySQL Database: Practical Design Tips and Techniques by Marc Delisle, PACKT Publications, ISBN-978-1904811305
- Mysql: The Complete Reference by Vaswani Vikram, Tata McGraw-Hill Education India, ISBN: 9780070586840, 9780070586840
- Murach'S Mysql by Murach Joel, PACKT Publishing, ISBN: 9789350237694, 9789350237694



1MCACCC2 - PROGRAMMING WITH VB.NET AND ASP.NET

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CC	3	0	4	5	50	20	30	100

COURSE OBJECTIVES

- Identify the basics of.NET framework, architecture and user programs.
- Do GUIprogramming using VB.NET
- Examine the challenges involved in.NET framework programming
- Do event driven programming projects
- Learn the ADO..NET Database Usages in Website Creation
- Develop Websites with use of ASP..NET.

COURSE OUTCOME

- Understand and explore various features of VB.NET framework
- Analyze, design and develop the GUI based applications software using VB.NET.
- Design, develop and implement complete software projects using VB.NET with consideration of environment in team spirit.
- Analyze the requirement, design and develop dynamic and static websites and web applications using.NET technology.
- Integrate and apply different components including database, with proper choice of languages mapping

UNIT-WISE SYLLABUS

UNIT- I

Object-Oriented Programming: Classes and Objects, Fields, Properties, Methods, and Events, Abstraction, Encapsulation, Inheritance, and Polymorphism, Overloading, Overriding, Shadowing, Constructors and Destructors,.Net Framework : Features & Architecture, Common Language Runtime, Common Type System, MSIL, Class Libraries. Event Driven Programming, Methods and Events. Programming into Visual Studio, IDE of VB.Net- Menu Bar, Toolbar, Project Explorer, Toolbox, Properties Window, Form Designer, Form Layout, Immediate Window, ASP & HTML Forms, Building VB.NET and C# Applications

UNIT- II

Visual Basic Language: Operators, Conditionals, Loops, Statements, Variables, Data Types, Arrays and Dynamic Arrays, Operators. Procedures, Scope, and Exception Handling, Creating Functions, Exception Handling, Using Resume Next and Resume Line, Using On Error GoTo, Windows Forms : Loading, Showing and Hiding Forms, Working with Multiple Forms, Creating Windows Applications, Adding Controls to Forms, Handling Events, MsgBox Function, InputBox Function, Startup Form, Multiple Document Interface (MDI) Applications, Dialog Boxes, Controls at Run Time, Mouse Events, Keyboard Events, Beeping, Deploying Applications

UNIT- III

.NET Tools: Control Class, Text Boxes, Rich Text Boxes, Labels, Link Labels, Buttons, Checkboxes, Radio Buttons, Panels, and Group Boxes, List Boxes, Checked List Boxes, Combo Boxes, and Picture Boxes, Scroll Bars, Splitters, Track Bars, Pickers, Notify Icons, Tool Tips, and Timers, Menus, Built-in Dialog Boxes, and Printing, Image Lists, Tree and List Views, Toolbars, Status and Progress Bars, and Tab Controls

UNIT- IV

Web Forms with ASP.Net: Web Form Controls, HTML, Web Applications, Multiform Web Project, Client Events, Title Bar Text, Error Page, Search Engine Keywords, Embedding Visual Basic Code in Web Pages, Validation Controls, Calendars. Introduction to Windows Services & Web Services

UNIT- V

Data Access with ADO.NET: Server Explorer Data Adaptors and Datasets, ADO.NET Objects, Data Connection, Dragging Tables, Dataset, Data Grid, Data Adapter Controls, Dataset Schema, MS Jet Database, Relational Databases.Binding Controls to Databases: Simple Binding, Complex Binding, Navigating in Datasets, Data Forms, Handling Databases in Code, Database Access in Web Applications.

TEXT &REFERENCE BOOKS

- Steven Holzner, VB.Net Programming-Black Book-Dreamtech Publications
- EvangelosPetroutsosMastering VB.Net - BPB Publications
- Mathew Macdonald-The Complete Reference Asp.Net-TMH
- Professional ASP.Net- Wrox Publication
- Stephen Walther Active Server Pages 2.0 (Unleashed) -Techmedia
- Eric A. Smith ASP 3 Programming Bible: IDG Books

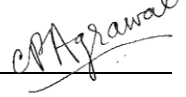
LIST OF PRACTICAL

1. Write a program to perform arithmetic operation in console application using switch case.
2. Write a program to perform reverse number.
3. Write a console application that obtains four integer values from the user and displays the product.
4. If you have two integers stored in variables var1 and var2, what Boolean test can you perform to see if one or the other (but not both) is greater than 10?
5. Write an application that includes the logic from Exercise 4, obtains two numbers from the user, and displays them, but rejects any input where both numbers are greater than 10 and asks for two new numbers.
6. Write a console application that places double quotation marks around each word in a string.
7. Write an application that uses two command-line arguments to place values into a string and an integer variable, respectively. Then display these values.
8. Write an application that receives the following information from a set of students:

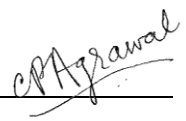
- Student Id:
- Student Name:
- Course Name:
- Date of Birth:

The application should also display the information of all the students once the data is Entered.

9. Create an application that allows the user to enter a number in the textbox named "getnum". Check whether the number in the textbox "getnum" is palindrome or not. Print the message accordingly in the label control named lbl display when the user clicks on the button "check".
10. Write a program to declare class "Distance" have data member's dist1, dist2, dist3. Initialize the two data members using constructor and store their addition in third data member using function and display addition.
11. Define a class "salary" which will contain member variable Basic, TA, DA, HRA. Write a program using Constructor with default values for DA and HRA and calculate the salary of employee.
12. Write a program to check whether the given number is Armstrong number or not.
13. Write a console application for bank account in C#.Net.
14. Write a console application to display student information using class and object.
15. Write a console application to display employee information using properties.
16. Write a console application for a class person having data members name & age. Accept the value for this using constructor. And display the output for one object.
17. Write a console application containing a method that will swap the value of two integer type variable.
18. Write a console application calculate the area and circumference of circle & rectangle using inheritance.
19. Write a program for calculates the area and circumference of circle & rectangle using abstract class.
20. Design a sign-Up form & validate user phone no with exactly 10 digit and email-id.
21. Design a sign-up form & validate username (minimum 8 characters &maximum 15and only character), password and retype password (both should be same)
22. Design a web application form having loan amount, interest rate and duration fields. Calculate the simple interest and perform necessary validation i.e. Ensures data has been entered for each field. Checking for non-numeric value.
23. Create an application which will ask the user to input his name and a message, display the two items concatenated in a label, and change the format of the label using radio buttons and check boxes for selection, the user can make the label text bold, underlined or italic and change its color. include buttons to display the message in the label, clear the text boxes and label and exit.
24. List of employees is available in list box. Write an application to add selected or all records from listbox (assume multi-line property of textbox is true).



25. "How is the book ASP.NET with C# by Raj Sharma?" Give the user three choice :i)Good ii)Satisfactory iii)Bad. Provide a VOTE button. After user votes, present the result in percentage using labels next to the choices.
26. Create a project that calculates the total of fat, carbohydrate and protein. Allow the user to enter into text boxes. The grams of fat, grams of carbohydrate and grams of protein. Each gram of fat is 9 calories and protein or carbohydrate is 4 calories. Display the total calories of the current food item in a label. Use to other labels to display and accumulated some of calories and the count of items entered. The form food have 3 text boxes for the user to enter the grams for each category include label next to each text box indicating what the user is enter.
27. Create a Global.asax file with Application variables count, color1 and gotohp. Create a Session variable called cont1. Initialize count as 0 and assign any color to color1. For the variable gotohp, give a hyperlink to any Website. Use the variables in a Web Form. Try these with the lock and unlock methods.
28. Write a program that gets user input such as the user name, mode of payment, appropriate credit card. After the user enters the appropriate values the Validation button validates the values entered.
29. Create the application that accepts name, password, age, email id, and user id. All the information entry is compulsory. Password should be reconfirmed. Age should be within 21 to 30. Email id should be valid. User id should have at least a capital letter and digit as well as length should be between 7 and 20 characters.
30. Create a Web Application to display all the Empname and Deptid of the employee from the database using SQL source control and bind it to GridView. Database fields are(DeptId, DeptName, EmpName, Salary)
31. Create a Login Module which adds Username and Password in the database. Username in the database should be a primary key.
32. Write a program to get a user input such as the boiling point of water and test it to the appropriate value using Compare Validator.
33. Create a web application to insert 3 records inside the SQL database table having following fields(DeptId, DeptName, EmpName, Salary). Update the salary for any one employee and increment it to 15% of the present salary. Perform delete operation on 1 row of the database table.
34. Create a web page to display the cricket score from the table event (id, name, score). Refresh the website automatically after every 30 seconds.
35. Write a program to display three images in a line. When any one of the images is clicked, it must be displayed below. On clicking the displayed image it must be cleared.
36. Design a college website (minimum 4 pages)
37. Design a company website (minimum 4 pages)



1MCACCE(A) - OPERATING SYSTEMS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	5	0	0	5	80	20	0	100

COURSE OBJECTIVES

- To Understand the Services Provided by Operating System
- To Understand the Working and Organization of Process and its Scheduling and Synchronization.
- To Understand the Concept of Deadlock.
- To Understand Different Approaches to Memory Management Techniques.
- To Understand the Structure and Organization of the File System.

COURSE OUTCOMES

- Identify and describe the Services Provided by Operating Systems.
- Understand and Solve Problems Involving Process Control, Mutual Exclusion, Synchronization and Deadlock.
- Implement Processor Scheduling, Synchronization and Disk Allocation Algorithms for a Given Scenario
- Apply Various Approaches of Memory Management Techniques
- Analyze Various Operating System Approaches in Linux and Windows

UNIT-WISE SYLLABUS

UNIT– I

Definitions, Components and Types of Operating System, Operating System Services, System Calls, System Programs, Process Concepts, Process State & Process Control Block, Process Scheduling, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Threads Introduction

UNIT–II

The Critical Sections Problem, Semaphores, Classical Problem of Synchronization, Deadlock Characterizations, Method for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined Approach to Deadlock

UNIT–III

Storage Management Logical Versus Physical Address Space, Swapping, Contiguous Allocating, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms, Thrashing, Demand Segmentation

UNIT–IV

Disk Structure, Disk Scheduling, Disk Management, Swap Space Management, Disk Reliability, Stable Storage Implementation, File Concepts, Directory Structure, Protecting, I/O Subsystem Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem

UNIT–V

Case Studies: Linux System: History, Components, Kernel Modules, Process Management – Model, Identity, Context, Scheduling – Kernel Synchronization, Process Scheduling, Memory Management of Physical Memory

Windows System: History, Design Principal, Components

TEXT &REFERENCE BOOKS

- Silberschatz, Galvin, Gagne-Operating System Concepts -Wiley Student Edition
- Milan Milenkovic-Operating System Concepts & Design-TMH Publication
- Andrew S. Tanenbaum-Modern Operating System-PHI

Dr. C.P.Agrawal

1MCACCE(B) - COMPUTER ORGANIZATION & ARCHITECTURE

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	5	0	0	5	80	20	0	100

COURSE OBJECTIVES

- To understand the basic blocks of digital logic.
- Understand basic operation of Combinational Circuits.
- Understand the Boolean algebra and map simplification.
- To examine the basics of assembly programming.
- To learn the memory addressing techniques and I/O organization.

COURSE OUTCOMES

- Able to Apply Boolean algebra and map simplification to digital circuit design
- Able to Apply the flip-flop operation to design the timing and control circuit
- By using memory addressing techniques solve memory address problem
- Able to write assembly code for some basic problem.
- Understand the various types of memory and their functions.

UNIT-WISE SYLLABUS

UNIT-I

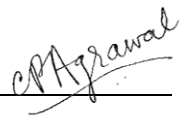
Digital Logic Circuits : Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Product-of sums simplification, don't-care-conditions, Combinational Circuits, Half-Adder, Full –Adder, Sequential Circuits, Flip-Flops SR, & J K, Basis Computer Organization, Instruction codes, Stored program organization, Computer registers, CommonBus system, Computer Instructions, timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description

UNIT-II

Basis Computer Organization and Design : Design of Basis Computer, Control Logic Gates, Control of Registers and Memory, Design of Accumulator Logic, Control of AC Register, Adder and Logic Circuit, Multiple Bus Organization of Computer, Memory Addressing

UNIT-III

Programming the Basis Computer:Programming the Basis Computer, Machine Languages, Assembly Language, The Assembler, Program Loops, Programming Arithmetic and Logic Operations, Subroutines, subroutine Parameters and Data Linkage, Input output Programming, Character Manipulation, Program Interrupt



UNIT-IV

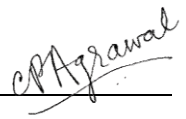
Micro programmed Control:Control Memory, Address Sequencing, Conditional Branching, Mapping of Instruction, Subroutines, Micro program Example, Design of Control Unit, Microgram Sequencer

UNIT-V

Input-Output & Memory Organization : Peripheral Devices, Input-Output Interface, Modes of Transfer, Priority Interrupt, Daisy-Chaining Priority, Parallel Priority Interrupt, Priority Encoder, Interrupt Cycle, Direct Memory Access (DMA), Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

TEXT &REFERENCE BOOKS

- Computer System Architecture Third Edition, by Mano M. Morris, Pearson Education India, ISBN: 9788131700709, 9788131700709
- Digital Design by Mano M. Morris, Pearson Education India, ISBN: 9789353062019, 9789353062019
- Digital Logic & Computer Design by Mano M. Morris, Pearson Education India, , ISBN: 9788177584097, 9788177584097
- Computer Organization and Architecture by Basu P N, Vikas Publishing House Pvt Ltd, ISBN: 9788125939917, 9788125939917
- Computer Organization & Architecture 10th Edition - Designing for Performance by Stallings William, Pearson, ISBN: 9789332570405, 9789332570405
- Computer Architecture and Organization by Hayes John, Tata McGraw-Hill Education India, ISBN: 9781259028564, 9781259028564
- Computer Organization by Hamacher V. Carl, McGraw-Hill Education - Europe, ISBN: 9781259005275, 9781259005275



1MCACCE(C) - DISCRETE MATHEMATICS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	5	0	0	5	80	20	0	100

COURSE OBJECTIVES

- Understand Different Types of Discrete Structures
- Express a Logic Sentence in Terms of Predicates, Quantifiers, and Logical Connectives
- Solve Problems Using the Principle of Inclusion-Exclusion.
- Understand Recursive Definitions;

COURSE OUTCOMES

- Apply the Operations of Sets and use Venn Diagrams to Solve Applied Problems.
- Analyze Properties of Algebraic Structures Such as Groups, Rings and Fields.
- Use and Analyze Recursive Definitions
- Understand, Explain and Apply the Basic Principles of Sets and Operations in Sets to Solve the Problems
- Analyze Modern Problems in Computer Science and solve them Using Graphs and Trees.

UNIT-WISE SYLLABUS

UNIT-I

Set Theory: Introduction to Set Theory, Set Operations, Algebra of Sets, Duality, Finite and Infinite Sets, Cartesian Product, Relations, Representation of Relations, Types of Relation, Equivalence Relations and Partitions, Partial Ordering Relations and Lattices, Function and its Types, Composition of Function and Relations

UNIT- II

Graphs and Trees: Introduction to Graphs, Directed and Undirected Graphs, Homomorphic and Isomorphic Graphs, Subgraphs, Cut Points and Bridges, Multigraph and Weighted Graph, Paths and Circuits, Shortest Path in Weighted Graphs, Eurelian Path and Circuits, Hamilton Paths and Circuits, Planar Graphs, Euler's Formula, Graph Coloring, Trees, Spanning Trees, Binary Trees and its Traversals.

UNIT- III

Propositional Logic: Basic Operations: and(^), Or(V), Not(~), Truth Value of a Compound Statement, Propositions, Tautologies, Contradictions, Validity of Arguments, Boolean Algebra Group Theory: Definition and Examples of a Monoid, Semigroup, Groups and Rings, Homomorphism, Isomorphism and Automorphism, Subgroups and Normal Subgroups, Cyclic Groups, Cosets, Lagrange's Theorem.

Dr. C.P.Agrawal

UNIT- IV

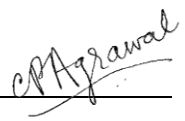
Definitions and Properties; Equivalence Relations and Equivalence Classes.Representations of Relations by Binary Matrices and Digraphs; Operations on Relations. Closure of a Relations; Reflexive, Symmetric and Transitive Closures.

UNIT- V

Definitions and Properties of Recursion and Recurrence Relation: Linear Recurrence Relation with Constant Coefficients, Homogeneous Solutions, Particular Solutions, Total Solution of a Recurrence Relation Using Generating Functions.

TEXT &REFERENCE BOOKS

- C.L Liu- Elements of Discrete Mathematics- McGraw Hill
- K.H.Rosen, Discrete Mathematics and Applications, Fifth Edition 2003, Tata Mcgraw Hill
- W.K.Grassmann and J.P.Trembnlay, Logic and Discrete Mathematics, a Computer Science
- Ronald Graham, Donald Knuth and Oren Patashik- Concrete Mathematics: a Foundation for Computer Science Ronald Graham
- Donald Knuth and Oren Patashik- Concrete Mathematics: a Foundation for Computer Science-Addison-Wesley
- Judith L. Gersting -Mathematical Structures for Computer Science, -Computer Science Press.
- K. a. Ross, Ch. R. B. Wright, Discrete Mathematics, Prentice Hall Inc., 1992 (Or Pwn Warszawa 1996).



1MCASEC(A) - LINUX SERVER ADMINISTRATION

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	1	0	4	3	0	10	40	50

COURSE OBJECTIVES

- Understand the fundamental concepts of Linux Server Administration
- Install and configure basic Linux services.
- Manage Users, Permissions, Folders, and Native Applications in Linux server.
- Manage the resources and security of a computer running Linux at a basic level
- Configure and manage simple networking services in Linux server.
- Creating and Maintaining E-Mail, FTP, and Web Servers.

COURSE OUTCOMES

- Explain the fundamental concepts of Linux Server Administration
- Install, configure and manage basic Linux services.
- Manage Users and their permissions, applications and services in Linux server.
- Manage the resources and security of a Linux server.
- Configure and manage basic networking services in Linux server.
- Install and configure E-Mail, FTP, and Web Servers.

UNIT-WISE SYLLABUS

UNIT – I

Introduction, Understanding Linux Distributions, Installing Linux

Using Essential Tools - Logging in to Linux, Using the Seven Essential Linux Command Line Tools (ls, cp, mv, rm, mkdir, cd, pwd) Getting Help with man, Finding Which man Page to Use, Using pinfo, Using Other Systems for Getting Help

Working with the Bash Shell - Understanding the Shell and Other Core Linux Components, Using I/O Redirection and Piping, Working with history, Using Command Line Completion, Using Variables, Using Other Bash Features, Working with Bash Startup Files

Essential File Management Tools - Understanding the Linux File System Hierarchy, Listing Files with ls, Using Wildcards, Copying Files with cp, Working with Directories, Using Absolute and Relative Paths, Moving Files with mv, Removing Files with rm, Understanding Hard and Symbolic Links, Managing Hard and Symbolic Links, Finding Files with find, Using Advanced find Options, Archiving Files with tar, Managing File Compression

Working with Text Files - Understanding vi, Creating Text Files with vi, Browsing Text Files with more and less, Using head and tail to See File Start and End, Displaying File Contents with cat and tac, Working with grep, Understanding Regular Expressions, Using Regular Expressions with grep, Using Common Text Processing Utilities

Connecting to a Server - Understanding the Root User, Using su, Using sudo, Creating a Simple sudo Configuration, Working on Linux from Graphical Interface or Command Line, Using ssh to Connect to a Remote Server, Using ssh Keys

UNIT - II

User and Group Management - Understanding Users, Understanding File Ownership, Creating Users with useradd, Creating Groups with groupadd, Managing User and Group Properties, Configuring Defaults for New Users, Managing Password Properties, Understanding User and Group Configuration Files, Managing Current Sessions

Permissions Management - Understanding Basic Linux Permissions, Managing Basic Linux Permissions, Understanding Advanced Linux Permissions, Managing Advanced Linux Permissions, Managing umask

Managing Partitions - Understanding Disk Storage and Devices, Understanding MBR and GPT Partitions, Creating MBR Partitions, Creating MBR Extended and Logical Partitions, Managing GPT Partitions, Working with SSD, Adding a Swap Partition, Understanding Encrypted Partitions, Configuring Encrypted Partitions

Managing File Systems and Mounts - Understanding Linux File Systems, Creating File Systems, Mounting File Systems through /etc/fstab, Using File System Label and UUID, Managing Systemd Mounts, Managing Systemd Automounts

Managing the Boot Procedure - Understanding the Linux Boot Procedure, Shutting Down a System, Configuring the GRUB2 Boot Loader, Troubleshooting Boot Issues, Working with a Rescue Disk

UNIT – III

Managing Networking - Understanding IPv4 Basics, Understanding IPv6 Basics, Applying run-time Network Configuration, Understanding Network Device Naming, Managing Host Names, Managing Host Name Resolution, Using Common Network Tools

Managing Time - Understanding Linux Time, Managing Linux Time, Understanding the NTP Protocol, Configuring Time Synchronization

Working with Systemd - Understanding Systemd, Managing Systemd Services, Modifying Service Configuration, Understanding Targets, Managing Targets

Process Management - Understanding Linux Processes and Jobs, Managing Interactive Shell Jobs, Monitoring Processes with top, Changing top Display Properties, Monitoring Process Properties with ps, Changing Process Priority, Managing Processes with kill

Managing Software - Installing Software from Source Packages, Understanding Software Packages, Managing Libraries, Understanding Repositories, Managing Packages with yum, Managing Packages with apt, Using rpm

Scheduling Tasks - Understanding Linux Task Scheduling, Scheduling Tasks with cron, Using systemd Timers, Using at to Schedule Tasks

Reading Log Files - Understanding Linux Logging, Working with journalctl, Understanding Rsyslog

UNIT – IV

An Introduction to Bash Shell Scripting - Understanding Bash Shell Scripts, Essential Shell Script Components, Using Loops in Shell Scripts

Managing Local Security - Using ulimit to Configure Resource Limitations, Configuring PAM, Working with /etc/securetty, Managing Secure Mount Options

Configuring a Firewall - Understanding Linux Firewalling, Configuring a Firewall with firewalld, Configuring a Firewall with ufw, Understanding iptables Basics, Configuring a Firewall with iptables

Managing SELinux and AppArmor - Understanding the Need for Mandatory Access Control, SELinux versus AppArmor, Configuring AppArmor, Troubleshooting AppArmor, Configuring SELinux Mode, Working with SELinux Labels, Managing SELinux Booleans, Troubleshooting SELinux

Managing SSH Services - Configuring the SSH Service, Using SSH Public/Private Keys, Using scp to Copy Files, Managing File Synchronization with rsync, SSH Port Forwarding

Managing Web Services - Configuring a Web Service, Managing Web Service Log Files, Configuring Virtual Hosts, Restricting Access to a Web Page

Configuring FTP Services - Understanding FTP Solutions, Configuring a Basic FTP Server, Working with sftp

UNIT - V

Configuring a Basic DNS Server - Understanding DNS, Configuring BIND, Configuring a Caching DNS Server

Providing NFS and CIFS File Shares - Understanding Linux File Sharing Solutions, Configuring a Basic NFS Server, Persistently Mounting NFS Shares, Configuring a Basic Samba Server, Mounting Samba Shares,

Configuring a Database Server - Understanding Linux Database Solutions, Installing MariaDB, Creating a Simple Database

Configuring Basic Email Handling - Understanding Email Handling, Configuring a Basic Postfix Server, Configuring Dovecot as an IMAP Server

Configuring a Web Proxy - Understanding Web Proxies, Configuring a Basic Squid Proxy, Restricting Access to the Squid Proxy

Working with Virtual Machines - Understanding Linux Virtualization Solutions, Creating a KVM Virtual Machines, Managing KVM Virtual Machines

LINUX SERVER ADMIN PRACTICAL LAB

UNIT -I

Lab: Installing Linux

Lab: Using Essential Tools,

Lab: Working with the Bash Shell

Lab: Using Essential File Management Tools

Lab: Working with Text Files

Lab: Connecting to a Server

UNIT -II

Lab: Managing Users

Lab: Managing Permissions

Lab: Managing Partitions
Lab: Managing File Systems
Lab: Managing the Boot Procedure

UNIT -III

Lab: Managing Networking
Lab: Managing Time
Lab: Working with Systemd
Lab: Managing Processes
Lab: Managing Software
Lab: Scheduling Tasks
Lab: Working with Logging

UNIT -IV

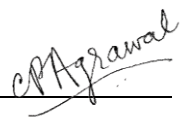
Lab: Writing Shell Scripts
Lab: Managing Security
Lab: Configuring a Firewall
Lab: Managing Mandatory Access Control
Lab: Configuring SSH
Lab: Managing Web Services
Lab: Configuring FTP Services

UNIT - V

Lab: Configuring DNS
Lab: Managing Remote File Shares
Lab: Configuring a Database Server
Lab: Configuring Email
Lab: Configuring a Proxy
Lab: Managing KVM Virtual Machines

TEXT & REFERENCE BOOKS

- Christopher Negus Fedora and Red Hat Enterprise Linux Bibile, Wiley India Ltd.
- Christopher Negus, Linux Bible, Wiley India Ltd
- Linux Administration, Kogent Learning Solutions Inc., ISBN 13- 9789350044209, ISBN 10-935004420x, Wiley India
- Linux Administration A Beginner's Guide, Sixth Edition, Wale Soyinka, MC Graw Hill
- Linux: Powerful Server Administration by Jonathan Hobson, Oliver Pelz, and Uday R. Sawant, Packt Publishing
- Forouzan-Unix & Shell Programming, Cengage Publications



1MCASEC(B) - PROGRAMMING WITH C++

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	0	2	3	0	10	40	50

COURSE OBJECTIVES

- To Implement Object Oriented Programming.
- To Learn the Syntax and Semantics of the C++ Programming Language.
- To Learn how to Implement Copy Constructors and Class Member Functions.
- To Learn how to Overload Functions and Operators in C++.
- To Learn how Containment and Inheritance Promote Code Reuse in C++.
- To Learn how to Use Exception Handling in C++ Programs.

COURSE OUTCOMES

- Explain Concepts and Advantages of Object Oriented Programming.
- Apply and implement the concepts of the Object-Oriented paradigms to analyze, design and developthe solutions of real world problems using the Principles of information Hiding, Localization and Modularity.
- Design, Development and maintain the small applications, system utility for societal and academic problems using reusability concepts in team spirit.
- Demonstrate the Advanced Features of C++ Specifically Stream I/O, Templates and Operator Overloading and overriding.

UNIT-WISE SYLLABUS

UNIT-I

Overview of C++: Object Oriented Programming, Concepts, Advantages, Usage, Program Development Environment, C++ Language Standards, Introduction to Various C++ Compilers, C++ Standard Libraries, Main Function in C++, Meaning of Empty Argument List, Function Prototyping, Default Arguments and Argument Matching, User Defined Data Types, Classes & Objects : Structure, Union & Classes, Inline Function, Scope Resolution Operator, Static Class Members: Static Data Member, Static Member Function, Passing Objects to Function, Returning Objects, Object Assignment, Friend Function, Friend Classes.

UNIT-II

Array, Pointers References & the Dynamic Allocation Operators: Array of Objects, Pointers to Object, Type Checking C++ Pointers, This Pointer, Pointer to Derived Types, Pointer to Class Members, References: Reference Parameter, Call by Reference and Return by Reference Passing References to Objects, Returning Reference, Independent Reference, C++Dynamic Allocation Operators, Initializing Allocated Memory, Allocating Array, Allocating Objects.

Constructor & Destructor: Introduction, Constructor, Access Specifiers for Constructors, and Instantiation, Parameterized Constructor, Multiple Constructor in a Class, Constructor with Default Argument, Copy Constructor, Destructor.

UNIT- III

Overloading as Polymorphism, Function & Operator Overloading, Function Overloading, Overloading Constructor Function Finding the Address of an Overloaded Function, Operator Overloading: Creating a Member Operator Function, Creating Prefix & Postfix Forms of the Increment & Decrement Operation, Overloading the Shorthand Operation (I.E. +=, -= etc.), Operator Overloading Restrictions, Operator Overloading Using Friend Function, Overloading New & Delete, Overloading Some Special Operators, Overloading [ ], ( ), -, Comma Operator, Overloading << and >>, Namespaces: Global Namespace and Namespace Standard, Nested Namespaces.

UNIT- IV

Inheritance: Base Class Access Control, Protected Base Class Inheritance, Single, Multiple & Multilevel Inheritance, Inheriting Multiple Base Classes, Constructors, Destructors & Inheritance, When Constructor & Destructor Function are Executed, Passing Parameters to Base Class Constructors, Granting Access, Virtual Base Classes, Virtual Functions & Polymorphism: Virtual Function, Pure Virtual Functions, Early Vs. Late Binding.

Exception Handling: try, throw, catch Sequence, Multiple Catch Blocks, Uncaught Exceptions, Catch-All Exception Handler, Catching Multiple Exceptions, Controlling uncaught Exceptions.

File Handling in C++: C++ I/O System Basics: C++ Streams, the Basic Stream Classes C++ Predefined Streams, File operations in C++, Sequential & Random-Access file operations in C++

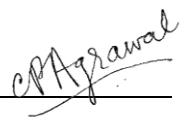
UNIT- V

Formatted I/O: Formatting Using the IOS Members, Setting the Formal Flags, Clearing Format Flags, an Overloaded Form of Setf(), Using Width() Precision() and Fill(), Using Manipulators to Format I/O, Creating Your Own Manipulators.

Class templates: Implementing a Class Template, Implementing Class Template Member functions, Using a Class Template, Function Templates, Implementing Function Templates, Using Template Functions, Template Instantiation, Class Template Specialization, Template Class Partial Specialization, Template Function Specialization, Template Parameters, Static Members and Variables, Templates and Friends, Templates and Multiple-file Projects, Overview of Standard Template Library (STL)

TEXT &REFERENCE BOOKS

- Herbertz Shield, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7
- Ashok Kamthane , Object-Oriented Programming with ANSI and Turbo C++, Pearson India, ISBN: 9788131791448/9788131703830, 8131703835
- R. Subburaj, 'Object Oriented Programming WithC++Vikas Publishing House, New Delhi.ISBN 81-259-1450-1
- E. Balgurusamy, "C++ '' TMH Publication ISBN O-07-462038-X
- M. Kumar 'Programming In C++'' TMH Publications
- R. Lafore, 'Object Oriented Programming C++"
- Ashok. N. Kamthane, "Object Oriented Programming WithANSI& Turbo C++", Pearson Education Publication, ISBN-8j-7808-772-3



LIST OF PRACTICAL

1. Basic Programming
   - Write a Program That Just Outputs `Hello, World
   - Write a Program to Find Maximum and Minimum of Given 3 Numbers.
   - Write a Program That Output Value as Number and as Character.
   - Implementation of the Function That Calculates the Cross Sum of an Integer.(123 as 1+2+3).
   - Determine Number of Characters in a String.
2. Function and Array
   - Raising a Number N to a Power P is the Same as Multiplying N by Itself P Times. Write a Function Called Power ( ) That Takes a Double Value for N and an INT Value for P, and Returns the Result as Double Value. use a Default Argument of 2 for P, So That If This Argument is Omitted, the Number Will Be Squared. Write a Main ( ) Function That Gets Values from the User to Test This Function.
   - Write a C++ Program to Sort an Array of Integer in Ascending Order Using a Function Called Exchange( ) Which Accepts Two Integer Arguments by Reference.
3. Write a C++ Program to Implement Function Overloading in Order to Compute.
4. Write a C++ Program to Implement Power(M, N) Where
5. I) M is Double and N is Int II) M and N are Int.
6. Write a Program That Uses a Structure Called Point to Model a Point. Define Three Points, and Have the User Input Values to Two of Them. Then Set the Third Point Equal to the Sum of the Other Two, and Display the Value of the New Point. Interaction with the Program Might Look Like This:

   Enter Coordinates for P1: 3 4
   Enter Coordinates for P2: 5 7
   Coordinates of P1 + P2 are: 8, 11
7. Create the Equivalent of a Four Function Calculator. Program Should Request the User to Enter a Number, an Operator, and Another Number. It Should Then Carry Out the Specified Arithmetical Operation: Adding, Subtracting, Multiplying, Or Dividing the Two Numbers. (It Should use a Switch Statement to Select the Operation). Finally It Should Display the Result. When It Finishes the Calculation, the Program Should Ask If the User Wants to Do Another Calculation. Response Can Be Y Or N. Some Sample Interaction with the Program Might Look Like This.

   Enter First Number, Operator, Second Number: 10/ 3
   Answer = 3.333333
   Do Another (Y/ N)? Y
   Enter First Number, Operator, Second Number 12 + 100
   Answer = 112
   Do Another (Y/ N) ? N
8. Create a 'Distance' Class with :
   - Feet and Inches as Data Members
   - Member Function to Input Distance

- Member Function to Output Distance
- Member Function to Add Two Distance Objects
- Write a Main Function to Create Objects of Distance Class. Input Two Distances and Output the Sum.

9. Create a Class Called 'Time' That Has
   - Three Integer Data Members for Hours, Minutes and Seconds
   - Constructor to Initialize the Object to Zero
   - Constructor to Initialize the Object to Some Constant Value
   - Member Function to Add Two Time Objects
   - Member Function to Display Time in Hh:Mm:Ss Format
   - Write a Main Function to Create Two Time Objects, Add Them and Display the Result in Hh:Mm:Ss Format.
10. Create a Class Called 'Employee' That Has
    - Empcode and Empname as Data Members
    - Member Function Getdata( ) to Input Data
    - Member Function Display( ) to Output Data
    - Write a Main Function to Create Emp, an Array of Employee Objects. Accept and
    - Display the Details of At Least 6 Employees.
11. Create a Class Rational Which Represents a Numerical Value by Two Double Values-Numerator& Denominator. Include the Following Public Member Functions: Constructor with No Arguments (Default). Constructor with Two Arguments.
    - Void Reduce( ) That Reduces the Rational Number by Eliminating the Highest Common Factor Between the Numerator and Denominator.
    - Overload + Operator to Add Two Rational Number.
    - Overload >> Operator to Enable Input Through Cin.
    - Overload << Operator to Enable Output Through Cout.
    - Write a Main ( ) to Test All the Functions in the Class.
12. Create a Class 'Complex' to Hold a Complex Number. Write a Friend Function Toadd Two Complex Numbers. Write a Main Function to Add Two Complex Objects.
13. Create a 'Matrix' Class of Size M X N. Overload the '+' Operator to Add Twomatrix Objects. Write a Main Function to Implement It.
14. Create a 'String' Class Which Overloads ' = = ' Operator to Compare Two Stringobjects.
15. Create a Base Class Called 'Shape' Having
    - Two Data Members of Type Double.
    - Member Function *Get-Data*( ) to Initialize Base Class Data Members.
    - Pure Virtual Member Function *Display-Area*( ) to Compute and Display the Area ofthe Geometrical Object.
    - Derive Two Specific Classes 'Triangle' and 'Rectangle' from the Base Class.
    - Using These Three Classes Design a Program That Will Accept Dimension of a Triangle/Rectangle Interactively and Display the Area.
16. Consider the Following Class Definition

    Class Father {

Protected :Int Age;

Public;

Father (Int X) {Age = X;}

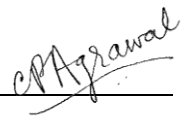
Virtual Void Iam( )

{ Cout<< I Am the Father, My Age is : << Age<< End1:}

};

- Derive the Two Classes Son and Daughter from the Above Class and for Each, Define Iam( ) to Write Our Similar But Appropriate Messages. You Should Also Define Suitable Constructors for These Classes.
- Now, Write a Main ( ) That Creates Objects of the Three Classes and Then Calls Iam ( ) for Them. Declare Pointer to Father. Successively, Assign Addresses of Objects of the Two Derived Classes to This Pointer and in Each Case, Call Iam( ) Through the Pointer to Demonstrate Polymorphism in Action.

17. Write a C++ Program That Displays the Size (in Bytes) of a Given File. the Name ofthe File is Specified as Command Line Argument.
18. Design Your own Manipulator to Provide the Following Output Specification Forprinting Money Value:
    a) 10 Columns Width
    b) The Character '$' At the Beginning
    c) Two Digits Precision
    d) Filling of Unused Spaces with ' * '
    e) Trailing Zeros Shown
19. Write a program in C++ to Create a Function Template
20. Write a program in C++ to Create a Class Template



1MCASEC(C) - PROFESSIONAL COMMUNICATION SKILLS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	1	0	3	40	10	0	50

COURSE OBJECTIVES:

- Improve Verbal and Non-Verbal Communication Style
- Enhance Interpersonal Skills.
- Communicate Clearly and With Impact
- Develop Oral and Written Language Skills
- Develop Reading, Listening, Speaking Skills,

COURSE OUTCOME:

- Explain and use Basic Concept of Communication.
- Demonstratethe Phonetic Capability in Communication.
- Indulge the Soft and Ethical Skills in Their Personality
- Participate inGroup Discussion, Mock Interview, Group Presentation etc.
- Explain and use Leadership Skills, Time Management Skills, Public Speaking Skills, and Situation Handling Skills to Solve the Societal Problem.

UNIT -WISE SYLLABUS

UNIT - I

Elements of Communication : the Importance and Scope of Communication Through English at the Present Time, the Process and Factors of Communication : Sender, Receiver, Channel, Code, Topic, Message, Context, Feedback, 'Noise', Filters and Barriers. Purpose of Communication, Verbal and Non Verbal Communication.

UNIT - II

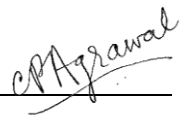
Sounds of English: Vowels, Diphthongs, Consonants, Consonant Clusters, the International Phonetic Alphabet (IPA) ; Phonemic Transcription, Problem Sounds, Stress and Intonation

UNIT - III

Developing Reading and Writing Skills: the Importance of Developing Reading and Skills, Benefits of Effective Reading, the Importance of Writing Skills, the Differences Between Speech and Writing, the Qualities of Effective Writing : Art of Condensation, Writing Effective Sentences, Developing Logical Paragraphs, Précis, Essay, Drafting, Editing.

UNIT - IV

Soft Skills Practice and Ethical Skills:Personality Development, Participating in Group Discussion and Job Interviews, Time Management Presentation Skills, Leadership Skills, Public Speaking, Extempore, Expressing Oneself in Various Situations, the Illusion of Communications, DangerofHalf Baked Ideas, The Art of Explanation.

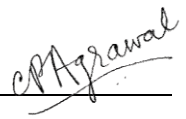


UNIT - V

Self Presentation:Dress Code, Business Card, Handshake, Telephone Etiquette, Email Etiquette, Dining Etiquette, office Etiquette, International Business Etiquette, Approaches to Professional Writing, Writing a C. V, Resume, Applications, Reports, Business and Social Letters, Notices, Circulars and Memos.

REFERENCE BOOKS

- Practical English Usage, Michael Swan, Oxford
- English for Effective Communication, Sanjay Kumarand Pushplata, Oxford
- B. K. Das et al-An Introduction to Professional English and Soft Skills -Cambridge University Press.
- Bovee et al Business Communication Today - (Pearson)
- Meenakshi Raman and Prakash Singh-Business Communication - -(Oxford)
- Brian Clegg - Crash Course in Personal Development - Kogan Page
- Adele B. LynnActivities for Developing Emotional Intelligence -(HRD Press)
- Edward De Bono -Lateral Thinking -Penguin



1MCAOE(A) - MANAGEMENT INFORMATION SYSTEMS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	3	0	0	3	40	10	0	50

COURSE OBJECTIVES

- To understand the process of Management roles, activities, planning and control
- To understand MIS feasibility study
- To explore approaches, techniques and methodologies to MIS development
- To understand Project management methodologies
- To understand the types of Files, Data Bases and Information Processing Control
- Understand the input /output form design

COURSE OUTCOMES

- Able to define Management activities, roles and levels
- Able to apply feasibility study to design any MIS software.
- Understand and define the relationships of MIS with other enterprise applications
- Explore Decision Making Process.
- Apply from design techniques in software user interface design
- Able to understand MIS projects and methodologies.

UNIT-WISE SYLLABUS

UNITI

Management activities, roles and levels, Management Planning and Control: how planning and control systems interrelate, Strategic Planning within an organization, activities, techniques andResults, The nature of decision-making: decision-making models and, classification of decision-making situations, The nature of information, classifications and characteristics. The nature of information and decision-making at different management levels, and the MIS subtypes typically implemented at each level ofmanagement to support these information/decision-making Requirements, Management as the direct user of an MIS vs. Intermediary use, Measurement of MIS performance and capabilities.

UNIT II

Logical Data Concepts, Types of Files, Databases, Serial Access andDirect Access devices. Sequential, Hashed and indexed File Organization – Data Base Organization – single flat File – Hierarchical, Network, Relational DB Structures. Transaction Processing – Control and Retrieval. Word and Text Processing. Document Filing Computer Graphics, Composition andReproduction, Document Distribution, Facsimile Transmission, Message Systems, InformationProcessing Control- Availability Controls.The relationships of MIS to other enterprise applications, such as Transaction Processing Systems (TPS) and Enterprise Resource Planning (ERP) systems Human Resources, Marketing &Sales, Production, Accounting & Finance, CustomerRelationships Management (CRM), Product Supply Chain

Management systems, The Internet and MIS provisions: Internet and the linkages to legacy MIS, security issues.

UNIT III

MIS feasibility study, Assessment of economic, Cost-Benefit Analysis Overall approaches to MIS development: Techniques and methodologies for supporting MIS development: Data warehouse/BI systems development methodologies and techniquesFact finding techniques (e.g. SQIRO) Database design techniques, Decision Making Process – Problem Formulation, programmed vs Non Programmed Decision, Criteria for Decision Making, Classical Economical Model, Administrative Model, Resolution of Conflict Uncertainty Avoidance, Problematic Search, Incremental Decision Making, Pay off Matrices, Decision Trees, Games Theory, Statistical Inference documenting and Communicating Decision rules, Support for Decision making phases.

UNIT IV

Management Reporting Systems (MRS), Decision Support Systems (DSS), Group Decision Support Systems (GDSS), Knowledge Based Systems that support management such as Expert Systems (ES) and Neural Network (NN) systems, The application of On-Line Analytical Processing (OLAP)/Data, mining/Business Intelligence (BI) tools in supporting management, decision making. Data warehouses and data mining facilities: the relationship between data warehousing and other MIS facilities.

System Design: System design consideration, input/output design, forms design, file organization and database, data management, file design, program design, control and security.

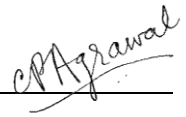
UNIT V

Managing MIS projects:Project management methodologiesOO methodologies, Value Analysis, The use of CASE tools to aid MIS development, The suitability of packages vs. bespoke systems development, End-user development of MIS and its implications, Outsourcing vs. insourcing of MIS development and/or operational activities, Developments in hardware, software, Internet and communications capabilities and their implication for MIS, Trends in management and organisations, for example the possible movement towards flexible, virtual organisations and the role of MIS may have in this scenario MIS and mobile computing, MIS and social media

TEXT &REFERENCE BOOKS

- Gordon B. Davis And MaggretheH.Olson, Management Information Systems, McGraw Hill
- International Edition.
- RoberG.Mudrick, Joel E. Ross And James R.ClAGGET, Information Systems For Modern Management, Prentice Hall Of India (P) Ltd., Eastern Economy Edition.
- Jerome Kanter Management Information Systems, Prentice Hall of India Ltd.
- Kenneth C. Laudon& Jane P. Laudon, Essentials ofManagement Information Systems, Tenth Edition, Pearson Prentice-Hall.
- Terry Lucey, Management Information Systems, Ninth Edition, Thompson
- McNurlin, Sprague & Bui, Information Systems Management in Practice, Prentice Hall.
- Efraim Turban, Jay Aronson & Tin-Peng Liang, Decision Support Systems and Intelligent Systems, Ninth International Edition, Pearson Prentice- Hall.

Dr. C.P.Agrawal



1MCAOE(B) - ADVANCED EXCEL

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	0	2	3	40	10	0	50

COURSE OBJECTIVES

- To use of various Excel functions.
- To create pivot tables and charts.
- To validate and consolidate data.
- To protecting worksheets and workbooks.
- To Create, use, Edit, and Manage macros.
- To Import and export data.

COURSE OUTCOMES

- Explain and Apply Functions, Formulas, Chart, Macro, Filtering and Sorting of Data in Excel.
- Protect data and carryout data analysis in Excel
- Create Summaries and Linkage in Excel
- Explain and Apply Data Consolidation Feature to Combine Data from Several Workbooks into one
- Apply Goal Seek Analysis for EfficientDecision Making

UNIT-WISE SYLLABUS

UNIT-I

Using Excel Shortcuts with Full List of Excel Shortcuts, Copy, Cut, Paste, Hide, Unhide, Delete and Link the Data in Rows, Columns and Sheets, Using Paste Special Options, Formatting Cells, Rows, Columns and Sheets, Protecting & Un protecting Cells, Rows, Columns and Sheets with or without, Password, Page Layout, Themes, Background and Printer Properties, Inserting Pictures, Hyperlinks, Header/Footers, Shapes and Other Objects in Worksheets

UNIT-II

Lookup and Reference Functions: VLOOKUP, HLOOKUP, INDEX, ADDRESS, MATCH, OFFSET, TRANSPOSE etc., Logical Function: IF/ELSE, AND, OR, NOT, TRUE, NESTED IF/ELSE etc., Date and Time Functions: DATE, DATEVALUE, DAY, DAY360, SECOND, MINUTES, HOURS, NOW, TODAY, MONTH, YEAR, YEARFRAC, TIME, WEEKDAY, WORKDAY etc., Information Functions: CELL, ERROR.TYPE, INFO, ISBLANK, ISERR, ISERROR, ISEVEN, ISLOGICAL, ISNA, ISNONTEXT, ISNUMBER, ISREF, ISTEXT, TYPE etc.

UNIT-III

Math and Trigonometry Functions: RAND, ROUND, CEILING, FLOOR, INT, LCM, MOD, EVEN, SUMIF, SUMIFS etc. Statistical Functions: AVEDEV, AVERAGE, AVERAGEA, AVERAGEIF, COUNT, COUNTA, COUNTBLANK, COUNTIF, FORECAST, MAX, MAXA, MIN, MINA, STDEVA

etc Text Functions: LEFT, RIGHT, TEXT, TRIM, MID, LOWER, UPPER, PROPER, REPLACE, REPT, FIND, SEARCH, SUBSTITUTE, TRIM, TRUNC, CONVERT, CONCATENATE, DOLLAR etc.

UNIT-IV

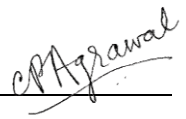
Using Conditional Formatting, Using Conditional Formatting with Multiple Cell Rules, Using Color Scales and Icon Sets in Conditional Formatting, Creating New Rules and Managing Existing Rules, Data Sorting and Filtering, Sorting Data by Values, Colors, etc. Using Filters to Sort Data, Advance Filtering Options, Database Functions: DGET, DMAX, DMIN, DPRODUCT, DSTDEV, DSTDEVP, DSUM, DVAR, DVARP etc, Financial function PV, FV etc.

UNIT-V

Pivot Tables, Creating Pivot Tables, Using Pivot Table Options, Changing and Updating Data Range, Formatting Pivot Table and Making Dynamic Pivot Tables, Creating Pivot Charts, Types of Pivot Charts and Their Usage Formatting Pivot Charts and Making Dynamic Pivot Charts, VBA Macro, Introduction to VBA Macro, Recording Macro & Understanding Code Behind, Editing

TEXT &REFERENCE BOOKS

- Microsoft Excel 2013 Bible by John Walkenbach, Wiley publication
- Excel 2013 Pivot Table Data Crunching by Bill Jelen, Pearson publication
- Excel Functions and Formulas by Bernd Held, BPB publication



Dr. C.P.Agrawal

1MCAOE(C) - MULTIMEDIA SYSTEMS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	0	2	3	40	10	0	50

COURSE OBJECTIVES

- To provide students with a basic understanding of multimedia systems and its components.
- To understand multimediainformation representation and multimedia standards in the components of multimedia – Text, audio, image, video and animation.
- To gain knowledge about the standards tools and techniques used in development of multimedia components for productions
- To create simple multimedia applications and products for using standalone, networked or web based computers.

COURSE OUTCOMES

- Define multimedia and its components
- Acquire skill to create various multimedia components
- Create simple multimedia product that include all components
- Use standards software tools to develop multimedia components and integrate all components as per the requirement

UNIT-WISE SYLLABUS

UNIT-I

Introduction to Multimedia, Identifying Multimedia Elements Text, Images, Sound, Video and Animation, Multimedia Applications in Education, Entertainment. Advertising world & Media industry etc.

Text - Concepts of Plain & Formatted Text, RTF & HTML Texts, Using Common Text Preparation Tools, Conversion to and from of Various Text Formats, Using Standard Software, Object Linking and Embedding Concept, Fonts – Various types and uses.

UNIT-II

Sound - Sound and its Attributes, Sound and its Effects in Multimedia, Representation of Analog Signals, A/D: Sampling and quantization, Frequency, Sound Depth, Channels and its Effects on Quality and Storage, Size Estimation of Space of a Sound File, Sound Card Standard – FM Synthesis Cards, Introduction to MP3, WMA, WAV, MIDI etc. Audio file formats, 3D Sounds, Recording and Editing Sound Using Sound Editors like Audacity, Sound Forge etc.

Graphics- Importance of Images/graphics in Multimedia, Vector and Raster Graphics, Regular Graphics Vs. Interlaced Graphics, Image Capturing Methods - Scanner, Digital Camera etc. Color Models-RGB, CYMK, HUE, Saturation, and Brightness, Various Attributes of Images Size, Color, Depth etc, Various Image File Format BMP, TIFF, GIF, PNG and JPEG Format Their Features and Limitations, Image Format Conversion, Various Effects on Images. Create Images Using Photoshop, CorelDrawor other Open Source software, Apply Various Effects, Using Layers, Channels and Masks in Images.

Dr. C.P.Agrawal

UNIT-III

Video- frame rate and resolution, interlaced and non-interlaced video, colour planes (YCBCR, YUV), Video broadcast standards (PAL, NTSC, SECAM), HD Video, 3D TV, Video representation: AVI, MPEG, Quick Time, real video (.rm), Video Editing and Movie Making Tools, Converting Formats of Videos, Recording and Editing Videos Using Video Editing Software Like Adobe Premiere / Sony Vegas or Open Source software.

UNIT-IV

Animation and its Basic – Principals of Animation and its use in Multimedia, Computer System Configuration and Peripherals Requirements, Software for Animation, Effects of Resolution, Pixel Depth, Image Size, on Quality and Storage, Types of Animation and Applications.

Introduction to Compression Technology - Concept of lossy and lossless compression, Concept of rate-distortion characteristics, Basics image compression (JPEG, JPEG 2000), Basics of Audio compression (MP3, MP4), Basics of Video Compression (MPEG, H.264)

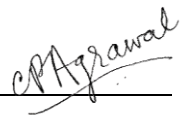
UNIT-V

Multimedia Application Design - Content design, technical design, visual design, design metaphors, example studies, interactivity.

Authoring Tools for Multimedia – Introduction to Various Types of Multimedia Authoring systems, uses of an authoring system, Definition and function of Authoring Metaphor, Different Metaphors, CD/DVD Based and Web Based Tools, Features and Limitations, Creating Multimedia Package using All Components.

TEXT &REFERENCE BOOKS

- Tay Vaughan-Multimedia: Making It Work, Tata Mc-Graw Hill.
- Ramesh Bangia-Introduction to Multimedia- Laxmi Publications Pvt. Ltd.
- Satish Jain, Shashi Singh, Introduction To Multimedia - Based On Nielit O Level Syllabus For Mat-O2.R0 1st Edition, , BPB Publications, ISBN: 9788183335355, 8183335357



BRIDGE COURSE
DETAILED SYLLABUS

- **For Those Students Who Have Passed Their Graduation Exam Without Computer Subjects Specialization.**
- **This Course Of 100 Marks (80 Theory + 20 Internal) Must Be Passed With MCA First Semester Examination.**

UNIT – I

- Brief history of development of computers
- Computer system concepts
- Computer system characteristics
- Capabilities and limitations
- Types of computers Generations of computers
- Basic components of a computer system - Control unit, ALU, Input / Output functions and characteristics
- Memory - RAM, ROM, EPROM, PROM and other types of memory
- Personal Computer (PCs) – evolution of PCs
- Configurations of PCs- Pentium and Newer, PCs specifications and main characteristics.
- Various Input / Output & Storage Units
- Storage fundamentals - Primary V/s Secondary Data Storage
- Data Retrieval methods - Sequential, Direct and Index Sequential

UNIT – II

- Software and its Need
- Types of Software - System software, Application software, System Software - Operating System, Utility Program,
- Programming languages - Machine, Assembly, High Level, 4GL, their merits and demerits
- Assemblers, Compilers and Interpreter, Single Pass & Multiple Pass Compiler
- Introduction to Operating System for PCs - DOS Windows, Linux, Macintosh
- Operating systems for mobile Devices - Symbian, Android, iMac etc.
- Application Software and its types - Word-processing, Spreadsheet, Presentation Graphics, Database Management Software - characteristics, Uses, examples and area of applications

UNIT-III

- Algorithms Need, & Development Process, Flow Chart, Types of Flow Chart.
- Programming Methodologies - Procedural Programming, Object-oriented Programming, Functional Programming, Logical Programming
- Top-down & Bottom-up approaches of software development
- Keywords, Constant & Variables
- Data Types - Integer, Float, Single, Double etc., Type Conversion
- Scope of variables - Local & Global,
- Expression

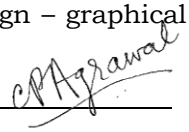
- Operators - Arithmetic, Logical, Relational, Conditional and Bit Wise Operators, Precedence and Associativity of Operators.
- Array - Single & Multi-dimension,
- Types of Statements - Iteration, Branching, Looping, Conditional. Examples & Uses,
- Functions - Library & User defined,

UNIT- IV

- Introduction to Databases, Flat File Vs Database, Significance of Databases
- Types of Database Models - Hierarchical Data Model, Network Data Model, The Relational Data Model, Advantages and Disadvantages of different Database Management systems, Comparison between DBMS, RDBMS,
- Conceptual Design, Mapping Relational Mode
- Distributed and Centralized DB
- Database System Applications,
- Business Requirements Databases and Data Modeling
- Conceptual and Physical Data Models
- Entities and Attributes - Unique Identifiers
- Relationships
- Entity Relationship Modeling (ERDs)
- Relational Databases- Integrity Constraints, Functional Dependency, Multi-valued Dependency
- Convert a Logical Model to a Relational Model Mapping to the Physical Model
- Mapping Entities and Attributes
- Primary, Secondary and Foreign Keys and their mapping
- Normalization of databases
- Data Definition Language (DDL)
- Data Manipulation Language (DML)

UNIT-V

- Data and Information – Types of information, requirements of information at different levels of management, qualities of information.
- Software Development Life Cycle (SDLC) - Defining the Problem, Designing, Coding, Testing and Debugging, Documenting, Deploying and Maintaining.
- Requirements determination – requirements specifications – feasibility analysis – final specifications – hardware and software study –system design – system implementation – system evaluation – system modification. Role of systems analyst – attributes of a systems analyst – tools used in system analysis.
- Information gathering – strategies – methods – case study – documenting study – system requirements specification.
- tools for prototype creation, data flow diagrams - leveling of DFDs – leveling rules – logical and physical DFDs – software tools to create DFDs.
- Data input methods – coding techniques – requirements of coding schemes – error detection of codes – validating input data – input data controls interactive data input.
- Designing outputs – output devices – designing output reports – screen design – graphical user interfaces – interactive I/O on terminals.



SEMESTER – II
2MCACCC2 - DATA MINING AND BUSINESS INTELLIGENCE

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CC	4	1	0	5	80	20	0	100

COURSE OBJECTIVES

- Introduce the Basic Concepts of Data Base, Data Warehouse and Data Mining
- Understand the Concept of Knowledge Discovery
- Understand the process of deriving Information from data with Different Perspectives
- Understand and apply Preprocessing Methods on Raw Data
- Discover Interesting and Useful Patterns and associations, Analyze Supervised and Unsupervised Models
- UnderstandBusiness Intelligence Life Cycle andTechniques Used in It

COURSE OUTCOMES

- Demonstrate an Understanding and knowledge of theData Warehousing, Data Mining and Business Intelligence
- Explain the Data Analysis and Knowledge Delivery Stages.
- Organize and Prepare the Data Needed for Data Mining Using Pre Preprocessing Techniques
- Implement the Appropriate Data Mining Methods Like Association, Classification, Clustering
- Apply Data Mining Methods to Solve Practical Problems.(Analyze the Problem Domain, Data Collection, Preprocessing, Apply Suitable Data Mining Method, Interpret and Visualize the Results and Provide Decision Support.)

UNIT-WISE SYLLABUS

UNIT-I

Data Ware Housing Definition, Usage and Trends, DBMS Vs. Data Warehouse, Data Marts, Metadata, Data Mining Definition & Application, DBMS Vs. Data Mining, KDD Versus Data Mining, Data Mining Techniques, Business Intelligence Introduction, Cycle of a Business Intelligence AnalysisData Preprocessing: Need, Data Cleaning, Integration & Transformation

UNIT-II

Data Warehouse Process & Architecture, OLAP and OLTP Definitions, Difference Between OLAP and OLTP, Dimensional Analysis, Multidimensional Data Mode, Data Cubes, Drill-Down and Roll-Up – Slice and Dice or Rotation, Operations, Types of OLAP, ROLAP Vs. MOLAP, Schemas for Multidimensional Database: Stars, Snowflakes and Fact Constellations

Relation between BI and DW, the Business Intelligence User Types, Standard Reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, Dimensional Analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards

UNIT-III

Association Rule Mining, Single-Dimensional Boolean Association Rules Apoiri Algorithm, FP Growth, Multi-Level Association Rules from Transaction Databases

UNIT-IV

Classification and Prediction, Concepts of Decision Tree Induction and Bayesian Classification,

Cluster Analysis, Categorization of Methods, Partitioning Methods, K-Means Algorithm, Outlier Analysis, Hierarchical Methods

UNIT-V

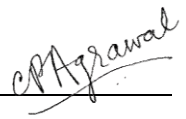
Emerging Technologies - Machine Learning, Big Data: Introduction, Importance, Four Vs

Data Mining for Business Applications Like Fraud Detection, Market Segmentation, Retail Industry, Telecommunications Industry, Banking & Finance and CRMetc.,

Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, Web Mining Concepts.

TEXT &REFERENCE BOOKS

- Jiawei Han, Michelinekamber, "Data Mining Concepts and Techniques", Morgan Kaufmann Publishers
- Arun K Pujari, "Data Mining Concepts and Techniques", University Press
- G.K.Gupta, "Data Mining with Case Studies", PHILtd



2MCACCC2 - WEB TECHNOLOGIES

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CC	2	0	6	5	50	20	30	100

COURSE OBJECTIVES

- Learn to Design and Develop a Web Page
- Design and Develop a Web Site Using Text, Images, Links, Lists, and Tables for Navigation and Layout.
- Style Your Page Using CSS, Internal Style Sheets, and External Style Sheets.
- Learn to use JavaScript & XML in Web Design.
- Learn How to use Database in Web Design.

COURSE OUTCOME

- Describe the Concepts of WWW Including Browser and HTTP Protocol.
- List the Various HTML Tags and usethem to develop the user friendly web Pages.
- Define the CSSwithits Types and usethemtoprovide the Styles to the web pages at Various Levels.
- Develop the Modern Web Pages Using the HTML and CSS Features with Different Layouts as per Need of Applications.
- Use the JavaScript to Develop the Dynamic Web Pages.
- Use Server Side Scripting with PHP to Generate the Web Pages Dynamically Using the Database Connectivity.
- Develop the Modern Web Applications Using the Client and Server Side Technologies and the Web Design Fundamentals.

UNIT-WISE SYLLABUS

UNIT-I

Introduction to Web, Web Designing and Website Planning: Concept of WWW, Internet and WWW, HTTP Protocol: Request and Response, Web Browser and Web Servers, Website Hosting-Free vs. Paid, Linux Vs. Windows Hosting, Concepts &use of Database & Mail Servers Associated with Web Sites, Features of Web 2.0Concepts of Effective Web Design, Web Design Issues Including Browser, Bandwidth and Cache, Display Resolution, Look and Feel of the Website, Page Layout and Linking, User Centric Design, Sitemap, Planning and Publishing Website, Designing Effective Navigation, Website Hosting Issues, FTP.

UNIT-II

Web Development withHTML: Basics of HTML, Formatting and Fonts, Commenting Code, Color, Hyperlink, Lists, Tables, Images, Forms, Meta Tags, Character Entities, Frames and Frame Sets, Browser Architecture and Web Site Structure, use of HTML Code Editor & WYSIWYG Editor.

Cascading Style Sheets (CSS): Style Sheets: Need, Introduction, Basic Syntax and Structure, Using CSS- Background Images, Colors and Properties, Manipulating Texts, Using Fonts,

Borders and Boxes, Margins, Padding Lists, Positioning Using CSS, CSS2, Overview and Features of CSS3

UNIT-III

Technologies for Web Applications JavaScript& XML: JavaScript: Client Side Scripting withJavaScript, Variables, Functions, Conditions, Loops and Repetition, Pop Up Boxes, JavaScript Objects, the Dom and Web Browser Environments, Manipulation Using Dom, Forms and Validations, DHTML: Combining HTML, CSS and JavaScript, Events and Buttons.

XML: Introduction of XML, Validationof XML Documents, Ways to useXML, XML for Data Files, HTML vs.XML, Embedding XMLinto HTML Documents, Converting XML to HTML for Display, Displaying XML Using CSS and XSL, Rewriting HTMLas XML, Relationship Between HTML, SGML and XML, Web Personalization, Semantic Web, Semantic Web Services. Transforming XML Using XSL and XSLT

UNIT-IV

Web Design with PHP: Introduction and Basic Syntax of PHP, Decision and Looping with Examples, PHP and HTML, Arrays, Functions, Browser Control and Detection, String, Form Processing, Files, Cookies and Sessions, Object Oriented Programming with PHP

UNIT-V

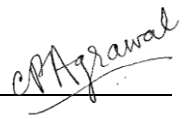
Introduction to Database Driven Websites withPHP, PHP and MYSQL, Basic Commands with PHP Examples, Connection to Server, Creating Database, Selecting a Database, Listing Database, Listing Table Names, Creating a Table, Inserting Data, Altering Tables, Queries, Deleting Database, Deleting Data and Tables

TEXT &REFERENCE BOOKS

- Roger S.Pressman, David Lowe, "Web Engineering", Tata McGraw Hill Publication, 2007
- Achyut S Godbole and AtulKahate, "Web Technologies", Tata McGraw Hill
- Gopalan N P, Akilandeswari "Web Technology: a Developer S Perspective", PHI
- Chris Bates Web Programming: Building Internet Applications Wiley
- Refter, Fawset- Beginning XML, Wiley India
- H.M. Deitel, P.J. Deitel, a.B. Goldberg-Internet & World Wide Web How to Program, Pearson Education, 3rd Edition,
- C. Xavier, "Web Technology &Design", Tata McGraw Hill.
- Ivan Bay Ross, "HTML, DHTML, JavaScript, Perl CGI", BPB.
- Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
- Web Technologies, Black Book, Dreamtech Press
- HTML 5, Black Book, Dreamtech Press
- Joel Sklar-Web Design, , Cengage Learning
- Harwani-Developing Web Applications in PHP and Ajax, Mcgrawhill

LIST OF OPEN SOURCE SOFTWARE/LEARNING WEBSITE

- Browsers Like IE, Mozilla, Firefox Etc.
- Server Software Xampp/Wamp/Lamp

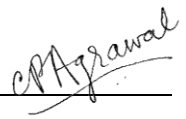


- www.apachefriends.org
- www.w3.org
- www.w3schools.com
- www.php.net
- www.mysql.com
- www.phpmyadmin.net

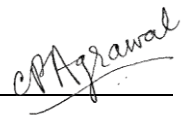
LIST OF PRACTICAL

1. Write an HTML page with Javascript that takes a number from one text field in the range 0-999 and display it in other text field in words.If the number is out of range, it should show "out of range" and if it is not a number, it should show "not a number" message in the result box.
2. Develop static pages (using only HTML) of an online Book store.

   The pages should resemble: www.amazon.com. The website should consist the following pages.
   - Home page
   - Registration and user Login
   - User profile page
   - Books catalog
   - Shopping cart
   - Payment by credit card Order Conformation
3. Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, lines and words in the text entered using an alert message.Words are separated with white space and lines are separated with new line character.
4. Write an HTML page that contains a selection box with a list of 5 countries. In this page when the user selects a country, its capital should be printed next to the list, and add CSS to customize the properties of the font of the capital.
5. Create an XML document that contains 10 users information. Write a script which takes user id as input and returns the user details by taking the user information from XML document.
6. Implement a user validation web application, where user submits the login name and password to server. These are checked against the data already available in database and if the data matches a successful login page is returned otherwise a failure message is shown to the user.
7. A simple calculator web application that takes 2 numbers and an operator (+, -, *, /, %) from an HTML page and returns the result page with the operation performed on the operands.
8. A web application shows a start time at the right top corner of the page and takes a name as inputand provides the logout button at bottom. On clicking logout button it should show a logout page with thank you message with the duration of Usage.



9. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with “hello, and You are not authorized to visit this site” otherwise it should send “You are welcome to this site” message.
10. Write a web application in which the user is first served a login page which takes users name and password.After submitting the details the server checks these values against the data from a database and takes the following decisions if name and password matches, serves a welcome page with user's full name.If name matches and password doesn't match then serves password mismatch page.If name not found in database, serves a registration page where users full name is asked and on submitting the full name, it storesthe login name, password and full name in the database.
11. A web application that lists all cookies stored in thebrowser on clicking “list cookies” button, add cookies if necessary



2MCACCE(A) - DATA STRUCTURES AND ALGORITHMS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	4	0	2	5	80	20	0	100

COURSE OBJECTIVES

- Learn Basic Data Structures such as, Linked Lists, Stacks and Queues, Tree and Graph.
- Learn Algorithm for Solving Problems Like Sorting, Searching, Insertion and Deletion of Data
- Understand the Complexity of Various Algorithms.
- Introduce Various Techniques for Representation of the Data in in Memory.

COURSE OUTCOMES

- Understand and Explain Basic Data Structures Such as, Linked Lists, Stacks and Queues, Tree and Graph.
- Selectand Apply Appropriate Data Structures to define the particular Problem statement.
- Implement Operations Like Searching/Sorting, Insertion, and Deletion, Traversing on Various Data Structures.
- Determine and Analyze the Complexity of GivenAlgorithms

UNIT-WISE SYLLABUS

UNIT-I

Algorithm Analysis and Complexity, Data Structure- Definition, Types of Data Structures Recursion: Definition, Linear and Binary Recursion, Searching Techniques, Linear Search, Binary Search.

UNIT- II

Sorting Techniques: Basic Concepts, Sorting Algorithms: Insertion (Insertion Sort), Selection (Heap Sort), Exchange (Bubble Sort, Quick Sort), Distribution (Radix Sort) and Merging (Merge Sort) Algorithms.

UNIT- III

Stacks and Queues: Stacks: Basic Stack Operations, Representation of a Stack Using Arrays, Stack Applications: Reversing List, Factorial Calculation, Infix to Postfix Transformation, Evaluating Arithmetic Expressions.

Queues: Basic Queue Operations, Representation of a Queue Using Array, Implementation ofQueue Operations Using Stack.Circular Queues, Priority Queues. Applications of Queues-Round Robin Algorithm,

UNIT- IV

Linked Lists: Introduction, Single Linked List, Representation of a Linked List in Memory, Operations on a Single Linked List, Circular Linked List, Double Linked List, Advantages and Disadvantages of Linked List.

UNIT- V

Trees: Terms Related to Tree, Binary Tree, Binary Tree Traversals, Creation of Binary Tree fromIn-order, Pre-order and Post-Order Traversals, Threaded BinaryTrees, Binary Search Tree, BST Operations: Insertion, Deletion.

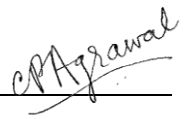
Graphs: Basic Concepts, Representations of Graphs: Using Linked List and Adjacency Matrix, Graph Algorithms.Graph Traversals (BFS & DFS), App1ications: Dijkstra's Shortest Path, Minimum Spanning Tree Using Prim's Algorithm, Warshall's Algorithm

TEXT &REFERENCE BOOKS

- R. S. Salaria- Data Structures and Algorithm-Khanna Publishing
- G. A. V. Pai, Data Structures and Algorithms- TMH
- Debasis, Sarnanta- Classic Data Structures- PHI, 2009
- E.Horowitz, Sartaj Sahni and Susan Anderson, W. H. Freeman -Fundamentals of Data Structures in C
- Schaum's Series- Introduction of Data Structure-Prentice Hall of India

LIST OF PRACTICAL

1. Program to Maintain a Linked List.
2. Program to Add a New Node to the Ascending Order Linked List.
3. Program to Maintain a Doubly Linked List.
4. Program to Implement Stack as an Array.
5. Program to Implement Stack as a Linked List.
6. Program to convert an expression from Infix Form to Postfix Form.
7. Program to Evaluate an Expression Entered in Postfix Form.
8. Program to Implement Non-Recursive Function for Factorial of a Number.
9. Program to Implement Recursive Function for Factorial of a Number.
10. Program to Implement a Queue as an Array.
11. Program to Implement a Queue as a Linked List.
12. Program to Implement a Circular Queue as an Array.
13. Program to Implement a Circular Queue as a Linked List.
14. Program to Implement a Dequeue Using an Array.
15. Program to Implement Linear Search in an Unsorted Array.
16. Program to Implement Binary Search in a Sorted Array.
17. Program to Implement Selection Sort.
18. Program to Implement Insertion Sort.
19. Program to Implement Bubble Sort.



20. Program to Implement Quick Sort.

2MCACCE(B) - COMPUTER NETWORKS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	4	1	0	5	80	20	0	100

COURSE OBJECTIVES

- Build an understanding of the Fundamental Concepts of Computer Networking.
- Familiarize with the Taxonomy and Terminology of the Computer Networking Area.
- Introduce about various Networking Devices.
- Introduce about concept of Routing in networking.
- Preparing the Student for Entry Advanced Courses in Computer Networking.

COURSE OUTCOME

- Demonstrate the Basic Concepts of Networking, Networking Principles, Routing Algorithms, IP Addressing, and Working of Networking Devices.
- Demonstrate the Significance, Purpose, and application of Networking Protocols and Standards.
- Describe, compare, and contrast LAN, WAN, MAN, Intranet, Internet, AM, FM, PM, and Various Switching Techniques.
- Explain the working of Layers and apply the various protocols of the OSI & TCP/IP model.
- Analyze the Requirements for a Given Organizational Structure and Select the Most Appropriate Networking Architecture and Technologies.
- Design the Network Diagram and Solve the Networking Problems of the Organizations with Consideration of Human and Environment.
- Install and Configure Networking Devices.

UNIT-WISE SYLLABUS

UNIT-I

Introduction to Computer Networks, Types of Network - LAN, WAN, MAN, Internet, Network Topologies, Transmission Media, Communication Mode- Simplex, Half Duplex, Full Duplex Analog& Digital Signals, Base Band, Broad Band, Error Detection and Correction, OSI Model:- Functions of Each Layer, Services and Protocols, Inter-Networking Devices, Hub, Repeater, Bridge, Switch, Modem, Routers Gateways.

UNIT- II

Multiplexing Multiplexer FDM, TDM Statistical Multiplexing, Modulation AM, FM, PM, Switching Technique, Message Switching, Circuit Switching, Packet Switching, Virtual Circuit, IEEE Standards, 802.3, 802.4, 802.5. Fast Ethernet, FDDI Token Ring.

UNIT- III

Routing Algorithm:-Shortest Path Routing, Distance Vector Routing, Unicast Routing, Multicast Routing, Link State Routing, Broadcast Routing, Congestion Control, Traffic Shaping. TCP/IP: Introduction, History of TCP/IP, Architecture, Layers of TCP/IP, Comparison Between OSI and TCP/IP Models, Transmission Control Protocol, User Datagram Protocol, Internet Protocol IPAddressing, IP Addressing Classes, Internet Protocols – IP Packet, ARP, RARP, ICMP,

UNIT- IV

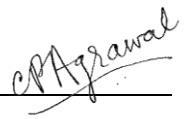
Various Protocol, HTTP, Telnet, FTP, SMTP, Mine, UDP, URL (Uniform Resource Locater), ISDN Channel, ISDN Services, Base Band ISDN, Broadband ISDN, Network Security: Network Security Issues, Firewalls – Need and Features of Firewalls, Types of Firewall Technology-Network Level and Application Level, IP Packets Filter Screening Routers, Limitations of Firewalls.

UNIT- V

Introduction to Wireless Network, Fundamentals of Cellular Systems, Mobile Ad-Hoc and Sensor Networks, Wireless PAN/LAN/MAN, Multi-Path Propagation, Path Loss, Slow Fading, Fast Fading, Frequency Reuse, Cell Splitting, Cell Sectoring.

TEXT &REFERENCE BOOKS

- Andrew S.Tanenbaum -Computer Networks, Pearson Publishers
- Behrouza Forouzan- Data Communications and Networking -Global
- William a Shay - Understanding Data Communications and Networks -Course Technology Inc
- Prakash C. Gupta -Data Communications and Computer Networks, PHI
- William Stallings- Data and Computer Communications, Pearson Education India
- Larry L. Peterson and Bruce S. Davie, -Computer Networks – A Systems Approach,
- Morgan Kaufmann Publishers
- Thomas D. Nadeau & Ken Gray-Software Defined Networks, O'reilly Publishers
- http://nptel.ac.in/video.php?subjectid=106105081



2MCACCE(C) - COMPUTER GRAPHICS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	4	1	0	5	80	20	0	100

COURSE OBJECTIVES

- Introduce Computer Graphics – Software, Hardware, Applications
- Understand the various object Drawing Algorithms
- Learn the Basic Principles of 2 Dimensional, 3-Dimensional Transformations
- Understand the Concepts of Curves and Surfaces
- Understand the Concepts of Viewing and Projection
- Learn and Understand the basic tools used in creation in Multimedia.

COURSE OUTCOMES

- Able to describe the Basic Concepts and terminologies used in Computer Graphics
- Apply and Analyze different Approaches/ Algorithms for Drawing various graphics objects
- Identify and Apply Various Geometrical Transformations Approaches
- Implement Various Algorithms to Polygon Fill.
- Describe the Importance of Viewing and Projections.
- Identify Various Software Systems Used in design, the Creation and Implementation of Multi-Media.

UNIT-WISE SYLLABUS

UNIT-I

Graphics Introduction, Application of Graphics, Elements of Graphics Workstation, Pixel, Frame, Buffer, Resolution, Graphics Display Devices-Raster Scan System, Random Scan System, Refresh CRT, Color CRT, LCD Led Monitorand Plasma Panel, Hard Copy Devices: Printers & Plotters, Input Devices: Mouse, Trackball, Light Pen, Scanner, Digital Camera

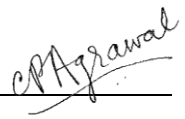
UNIT-II

Drawing Geometry: Point–Plotting, Coordinate System, Point Plotting, Line Drawing–Line Segments, Line Drawing Algorithm: DDA Algorithm, Bresenham's Line Algorithm, Circle Drawing, Ellipse Drawing, Polygon Representation Rectangle, Filling– Filled Area Primitives, Scan Line Polygon Fill Algorithm, Flood Fill Algorithm, Boundary Fill Algorithm

UNIT-III

2D Geometric Transformation: Translation, Rotation, Scaling, Geometric Transformation, Coordinate Transform and Composite Transformation, 2D Viewing Transformation & Clipping: World Coordinate System (WCS), Normalized Device Coordinate System, Point Clipping, Line Segment Clipping, Cohen–SutherlandLine Clipping

UNIT-IV



3D Geometric Transformation 3D Geometric Transformation: Translation, Rotation, Scaling, Composite Transformation, 3D Display Methods – Parallel Projection, Perspective Projection

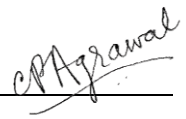
Curve Representation, Bezier and B-Spline Methods

UNIT-V

Multimedia Basics, Multimedia Applications, Multimedia: Text – Font, Faces, Animating Text, Hyper Text. Sound: Midi, Digital Audio Basics, File Formats Image - Bitmap, Vector Drawing, Color Palate, Image File Formats (BMP, JPG), Video – Broadcast Video Standards (NTSC, PAL), Integrating Computer and Television, Compression and Decompression (JPEG, MPEG) Animation: Principle of Animation, Cell Animation, Kinematics, Morphing

TEXT &REFERENCE BOOKS

- D. Hearn & M. Baker, "Computer Graphics", Prentice Hall
- D. F. Rogers, J. A. Adams, "Mathematical Elements for Computer Graphics", TMH
- Multimedia Systems, J.F.K, Buford, ACM Press, (ISBN 0-201-53258-1).
- Tay Vaughan, Multimedia: Making It Work, McGraw HillEducation
- Ranjan Parekh, Principles of Multimedia, McGraw Hill Education



2MCASEC(A) - PROGRAMMING IN PYTHON

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	0	2	3	0	10	40	50

COURSE OBJECTIVES

- To Introduce Python Programming Language and its Features and Applications.
- To Learn Installing Python.
- To Practice Basic Language Features of Python.
- To Implement Oops Concepts Using Python.
- To Work with Files in Python

COURSE OUTCOMES

- Install and use Python on Various Platform.
- Understand and Explain the features of Python language
- Build package and modules in Python with object-oriented concept.
- Design and Develop Python applications for data analysis
- Write programs for Reading and Writing files in Python.

UNIT-WISE SYLLABUS

UNIT-I

Environment Setup of Python Application Area, Interactive Mode and Script Mode Data Types, Mutableand Immutable Variables, Expressions and Statements, Variables and Keywords, Operators and Operands, Expressions and Statements, Taking Input andDisplaying Output.

Functions: Importing Modules, Invoking Built in Functions, Defining Functions, Invoking Functions, Scope, Passing Parameters, Scope of Variables, Returning Values, Recursion, Conditional and Looping Construct,

UNIT- II

Strings: String Operators, Comparing Strings Using Relational Operators; String Functions & Methods, Regular Expressions and Pattern MatchingLists: Concept of Mutable Lists, Creating, Initializing and Accessing the Elements, Traversing, Appending, Updating and Deleting Elements, Composition, Lists as Arguments, List Operations, ListFunctions and Methods, Dictionaries: Concept of Key-Value Pair, Creating, Initializing and Accessing, Traversing, Appending, Updating and Deleting Elements, Dictionary Functions and Methods, Tuples: Immutable Concept, Creating, Initializing and Accessing Elements, Tuple Assignment, Slices, Indexing, Functions.

UNIT- III

Concept of Object Oriented Programming: Data Hiding, Data Encapsulation, Class and Object, Polymorphism, Inheritance, Advantages of Object Oriented Programming over Earlier ProgrammingMethodologies

Classes: Defining Classes, Creating Instance Objects, Accessing Attributes andMethods, Constructor Methods in a Class, Private Attributes (Limited Support), Importance of "Self"(Acts as a Pointer to Current Calling Object) Operator Overloading with Methods

UNIT- IV

Inheritance: Concept of Base Class and Derived Class: Single, Multilevelandmultiple Inheritance-Overriding Methods, Using Super() in Derived Class to Invoke Init() Or Overridden Methods of ParentClassData, File: Need for Non-Bold for Data File, Types of Data File-Text and Binary, Opening and ClosingFiles- Open(), Close(), Access Modes (Output, Input, Default), File Object, Access_Modes, Reading andWriting a File Read(), Readline(), Readlines(), Write(), Writeliness, File Positions (Seek(), Tell()), Renaming and Deleting a File, Flush()

UNIT- V

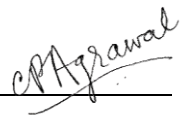
Implementation of Basic File Operations on Text and Binary File in Python: Creating/Writing Data intoFile, Reading and Displaying Data from File, Searching for Particular Data from a File, Insertion andDeletion of Data from an Already Existing File, Modification of Data in FileError and Exceptions: Nameerror, Indexerror, Typeerror, I/O Error, Importerror, Valueerror, Eoferror, Generator Function Using Yield

TEXT &REFERENCE BOOKS

- Mark Lutz Learning Python, 5th Edition O'reilly Publication
- Fabrizio Romano Learning Python - Download Link – Https://Www.Packtpub.Com/ Packt/Free-Ebook/Learning-Python
- Mark Lutz Learning Python (Fourth Edition) –Download Link Http://Freebook.Qiniudn.Com/Learning%20python, %204th%20edition.Pdf
- Https://Docs.Python.Org/3/Tutorial/Index.Html

LIST OF PRACTICAL

1. Program to demonstrate basic data type in python
2. A cashier has currency notes of denominations 10, 50, and 100.If the amount to be withdrawn isinput through the keyboard using input() function in hundreds, find the total number of currency notes of each denomination the cashier will have to give to the withdrawer
3. Program to demonstrate list and tuple in python
4. Write a program in Python, A library charges a fine for every book returned late. For first 5 days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or the appropriate message
5. Write a program to calculate overtime pay of 10 employees. Overtime is paid at the rate ofRs.12.00 per hour for every hour worked above 40 hours. Assume that employee do not work forfractional part of an hour.
6. Two numbers are entered through the keyboard, write a program to find the value of one numberraised to the power of another



7. Write a function that receives marks received by a student in 3 subjects and returns the averageand percentage of these marks. Call this function from main() and print the result in main
8. Write a program to read a file and display its contents
9. Write a program to demonstrate database connectivity in python

2MCASEC(B) - NOSQL DATABASES

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	0	2	3	0	10	40	50

COURSE OBJECTIVES

- To give knowledge about the four types of NoSQL Databases - Document-oriented, KeyValue Pairs, Column-oriented and Graph.
- To understand the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases.
- To describe architecture, define objects, load data, query data and performance tune Document-oriented NoSQL databases.
- To acquire skills to define objects, load data, query data and performance tune Key-Value Pair NoSQL databases.
- To acquire skill to use MongoDB

COURSE OUTCOMES

- Define, compare and use the four types of NoSQL Databases - Document-oriented, KeyValue Pairs, Column-oriented and Graph.
- Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases.
- Explain the detailed architecture, define objects, load data, query data and performance tune Document-oriented NoSQL databases.
- Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Key-Value Pair NoSQL databases.
- Explain the detailed architecture, define objects, load data, query data and performance tune Graph NoSQL databases.
- Perform hands-on NoSql database lab assignments with MongoDB.

UNIT-WISE SYLLABUS

UNIT - I

Review of the Relational Model, ACID Properties, Distributed Databases: Sharding and Replication, Consistency, The CAP Theorem, NoSQL Data Models

Introduction to NoSQL Database, Architecture, Characteristics and Significance, NoSQL database classification – Key value Stores, Column family Stores, Document store, XML Database, Graph Database, Introduction to MongoDB, Installation, Mongo DB Shell.

UNIT -II

Data Types, Data Modeling: Designing the Database, Drilling Down on Collections, Using Documents, Creating the _id Field, Building Indexes, Impacting Performance with Indexes, Working with data: Navigating Your Databases, Inserting Data into Collections, Querying for Data, Using the Dot Notation.

UNIT - III

UsingSort, Limit, and Skip Functions Working with Capped Collections, Retrieving a Single Document, Using the Aggregation Commands, Working with Conditional Operators, Leveraging Regular Expressions, Updating Data, Updating with update(), Updating Information Automatically, Specifying the Position of a Matched Array,

UNIT 4

Atomic Operations, Modifying and Returning a Document Atomically, Renaming a Collection, Removing Data, Referencing Data, Implementing Index-Related Functions, Surveying Index-Related Commands, Forcing a Specified Index to Query Data, Constraining Query Matches.

UNIT 5

Working with GridFS, Getting Started with the Command-Line Tools, Using the _id Key, Working with Filenames, Determining a File's Length, Working with Chunk Sizes, Tracking the Upload Date, Hashing Your Files, Using the search Command, Deleting, Retrieving Files from MongoDB.

TEXT AND REFERENCE BOOKS

- NoSQL For Dummiesby Adam FowlerA Wiely brand
- MongoDB Documentation online available at https://docs.mongodb.com/
- Mongo DB Basics by David Hows, Peter Membrey, EelcoPlugge.: Apress.
- https://www.amazon.com/NoSQL-Distilled-Emerging-Polyglot-Persistence/dp/0321826620 (Kindle edition)
- https://www.tutorialspoint.com/mongodb/mongodb_tutorial.pdf.
- http://www.ccs.neu.edu/home/kathleen/classes/cs3200/20-NoSQLMongoDB.pdf
- MongoDB Quick start Guides by Doug Bierer, Packet Publisher, ISBN- ISBN 978-1-78934-353-3

LAB EXERCISES USING MONGODB

1. Download and install MongoDB
2. Create a MongoDB database to store a collection of documents
3. Load a large amount of document-based data into the collection
4. Query the document collection to research a topic and answer questions

For Lab Assignment 3 and 4

Structure of 'restaurants' collection:

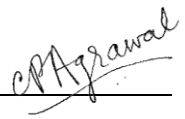
```
{
  "address": {
     "building": "1007",
     "coord": [ -73.856077, 40.848447 ],
     "street": "Morris Park Ave",
```

```
    "zipcode": "10462"
  },
  "borough": "Bronx",
  "cuisine": "Bakery",
  "grades": [
    { "date": { "$date": 1393804800000 }, "grade": "A", "score": 2 },
    { "date": { "$date": 1378857600000 }, "grade": "A", "score": 6 },
    { "date": { "$date": 1358985600000 }, "grade": "A", "score": 10 },
    { "date": { "$date": 1322006400000 }, "grade": "A", "score": 9 },
    { "date": { "$date": 1299715200000 }, "grade": "B", "score": 14 }
  ],
  "name": "Morris Park Bake Shop",
  "restaurant_id": "30075445"
}
```


You may download the compressed file (https://www.w3resource.com/mongodb-exercises/restaurants.zip) and uncompress it to find the collection used in our exercises. The collection comprises of 3772 documents.

1. Write a MongoDB query to display all the documents in the collection restaurants.
2. Write a MongoDB query to display the fields restaurant_id, name, borough and cuisine for all the documents in the collection restaurant.
3. Write a MongoDB query to display the fields restaurant_id, name, borough and cuisine, but exclude the field _id for all the documents in the collection restaurant.
4. Write a MongoDB query to display the fields restaurant_id, name, borough and zip code, but exclude the field _id for all the documents in the collection restaurant.
5. Write a MongoDB query to display all the restaurant which is in the borough Bronx.
6. Write a MongoDB query to display the first 5 restaurant which is in the borough Bronx.
7. Write a MongoDB query to display the next 5 restaurants after skipping first 5 which are in the borough Bronx.
8. Write a MongoDB query to find the restaurants who achieved a score more than 90.
9. Write a MongoDB query to find the restaurants that achieved a score, more than 80 but less than 100.
10. Write a MongoDB query to find the restaurants which locate in latitude value less than -95.754168.
11. Write a MongoDB query to find the restaurants that do not prepare any cuisine of 'American' and their grade score more than 70 and latitude less than -65.754168.
12. Write a MongoDB query to find the restaurants which do not prepare any cuisine of 'American' and achieved a score more than 70 and located in the longitude less than -65.754168. (Note : Do this query without using $and operator.)
13. Write a MongoDB query to find the restaurants which do not prepare any cuisine of 'American ' and achieved a grade point 'A' not belongs to the borough Brooklyn. The document must be displayed according to the cuisine in descending order.
14. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'Wil' as first three letters for its name.
15. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'ces' as last three letters for its name.

16. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'Reg' as three letters somewhere in its name.
17. Write a MongoDB query to find the restaurants which belong to the borough Bronx and prepared either American or Chinese dish.
18. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which belong to the borough Staten Island or Queens or Bronxor Brooklyn.
19. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which are not belonging to the borough Staten Island or Queens or Bronxor Brooklyn.
20. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which achieved a score which is not more than 10.
21. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which prepared dish except 'American' and 'Chinees' or restaurant's name begins with letter 'Wil'.
22. Write a MongoDB query to find the restaurant Id, name, and grades for those restaurants which achieved a grade of "A" and scored 11 on an ISODate "2014-08-11T00:00:00Z" among many of survey dates..
23. Write a MongoDB query to find the restaurant Id, name and grades for those restaurants where the 2nd element of grades array contains a grade of "A" and score 9 on an ISODate "2014-08-11T00:00:00Z".
24. Write a MongoDB query to find the restaurant Id, name, address and geographical location for those restaurants where 2nd element of coord array contains a value which is more than 42 and upto 52..
25. Write a MongoDB query to arrange the name of the restaurants in ascending order along with all the columns.
26. Write a MongoDB query to arrange the name of the restaurants in descending along with all the columns.
27. Write a MongoDB query to arranged the name of the cuisine in ascending order and for that same cuisine borough should be in descending order.
28. Write a MongoDB query to know whether all the addresses contains the street or not.
29. Write a MongoDB query which will select all documents in the restaurants collection where the coord field value is Double.
30. Write a MongoDB query which will select the restaurant Id, name and grades for those restaurants which returns 0 as a remainder after dividing the score by 7.
31. Write a MongoDB query to find the restaurant name, borough, longitude and attitude and cuisine for those restaurants which contains 'mon' as three letters somewhere in its name.
32. Write a MongoDB query to find the restaurant name, borough, longitude and latitude and cuisine for those restaurants which contain 'Mad' as first three letters of its name.



2MCASEC(C) - DIGITAL MARKETING

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	0	2	3	40	10	0	50

UNIT - I

Digital Marketing - Introduction, Key terms and concepts, understanding marketing strategy, The building blocks of marketing strategy, Crafting a digital marketing strategy, Case study: Nike digital strategy

Market Research - Introduction, importance of market research, Key terms & concepts in market research, Online research methodologies, Justifying the cost of research, Tools of the trade, Advantages and challenges, Case Study: Rocking the Daisies – 2011 & 2012

Content Marketing Strategy - Introduction, Defining Content marketing, Key terms and concepts, Strategic building blocks, Content creation, Content channel distribution, Tools of the trade, Advantages and challenges, Case study : Coca-Cola Company

UNIT - II

User Experience Design - Introduction, Key terms and concepts, Understanding UX design, Core principles of UX design, Mobile UX, Step in UX design, Tools of the trade, Case study: Rail Europe

Web Development and Design - Introduction, Key terms and concepts, Web design, Web development, Mobile development, Steps in building a website, Case study – The Boston Globe

Writing for Digital - Introduction, Key terms and concepts, Writing for your audience, Types of web copy, HTML for formatting, SEO copywriting, Best practices for online copywriting, Tools of the trade, Case study: Encyclopaedia Britannica Online

UNIT - III

Customer Relationship Management - Introduction, Key terms and concepts, A CRM model, Understanding customers, CRM and data, The benefits of CRM, Social CRM, Steps in implementing a CRM strategy, Tools of the trade, Case study: Fuji Xerox

Search Engine Optimisation (SEO) - Introduction, Key terms and concepts, Understanding SEO, Search engine friendly website structure, SEO and key phrases, Link popularity, User insights, What not to do, Tools of the trade, Benefits and challenges, Case study: Viewpoints.com and the Panda update

Search Advertising - Introduction, Key terms and concepts, Advertising in search, The elements of a search ad, Targeting options, Bidding and ranking for search ads, Tracking, Planning and setting up a search advertising campaign, Tools of the trade, Advantages and challenges, Case study – 'Sister Act' on Broadway

UNIT - IV

Online Advertising - Introduction, Key terms and concepts, Online advertising objectives, The key differentiator, Types of display adverts, Payment models for display advertising, Getting

your ads online, Targeting and optimising, Tracking, Steps in online advertising, The future of online advertising, Advantages and challenges, Case study: Toyota Prius

Affiliate Marketing - Introduction, Key terms and concepts, The building blocks of affiliate marketing, Setting up a campaign, Tools of the trade, Advantages and challenges, Case study.

Video Marketing - Introduction, Key terms and concepts, Video content strategy, Video production step by step, Video promotion, Tools of the trade, Advantages and challenges, Case study – Woolworths: 'Cook like a MasterChef' for MasterChef South Africa

UNIT - V

Social Media Channels - Introduction, Key terms and concepts, Social media channels, Social networking, Content creation, Bookmarking and aggregating, Location and social media, Tracking social media campaigns, Social media marketing: Rules of engagement, Tools of the trade, Advantages and challenges, Case study – Col'Cacchio #PriceSlice

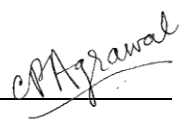
Social Media Strategy - Introduction, Key terms and concepts, Using social media to solve business challenges, Step-by-step guide to creating a social media strategy, Documents and processes, Dealing with opportunities and threats, Step-by-step guide for recovering from an online brand attack, Social media risks and challenges, Case study – Super Bowl Social Media Command Center

Email Marketing - Introduction, Key terms and concepts, Email strategy and planning, Step-by-step process, Tools of the trade, Advantages and challenges, Case study – Zando

Mobile Marketing - Introduction, Key terms and concepts, The role of mobile in personal communication, Mobile messaging channels, Location and mobile, Mobile commerce, Integrating mobile into online marketing, Augmented reality, Mobile analytics, Advantages and challenges, Case study – Carling Black Label's "Be the Coach"

TEXT & REFERENCE BOOKS

- eMarketing : The Essential Guide to Marketing in a digital world, 5th Edition, Rob Stokesand the Minds of Quirk, Availbale online at https://www.redandyellow.co.za/content/uploads/woocommerce_uploads/2017/10/emarketing_textbook_download.pdf
- Ryan Deiss, Russ Henneberry- "Digital Marketing for Dummies", John Wiley & Sons.
- AhujaVandana- "Digital Marketing", Oxford University Press.
- Ira Kaufman, Chris Horton- "Digital Marketing: Integrating Strategy and Tactics with Values, A Guidebook for Executives, Managers, and Students", Routledge,
- Matt Chiera- "Digital Marketers Sound Off: Tips, Tactics, Tools, and Predictions from 101 Digital Marketing Specialists", Matt Chiera,
- Puneet Bhatia- "Fundamentals of Digital Marketing", Pearson India
- Dan Zarrella- "The Social Media Marketing Book", O'Reilly Media.
- Krista Neher- "Visual Social Media Marketing: Harnessing Images, Instagram, Infographics and Pinterest to Grow Your Business Online", Boot Camp Digital.
- Damian Ryan, Understanding Digital Marketing Strategies for Engaging the Digital Generation



2MCAOE(A) - STATISTICAL METHODS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	1	0	3	40	10	0	50

COURSE OBJECTIVES

- To develop the students ability to deal with quantitative & statical data
- To enable the use of statistical methods &techniques wherever relevant.
- To have a proper understanding of various Statistical techniques for solving problems

COURSE OUTCOMES

- Describe and discuss the key terminology, concepts tools and techniques used in Statistical analysis
- Critically evaluate the underlying assumptions of analysis tools
- Understand and critically discuss the issues surrounding sampling, estimation and regression
- Discuss critically the uses and limitations of statistical methods
- Solve a range of problems using the techniques covered

UNIT-WISE SYLLABUS

UNIT-I

Statistics and Data Analysis: Statistical Inference, Samples, Populations, and the Role of Probability, Sampling Procedures; Collection of Data, Measures of Location: The Sample Mean and Median, Measures of Variability, Discrete and Continuous Data, Statistical Modeling.

Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes‟ Rule.

UNIT-II

Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Joint Probability Distributions.

Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev‟s Theorem.

UNIT-III

Some Continuous Probability Distributions: Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions, Chi-Squared Distribution, Beta Distribution, Lognormal Distribution.

UNIT-IV

Fundamental Sampling Distributions and Data Descriptions: Random Sampling, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Distribution of S^2, t –Distribution, F-Distribution.

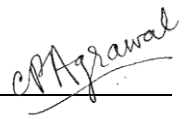
One and Two-Sample Estimation Problems: Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Two Samples: Estimating the Difference between Two Means, Paired Observations, Single Sample: Estimating a Proportion, Two Samples: Estimating the Difference between Two Proportions, Single Sample: Estimating the Variance, Two Samples: Estimating the Ratio of Two Variance.

UNIT-V

Multiple Linear Regression and Certain Nonlinear Regression Models: Introduction, Estimating the Coefficients, Linear Regression Model Using Matrices, Properties of the Least Squares Estimators, Inferences in Multiple Linear Regression, Choice of a Fitted Model through Hypothesis Testing, Categorical or Indicator Variables, Sequential Methods for Model Selection, Cross Validation, Other Criteria for Model Selection, Special Nonlinear Models for Non ideal Conditions.

TEXT &REFERENCE BOOKS

- Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, PearsonPublishers.
- S C Gupta and V K Kapoor, Fundamentals of Mathematical Statistics, Khannapublications.
- T.T. Soong, Fundamentals of Probability and Statistics For Engineers, John Wiley & Sons Ltd.
- Sheldon M Ross, Probability and Statistics for Engineers and Scientists, AcademicPress.
- S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi



2MCAOE(B) - VIRTUAL REALITY

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	0	2	3	40	10	0	50

UNIT - I

Introduction - The Three I's of Virtual Reality, A Short History of Early Virtual Reality, Early Commercial VR Technology, The five Classic Components of a VR System, Advantages of using VR

VR Input Devices - Trackers, Navigation, and Gesture - Interfaces, Three-Dimensional Position Trackers, Tracker Performance Parameters, Mechanical Trackers, Magnetic Trackers, Ultrasonic Trackers, Optical Trackers, Hybrid Inertial Trackers, Navigation and Manipulation Interfaces, Tracker-Based Navigation/Manipulation Interfaces, Trackballs, Three-Dimensional Probes, Gesture Interfaces, The Pinch Glove, The 5DT Data Glove, The DidjiGlove, The CyberGlove

VR Output Devices: Graphics, Three-Dimensional - Sound, and Haptic Displays, Graphics Displays, The Human Visual System, Personal Graphics Displays, Large-Volume Displays, Sound Displays, The Human Auditory System, The Convolvotron, Speaker-Based Three-Dimensional Sound, Haptic Feedback, The Human Haptic System, Tactile Feedback Interfaces, Force Feedback Interfaces

UNIT - II

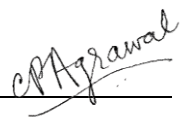
Computing Architectures for VR - The Rendering Pipeline,The Graphics Rendering Pipeline,The Haptics Rendering Pipeline,PC Graphics Architecture,PC Graphics Accelerators,Graphics Benchmarks,Workstation-Based Architectures,The Sun Blade 1000 Architecture,The SGI InfiniteReality Architecture,Distributed VR Architectures,Multi-pipeline Synchronization,Co-located Rendering Pipelines,Distributed Virtual Environments

VR Modeling - Geometric Modeling,Virtual Object Shape,Virtual Object Appearance,Kinematics Modeling,Homogeneous Transformation Matrices,Object Position,Transformation Invariants,Object Hierarchies,Viewing the Three-Dimensional World,Physical Modeling,Collision Detection,Surface Deformation,Force computation,Force Smoothing and Mapping,Haptic Texturing,Behavior Modeling,Model Management,Level-d-Detail Management,Cell Management

UNIT - III

VR Programming - Toolkits and Scene Graphs,WorldToolKit,Model Geometry and Appearance,The WTK Scene Graph,Sensors and Action Functions,WTK Networking,Java 3D,Model Geometry and Appearance,The Java 3D Scene Graph,Sensors and Behaviors,Java 3D Networking,WTK and Java 3D Performance Comparison,General Haptics Open Software Toolkit,GHOST Integration with the Graphics Pipeline,The GHOST Haptics Scene Graph,Collision Detection and Response,Graphics and PHANToM Calibration,PeopleShop,DI-Guy Geometry and Path,Sensors and Behaviors,PeopleShop Networking

UNIT - IV



Human Factors in VR,Methodology and Terminology,Data Collection and Analysis,Usability Engineering Methodology,User Performance Studies,Testbed Evaluation of Universal VR Tasks,Influence of System Responsiveness on User Performance,Influence of Feedback Multimodality,VR Health and Safety Issues,Direct Effects of VR Simulations on Users,Cybersickness,Adaptation and Aftereffects,Guidelines for Proper VR Usage,VR and the Society,Impact on Professional Life,Impact on Private Life,Impact on Public Life

UNIT - V

Traditional VR Applications - Medical Applications of VR,Virtual Anatomy,Triage and Diagnostics,Surgery,Rehabilitation,Education, Arts, and Entertainment,VR in Education,VR and the Arts,Entertainment applications of VR,Military VR Applications,Army Use of VR,VR Applications in the Navy,Air Force Use of VR

Emerging Applications of VR - VR Applications in Manufacturing,Virtual Prototyping,Other VR Applications in Manufacturing,Applications of VR in Robotics,Robot Programming,Robot Teleoperation,Information Visualization,Oil Exploration and Well Management,Volumetric Data Visualization

TEXT & REFERENCE BOOKS

- Virtual Reality Technology, Second Edition, by GRIGORE C. BURDEA, PHILIPPE COIFFET, Wiley,
- Virtual Reality BYLaValle, Steven M.
- Fundamentals of Computer Graphics by Shirley, Peter, Michael Ashikhmin, and Steve Marschner, CRC Press (2009)
- Visual Perception from a Computer Graphics Perspective by Thompson, William, Roland Fleming, Sarah Creem-Regehr, Jeanine K. Stefanucci, CRC Press

Dr. C.P.Agrawal

2MCAOE(C) - ANGULAR JAVA SCRIPT

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	0	2	3	40	10	0	50

COURSE OBJECTIVES

- Implement single-page applications, Build Angular Forms
- Understand the use of Modules, Controllers and Directives
- Understand the concept and implementation of Dependency Injection
- Master AngularJS expressions, filters, and scopes

COURSE OUTCOMES

- Build real client apps with Angular on your own
- Troubleshoot common compile-time and run-time errors
- Write clean and maintainable code like a professional
- Apply best practices when building Angular apps

UNIT-WISE SYLLABUS

UNIT - I

JavaScript Introduction, The Basics of AngularJS - Why We Need Frameworks, What Is a Framework?, Downloading and Installing AngularJS, Browser Support, Your First AngularJS Application, Declarative vs. Procedural Programming, Directives and Expressions - What Is a Directive?, What Are Expressions ?

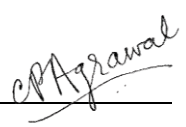
JavaScript Primer - Including Scripts on a Page, Statements, Functions, Parameters and Return Values, Types and Variables, Primitive Types – Booleans, Strings, Numbers, Undefined and Null, JavaScript Operators, Equality vs. Identity, Pre- vs. Post- Increment, Working with Objects - Creating Objects, Reading and Modifying an Objects Properties, Adding Methods to Objects, Enumerating Properties, Control Flow – Loops, Conditional Statements, Working with Arrays - Array Literals, Enumerating and Modifying Array Values, Callbacks, JSON

UNIT - II

Introduction to MVC - Design Patterns, Model View Controller – Model, View, Controller, A Separation of Concerns, Why MVC Matters, MVC the AngularJS Way, Filters and Modules - Introduction to Filters, Built-in Filters, The Number Filter, The Date Filter, The limitTo Filter, AngularJS Modules - What Is a Module?, Bootstrapping AngularJS, Creating a Custom Filter

UNIT - III

Directives - The Basics of Directives, Using Directives, Built-in Directives - ngBind, ngCloak, ngInclude, ngShow and ngHide, ngRepeat, Event-Handling Directives, Using the API Documentation, Creating a Custom Directive - The restrict Option, The template Option, The link Option



Working with Forms - HTML Forms Overview, The form Element, The input Element – button, submit, text, checkbox, password, radio, The textarea Element, The select Element, The label Element, Model Binding, AngularJS Forms, Validating Forms

UNIT - IV

Services and Server Communication- Using Services, The $window Service, The $location Service, The $document Service, Why Use Services?, Creating Services – Promises, Server Communication, Handling Returned Data - Accessing Returned Data, Handling Errors

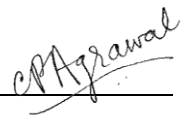
Organizing Views - Installing the ngRoute Module, Using URL Routes - Defining Routes, Route Parameters, Eager vs. Conservative Routes, Route Configuration Options, HTML5 Mode

UNIT - V

AngularJS Animation - Installing the ngAnimate Module, CSS Animation Overview - Transforms, Transitions, Applying Animations, Deployment Considerations – Configuration, Testing, Error Handling, Hide Unprocessed Templates, Minification and Bundling, Managing the Build Process, Deployment

TEXT &REFERENCE BOOKS

- AngularJS Essentials- Rodrigo Branas, Packt Publishing Ltd Open Source
- AngularJS:Novice To Ninja - Sandeep Panda, Sitepoint Pty. Ltd, Download link http:// www.longevity.co.uk/media/1008/angularjs-novice-to-ninja.pdf



3MCACCC1 - SOFTWARE ENGINEERING

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CC	4	1	0	5	80	20	0	100

COURSE OBJECTIVES

- Understand, Learn and Apply the Theoretical and Practical Knowledge of Software Development Such as Software Development Paradigms, Process, Models, Tools and Techniques.
- Understand and Learn the Process of Software Requirements Identification, Analysis, Review, and also Learn Recording Requirements in theIEEE Format of the SRS Document.
- Understand the Various Types and Levels of Software Testing and Basic Approaches of Test Case Designing.
- Gain the Knowledge of the Various Models of Software Quality, Estimation, Quality Assurance and Control.

COURSE OUTCOMES

- Identify, Analyze, Review and Validate the Requirement of SoftwareComponents and System, and Also Prepare Software Requirement Specification (SRS) Document Using Relevant Standards, Tools and Methodologies.
- Manage a Software Project by Applying Project Management Concepts Such as Planning, Scheduling and Risk Management for Developing Qualitative and Economic Software.
- Work Effectively in Various Profiles of Software Developing Team Such as Software Analyst, Architecture, Programmer, Tester, Quality Assurance and Control officer, Project Manager and Leaders.
- Communicate and Coordinate Competently by Listening, Speaking, Reading and Writing Software Documents
- Apply Coding Standards & Guidelines, and Quality Norms in Coding of Software Systems to Satisfy the Requirements and Quality.
- Design Test Cases and Optimize the Test Suite for UNIT, Integration and System-Level Testing using various Techniques and Tools for Adequately Testing the Software Components and Systems.

UNIT-WISE SYLLABUS

UNIT-I

Software: Software Characteristics, Components, and Applications, Software Engineering Layered Technology, Software Development Life Cycle, Software Process Models- Linear Sequential Model, Prototype & RAD Model, Incremental and Evolutionary Process Models. Introduction of Agile Software Development, CBSD(Component Based Software Development) Aspect Oriented Paradigm (AOP) and Green Software Development, Process and Product Metrics.

UNIT-II

Analysis Concept and Principles: Requirement Analysis, Analysis Principles, Requirement Elicitation, Information Gathering Techniques, Requirements Specification, Requirements Verification and Validation, Requirements Management. Requirements Modeling: Scenarios, Information and Analysis Classes, Flow and Behavioral Modeling, Documenting Software Requirement Specification (SRS) Characteristics of SRS, Format of SRS, Software Project Planning: Objectives, Decomposition Techniques, and Empirical Estimation Models. Project Metrics: Software Measurement–Size Oriented, Function Oriented Metrics.

UNIT-III

Design Concepts and Principles: Design Process, Design Concepts, Design Principles, Effective Modular Design, Human Computer Interface Design, Interface Design Guidelines. System Design: Design Models for Architecture, Component, Data and User Interfaces; Problem Partitioning, Abstraction, Cohesiveness, Coupling, Top Down and Bottom Up Design Approaches; Functional Versus Object Oriented Approach, Design Specification. Coding:Top-Down and Bottom-Up Structure Programming, Information Hiding, Programming Style, and Internal Documentation, Verification.

UNIT-IV

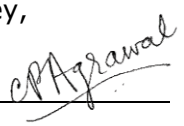
Software Testing: White and Black Box Testing, Levels of Testing, Unit, Integration, System Testing, Functional Testing, Structural Testing, Test Plan, Software Testing Strategies, Verification & Validation, Incremental & Non-Incremental Testing, Top Down and Bottom Up Integration Testing, Alpha & Beta Testing, White Box and Black Box Test Case Design Techniques, Debugging Techniques. Software Quality, Quality Models, Quality Control and Quality Assurance, ISO, SEI Capability Maturity Model (CMM) and Comparison between ISO& SEI CMM.

UNIT-V

Agile Methodology: Introduction and background, Values of Agile, Stakeholders, Challenges, Agile Manifesto andPrinciples,, Twelve Practices of XP, Overview of Scrum, Need of scrum, working of scrum, advanced Scrum Applications, Scrum and the Organization, scrum values, Framework of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Refactoring, Pair Programming, User Stories, Characteristics and contents of User stories, Backlog Management, Agile Risk Management, Scrum roles, Agile Tools, Agile Metrics and Measurements, Agile Design Practice, Refactoring Techniques, Agile Testing, Test-Driven Development (TDD), x Unit framework and tools for TDD, Agile Configuration Management, Continuous Integration /Continuous Delivery (CI/CD), and DevOps

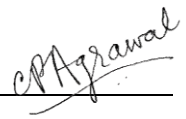
TEXT &REFERENCE BOOKS

- Roger S. Pressman, Software Engineering-a Practitioner's Approach, McGraw Hill International Edition,
- K. K. Aggarwal, Yogesh Singh, Software Engineering,
- Ian Sommerville, Software Engineering, Addison-Wesley Publishing Company,
- James F. Peter, Software Engineering - an Engineering Approach, John Wiley,
- Fairley Richard Software Engineering Concepts, Tata McGraw Hill



Dr. C.P.Agrawal

- ScrumKenSchawber, Mike Beedle-Agile Software Development with Publisher: Pearson.
- Lisa Crispin, Janet Gregory Agile Testing: A Practical Guide for Testers and Agile Teams Publisher: Addison Wesley.
- Kenneth S. Rubin, Essential Scrum: A Practical guide to the most popular agile process
- Robert C. Martin, Agile Software Development, Principles, Patterns and Practices, Publisher: Prentice Hall



3MCACCC2 - JAVA PROGRAMMING

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CC	3	0	4	5	50	20	30	100

COURSE OBJECTIVES

- Introduce and Learn the Usage of the Java SDK Environment to Create, Debug and Run Java Programs.
- Understand Fundamentals of Java Programming Such as Character Set, Variables, Data Types, and Control Structures, Array, Class and Methods.
- Understand the Concepts of (OOPs) and Learn Implementation in Java Defining Classes, Invoking Methods, Using Class Libraries.
- Introduce Strings, Vectors, Interfaces, Packages and Threads Handling in Java.
- Gain the Knowledge of Java Applets, AWT, Swings, Servlet.
- Understand the GUI Application, Web Applications, N-Tier Architecture.
- Develop the Understanding of the Basic Knowledge of File Handling, Database Connectivity, Java Servlets and Web Application.

COURSE OUTCOMES

- Explain and Apply the Object-Oriented Concepts for Solving Real Problem.
- Use the Java SDK Environment to Create, Debug and Run Simple Java Programs.
- Apply Java Technology to Develop the Small Applications, Utilities, and Web Applications.
- Apply Events Management and Layout Managers Using AWT, Swing, JDBC and Servlet for Developing the Software for Various Problems.

UNIT-WISE SYLLABUS

UNIT-I

Basics of Java: History and Basics of Java, Java Environment, JDK Tools, Java Virtual Machine, Java Program Structure, Java Language- Tokens, Keywords, Constants, Variables, and Data Types. Operators and Expressions, Statements - Decision Making, Branching and Looping, Labeled Loops Statement, Jump Statements: Break, Continue, and Return, Command Line Argument.

UNIT-II

Classes and Objects: Classes, Objects, Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Static Members, Nesting of Methods, Inheritance and Polymorphism: Basics Types, Extending a Class, Using Super, Method Overloading, Method Overriding, Final Variables and Methods, Final Classes, Finalize Method, Abstract Methods and Classes, Visibility Control.

UNIT-III

One and TwoDimension Arrays, String Array, String and String Buffer Classes, Vectors, Wrapper Classes. Interfaces: Defining Interfaces, Extending Interfaces, Implementing

Interfaces, Accessing Interface Variables, Packages: System Packages, Naming Conventions, Creating Packages, accessing a Package, Using Package, Adding a Class to a Package, Hiding Classes. Exception Handling: Introduction to Exception Handling, Try-Catch, Finally, Throws, JavaThread Model: Life Cycle of a Thread, Thread Class, Runnable Interface

UNIT-IV

Applet Programming: Creating and Executing Java Applets, Inserting Applets in a Web Page, Applet Tag, Local and Remote Applets, Applets Vs. Applications, Applets Life Cycle. AWT Classes, Swing Classes, Event Handling, AWT Programming: Working with Windows, Graphics and Text, Using AWT Controls, Layout Managers and Menus, Handling Image, Animation, Sound and Video. Java Swing: Japplet, Icons and Labels, Text Fields, Buttons, Radio Buttons, Check Boxes, Combo Boxes, List Boxes, Tabbed and Scroll Panes, Tables. Event Handling:

UNIT-V

I/O Stream:Introduction of I/O Stream, Types of Streams, Stream Class Hierarchy, Using File Class, Byte Streams Vs Character Streams, TextfileVs Binary File, Standard I/O Streams, and Random-Access File, Serialization.

Database Programming Using JDBC: Introduction to JDBC, JDBC Drivers, Types of JDBC Drivers, Connecting with Database.

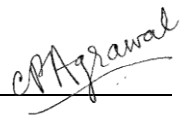
J2EE: Introduction ofJ2EE, Web Application Basics, Architecture and Challenges of Web Application, Servlet, Servlet Life Cycle, Developing and Deploying Servlets.

TEXT &REFERENCE BOOKS

- E. Balagurusamy, "Programming with Java, a Primer",TMH, ISBN-13: 978-0-07-061713-1, ISBN-10: 0-07-061713-9.
- Patrick Naughton and Herbert Schildt, "Java: the Complete Reference", TMH Publication, ISBN 0-07-463769-X.
- Yashavant Kanetkar, "Let us Java", BPB Publications.
- Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI",BPB Publications
- Cay Horstmann, "Big Java", Wiley Publication
- Peter Norton, "Java Programming", Techmedia Publications.
- Joseph Weber, "Using Java 1.2", PHI, ISBN -81-203-1558-8.

LIST OF PRACTICAL

1. Write a Program in Java to Calculate the Simple Interest.
2. Write a Program in Java to Calculate Sum of Two Numbers Input from Command Line Argument.
3. Write a Program in Java to Calculate Area of Circle Using Scanner Class.
4. Write a Program in Java to Calculate Square Root of a Number.
5. Write a Program in Java to Display Name, Age, Calendar and Salary of a Person Input from the Keyboard.



6. Write a Program in Java to Display Grading of Student When His Percentage is Input from Keyboard.
7. Write a Program in Java to Display Odd Number from 1 to 100.
8. Write a Program in Java to Display the Following Patterns using Functions.

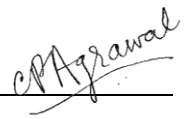
(a)	(b)	(c)	(d)
1	1	1	1
2 2	2 2	1 2	2 3
3 3 3	3 3 3	1 2 3	4 5 6
4 4 4 4	4 4 4 4	1 2 3 4	7 8 9 10
5 5 5 5 5	5 5 5 5 5	1 2 3 4 5	11 12 13 14

9. Write a Program in Java to Calculate the Factorial of a Number.
10. Write a Program in Java to Determine Whether a Number Input from Keyboard is Prime Number Or Not.
11. Write a Program in Java to Display the Prime Numbers from 1 to 500 Using Function.
12. Write a Program in Java to Show Accessing Class Members and use a Dot(.).
13. Write a Program in Java to Show Multilevel Inheritance.
14. Write a Program in Java to Show Single Inheritance.
15. Write a Program in Java to Concatenate Two Strings Without Using Library Function.
16. Write a Program in Java to Make First Alphabet Capital of Each Word in a String.
17. Write a Program in Java to Get the Last Index of Any Given Character in a String.
18. Write a Program in Java to Reverse Words of a String.
19. Write a Program in Java to Find Occurrences of Each Character in a String.
20. Java Program to Get String and Count Number of Words in Provided String.
21. Write a Program in Java to Check Given String is Palindrome String Or Not in Java.
22. Write a Program in Java to Reverse Each Word of Given String.
23. Write a Program in Java to Get Sub String from a Given String.
24. Java Program to Convert String to Lowercase and Uppercase.
25. Create a Java Applet and Show the use of Drawstring() Function.
26. Create a Java Applet to Show How to use Various Methods of Applet Class and Graphics Class in a Java Applet.
27. Write a Program in Java to Show the use of Interface.
28. Create a Java GUIApplication Using Labels and Textfields.
29. Create a Java GUI Application Using Radiobuttons.
30. Create a Java GUI Application Using Checkboxes.
31. Create a Java GUI Application Using Comboboxes.

32. Create a Java GUI Application Using Listboxes.
33. Create Two Html Pages with Links to Navigate from One Page to Other Page.
34. Write a Servlet to Display Current Date and Time of Server on Client : Date Servlet
35. Write a Servlet to Display Natural Numbers from 1 to 100 : Numberservlet
36. Create a JSP to Display Natural Numbers from 1 to 50 :Number.Jsp and Write Down the Process of Running It Step by Step.
37. Create a JSP to Display Current Date and Time of Server onClient :Date.JSP and Write Down the Process of Running it Step by Step.

GROUP ASSIGNMENT

1. Scientific Calculator Utility
2. Chat Application
3. Time Table System
4. Student Attendance System
5. Steganography & Data Encryption System Java
6. Student Information System
7. Survey Tool System
8. Text Editor Like Notepad/Wordpad
9. Game / Puzzle Like Luddo Game
10. Game / Puzzle Like Snake Game
11. Paint Application



3MCACCE(A) - THEORY OF COMPUTATION

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	4	1	0	5	80	20	0	100

COURSE OBJECTIVES

- Learn and Understand FSA, DFA, NDFA, Turing Machine, Regular Expression, Push Down Automaton.
- Learn and Understand Properties of Languages, Grammars and Automata.
- Gain knowledge of Computing and Mathematics to Solve Problems.

COURSE OUTCOMES

- Demonstrates Models, Turing Machine, Regular Expression, Push Down Automaton.
- Model, Compare and analyze different Computational Models.
- Apply and Prove properties of Languages, Grammars and Automata.
- Apply Knowledge of Computing and Mathematics to SolveProblem
- Apply Mathematical Foundations, Algorithmic Principles and Computer Science Theory to the Modeling

UNIT-WISE SYLLABUS

UNIT-I

Introduction to Theory of Computation: Basic Computational Constructs: Finite State Systems, Non Deterministic Finite Automata (NDFA), Deterministic Finite Automata (DFA), Equivalence of DFA and NDFA, Finite Automata with E-Moves, Limitations of FSM, Minimization of Finite Automata, Moore and Mealy Machines, Equivalence of Moore and Mealy Machines.

UNIT- II

Regular Sets, Closure Properties of Regular Sets, Pumping Lemma, Applications of Pumping Lemma. Regular Expression, Laws for Regular Expression, Equivalence of Finite Automata and Regular Expression, Introduction to Regular Grammar.

UNIT- III

Introduction to Context Free and Context Sensitive Grammar, Ambiguity, Parse Tree Representation of Derivations, Simplification of Context Free Grammar, Normal Forms (Chomsky Normal Form (CNF) and Griebach Normal Form (GNF)).

UNIT- IV

Definition, Deterministic Push Down Automaton (DPDA), Non-Equivalence of PDA& DPDA, Equivalence of CFG and PDA, Pumping Lemma for CFL's, Closure Properties of CFL, Non-CFL.

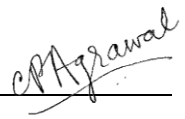
UNIT- V

Turing Machine(TM): Introduction, Types of Turing Machine, Universal Turing Machine and Other Modifications, Construction of Tm for Simple Problems, Turing Machine as Enumerators, Relation Between Languages of Classes, Computational Complexity Theory. Computable

Functions: Partial, Total, Constant Functions, Primitive Recursive Function, Regular Function, Recursive Functions.

TEXT &REFERENCE BOOKS

- John E Hopcroft, Rajeev Motwani, Jeffrey D. Ullman.Introduction to Automation Theory, Languages & Computation
- Mishra &Chandrasekaran-Theory of Computer Science (Automata, Languages and Computation PHI ISBN-81-203-1271-6
- Lewis & Papadimitriou Elements of the Theory of Computation, PHI ISBN 81-203-1016-0
- John C. Martin -Introduction to Languages and Theory of Computation ISBN- 0-07-463722-3
- Bernard M. Moret Pearson -Theory of Computation ISBN-81-7808-550
- Raymond Greenlaw& H. James Hoover (Harcount) - Fundamentals of Theory of ComputationISBN: 81-7867-036-4



3MCACCE(B) - BIG DATA

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	3	0	4	5	80	20	0	100

COURSE OBJECTIVES:

- Familiarize the students with most important information technologies used in manipulating, storing, and analyzing big data.
- This course gives students all around learning of the big data framework using Hadoop and spark, including yarn, HDFS and MapReduce
- Itprovide an overview of approaches facilitating data analytics on huge datasets.

COURSE OUTCOME:

- Ability to identify the characteristics of datasets and compare the trivial data andbig data for various applications.
- Demonstrate an ability to useHadoopframeworkto efficiently store retrieve and process Big Data for Analytics.
- Implement several Data Intensive tasks using the MapReduce Paradigm

UNIT -WISE SYLLABUS

UNIT - I

Big Data- Introduction, Characteristics, Types, Elements, Traditional vs. Big Data Business Approach, Big Data Analytics, Advantages, Applications, Distributed & Parallel Computing for Big Data, Components in Big Data Architecture, Virtualization Approaches.

UNIT - II

Statistics and Probability: Sampling Techniques - Data Classification, Tabulation, Frequency and Graphic Representation, Measures of Central Value - Mean, Mode, Median, Random Variable and Probability Theory.

UNIT - III

Hadoop- Introduction, Features, Advantages, Versions, Key Considerations of Hadoop, RDBMSVsHadoop, Hadoop Ecosystem, HDFS - Architecture, Features, Commands, Processing Data withHadoop, Hadoop Yarn.

UNIT - IV

MapReduce Framework, Features, Uses, WorkingonMapReduce, MapReduce Input and Output Operations, Exploring Map and Reduce Functions, MapReduce Optimization Technique, HBASE Introduction, Architecture, HBASE in Hadoop Applications.

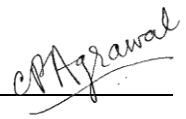
UNIT - V

Processing Data withMapReduce, Task Execution & Environment – Installation of Eclipse, Hadoop, Java Development Kit and Linux Ubuntu OS, MapReduce Program Steps to Obtain Word Count, Functionality of Input Format- Inputsplit, Recordreader, Fileinputformat, Output

Process of Fileoutputformat – Outputformat, Recordwriter, Role of Combiner, Partitioner, Debugging MapReduce.

REFERENCE BOOKS

- Rob Kitchin The Data Revolution: Big Data Open Data Data Infrastructures and theirConsequences SAGE Publications Ltd
- Croll and B. YoskovitzLean Analytics: Use Data to Build a Better Startup Faster o'reilly
- Mayer-Schönberger and K. CukierBig Data: A Revolution That Will Transform How We Live Work and Think
- E. Siegel-Predictive Analytics: The Power to Predict Who Will Click Buy Lie or Die
- Bernard Marr-Big Data in Practice Wiley publication.



3MCACCE(C) - DEVELOPMENT AND OPERATIONAL TOOLS (DEVOPS)

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	3	0	4	5	50	20	30	100

COURSE OBJECTIVES

- Understand the principles of continuous development and deployment.
- Understand and use AWS Services.
- Concepts of version control and using Git for version control
- Understand and use the container Technology
- Using DevOps tools like Git, Docker etc. in various aspects of DevOps delivery model.

COURSE OUTCOME

- Explain the principles of continuous development and deployment of software.
- Using AWS Services
- Using Git for version control
- Use container Technology in Software development
- Using DevOps tools like Git, Docker etc in various aspects of DevOps delivery model.

UNIT-WISE SYLLABUS

UNIT-I

What is DevOps?, Why is DevOps is Needed?, How is DevOps different from traditional IT?, Why is DevOps used?, DevOps Lifecycle, DevOps Work Flow, DevOps Vs Agile, DevOps Principles, Roles, Responsibilities, and Skills of a DevOps Engineer, Various DevOps Tools

Amazon Web Services - Cloud Computing, Advantages, Types of Cloud Computing, Amazon Web Services Cloud Platform Overview, Features of Elastic Compute Cloud (EC2), AWS Services, AWS Management Console, AWS Command Line Interface, Region, availability Zone and edge location, Amazon EC2 root device volume, Creating and Launching EC2 windows and Linux Instances, Connecting to Linux and Windows Instances, Managing Security Group, Identity access Management (IAM), Create IAM users and Group, Assign policy to IAM users and Groups, Configure IAM roles to access AWS resources

UNIT - II

Version Control with Git - About Version Control, Local Version Control Systems, Centralized Version Control Systems, Distributed Version Control Systems, What is Git?, A Short History of Git, difference between Git and any other VCS, The Three States of Git - modified, staged, and committed, Why Git for your organization, Install and Using Git, Common commands in Git, Working with Remote Repositories

UNIT - III

Container Technology - Introduction to Containers?, Benefits of Containerization, How Do Containers Work?, Virtual Machines vs Containers, brief intro to Container Terminology,

Overview of Container Architecture, Installing Container engine tool, Creating Containerized Services, Provisioning Containerized Services

UNIT - IV

Managing Containers - What is Container management, Benefits of Container management, Container management strategy, Pull Docker images from Docker hub, Managing the Life Cycle of Containers, Attaching Persistent Storage to Containers, Accessing containers, Managing Container Images - Accessing Registries (public and Private), Manipulating Container Images

UNIT - V

Creating Custom Container Images - Designing Custom Container Images, Building Custom Container Images with Dockerfile

Configuration Management with Ansible - Introduction to Ansible, Ansible Installation, Configuring Ansible Roles, Write Playbooks, working with playbooks, manage ansible variables, Executing adhoc command, Ansible Variables

PRACTICAL LAB

UNIT - I

- Create AWS Account
- Launch Linux and Windows Instances
- Connecting to Linux and Windows Instances
- Create IAM users and Groups
- Manage IAM Policy and Roles

UNIT - II

- Create github account
- Create public and private repository
- Working with github repository

UNIT - III

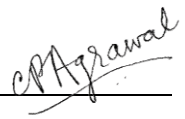
- Installation of Docker / Podman / Rocket
- Creating Containerized Services (Database and webserver instances)
- Maria DB / My Sql / Nginx / Httpd

UNIT - IV

- Persisting a MYSQL Database
- Managing a MYSQL Container
- Managing Images (tags)

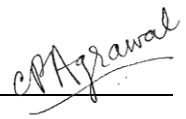
UNIT – V

- Creating Custom Container Images
- Install ansible on control node
- Execute adhoc command
- Working with playbooks
- Manage ansible variables



TEXT & REFERENCE BOOKS

DevOps For Dummies 2ndIBMLimitedEdition by Sanjeev Sharma and Bernie Coyne.
DevOps_Revealed_by_International_DevOps_Certification_Academy.
Effective DevOps by Jennifer Davis & Katherine Daniels.
The DevOps Handbook_ How to Create World-Class Agility, Reliability, and Security in Technology Organizations.



3MCASEC(A) - PROGRAMMING WITH R

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	0	2	3	0	10	40	50

COURSE OBJECTIVES:

- Provide the knowledge of Basic R Programming Language to Students.
- Prepare Students for Role of Professional Data Analyst.
- Learn about Concepts of R Programming like Control Structures, Functions, Arrays.
- This course will teach students, How to develop workflows going from raw data to graphics and statistical analysis, Using the Programming Language and Statistical Environment R.
- Over the Course of the Semester, Students will Learn the Skills to Write Scripts to automate data formatting and analysis, making their studies replicable.
- Student will be able Apply Programming Knowledge to Develop R Programs Based onSimulation.

COURSE OUTCOMES:

- Learn and apply the features ofR Programming Tool to Carry out Statistical Analysis of data
- Write, Compile and Execute the Programs Written in R Programming Language
- Implement Intelligent Algorithms in R to Solve Statistical and Decision Making Problems

COURSE OUTCOME:

1. Understand the basics in R programming in terms of constructs, control statements, string functions
2. Understand the use of R for Big Data analytics
3. Learn to apply R programming for Text processing
4. Able to appreciate and apply the R programming from a statistical perspective

UNIT -WISE SYLLABUS

UNIT - I

OVERVIEW— Evolution of R, Features of R

ENVIRONMENT SETUP— Try it Option Online, Local Environment Setup

BASIC SYNTAX—R Command Prompt, R Script File, Comments

DATA TYPES—Vectors, Lists, Matrices, Arrays. , Factors, Data Frames

VARIABLES—Variable Assignment, Data Type of a Variable, Finding Variables, Deleting Variables

OPERATORS—Types of Operators, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Miscellaneous Operators

DECISION MAKING—If Statement, If- Else Statement, The if. else if. else Statement, Switch Statement

Dr. C.P.Agrawal

LOOPS—Repeat Loop, While Loop, For Loop, Loop Control Statements, Break Statement, Next Statement

UNIT - II

FUNCTION—Function Definition, Function Components, Built- In FunctionUser-defined Function, Calling a Function, Lazy Evaluation of Function

STRINGS—Rules Applied in String Construction, String Manipulation

VECTORS—Vector Creation, Accessing Vector Elements, Vector Manipulation

LISTS—Creating a List, Naming List Elements, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting List to Vector

MATRICES—Accessing Elements of a Matrix, Matrix Computations

ARRAYS—Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculations Across Array Elements,

FACTORS—Factors in Data Frame, Changing the Order of Levels, Generating Factor Levels

DATA FRAMES—Extract Data from Data Frame, Expand Data Frame

UNIT - III

PACKAGES – Introductions, Uses, Install R Package

DATA RESHAPING, —Joining Columns and Rows in a Data Frame, Merging Data Frames, Melting and Casting, Melt the Data, Cast the Molten Data

CSV FILES—Getting and Setting the Working Directory, Input as CSV File, Reading a CSV File, Analyzing the CSV File, Writing into a CSV File

EXCEL FILE—Install xlsx Package, Verify and Load the "xlsx" Package, Input as xlsx File, Reading the Excel File, 21. BINARY FILES, Writing the Binary File, Reading the Binary File, XML FILES, Input Data, Reading XML File, Details of the First Node, XML to Data Frame

JSON FILE—Install rjson Package, Input Data, Read the JSON File, Convert JSON to a Data Frame

WEB DATA

DATABASES—RMySQL Package, Connecting R to MySql, Querying the Tables, Query with Filter Clause, Updating Rows in the Tables, Inserting Data into the Tables, Creating Tables in MySql, Dropping Tables in MySql

UNIT - IV

PIE CHARTS—Pie Chart Title and Colors, Slice Percentages and Chart Legend, 3D Pie Chart,

BAR CHARTS—Bar Chart Labels, Title and Colors, Group Bar Chart and Stacked Bar Chart

BOXPLOTS—Creating the Boxplot, Boxplot with Notch,

HISTOGRAMS—Range of X and Y values

LINE GRAPHS—Line Chart Title, Color and Labels, Multiple Lines in a Line Chart

SCATTERPLOTS—Creating the Scatterplot, Scatterplot Matrices

UNIT - V

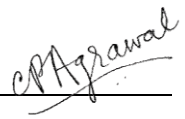
MEAN, MEDIAN & MODE—Mean, Applying Trim Option, Applying NA Option, Median, Mode

LINEAR REGRESSION—Steps to Establish a Regressionlm() Functionpredict() Function

MULTIPLE REGRESSION—lm() FunctionExample

LOGISTIC REGRESSION—Create Regression Model

NORMAL DISTRIBUTION—dnorm()pnorm()qnorm()rnorm()



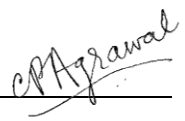
BINOMIAL DISTRIBUTION—dbinom() pbinom() qbinom() rbinom()
Poisson Regression, Analysis of Covariance
TIME SERIES ANALYSIS—Different Time Intervals, Multiple Time Series
Nonlinear Least Square, Decision Tree Install R Package
RANDOM FOREST—Install R Package, Survival Analysis, Chi Square Test

TEXT &REFERENCE BOOKS

- The Art of R Programming: A Tour of Statistical Software Design, by Norman Matloff, No Starch Press, 2011
- R for Everyone: Advanced Analytics and Graphics by Jared P. Lander, Addison-Wesley Data & Analytics Series, 2013.
- Beginning R – The Statistical Programming Language, by Mark Gardener, Wiley, 2013
- Introductory R: A Beginner's Guide to Data Visualisation, Statistical Analysis and Programming in R, by Robert Knell, Amazon Digital South Asia Services Inc, 2013
- W. N. Venables, D. M. Smith, an introduction to R, r-core team, 2015
- Alain F. Zuur, Elena n. Ieno, and Erik Meesters. A beginner's guide to R. Use R. Springer, 2009. ISBN: 978-0-387-93836-3.
- Roger D. PengR Programming for Data Science, , https://leanpub. com/rprogramming
- John Verzani, chapman -Using R for introductory statistics, , ISBN- 1584884509
- Https://www. r-project. org/doc/bib/r-books. html

LIST OFPRACTICAL

1. Write a program that prints 'Hello World' to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n.
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort.
8. Implement linear search.
9. Implement binary search.
10. Implement matrices addition, subtraction and Multiplication.



3MCASEC(B) - INTERNET OF THINGS

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	0	2	3	0	10	40	50

COURSE OBJECTIVES

- To impart necessary and practical knowledge of components of Internet of Things
- To introduce the latest microcontrollers with application development, productdesign and prototyping.
- Learn and Understand Various Protocols used in Wireless Sensor Network.
- Develop skills required to build real-life IoT based projects

COURSE OUTCOMES

- Understand the Concepts of Internet of Things and the Application Areas of IoT
- Understand IOT's hardware and software components
- Interface I/O devices, sensors & communication modules
- Remotely monitor data and control devices
- Develop real life IoT based projects

UNIT – WISE SYLLABUS

UNIT-I

Introduction to IoT, Architectural Overview, Design principles and needed capabilities, IoT Applications, Sensing, Actuation, Basics of Networking, M2M and IoT Technology Fundamentals- Devices andgateways, Data management, Business processes in IoT, Everything as a Service(XaaS), Role ofCloud in IoT, Security aspects in IoT.

UNIT-II

Elements of IoT, Hardware Components- Computing (Arduino, Raspberry Pi), Communication, Sensing, Actuation, I/O interfaces.

Software Components- Programming API's (using Python/Node. js/Arduino) for communicationProtocols-MQTT, ZigBee, Bluetooth, CoAP, UDP, TCP.

UNIT-III

IoT Application Development: Solution framework for IoT applications- Implementation of Device integration, Data acquisitionand integration, Device data storage- Unstructured data storage on cloud/local server, Authentication, authorization of devices.

UNIT-IV

IoT case studies and mini projects based on Home Automation, Industrial automation, Transportation etc.

UNIT-V

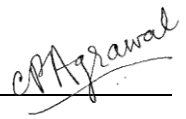
IoT case studies and mini projects based on Agriculture, Healthcare, logistics etc.

TEXT & REFERENCE BOOKS

- Vijay Madisetti, Arshdeep Bahga, İnternet of Things, "A Hands on Approach", University Press
- Dr. SRN Reddy, Rachit Thukral and Manasi Mishra, "Introduction to Internet of Things: A practical Approach", ETI Labs
- Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
- Jeeva Jose, "Internet of Things", Khanna Publishing House, Delhi
- Adrian McEwen, "Designing the Internet of Things", Wiley
- Raj Kamal, "Internet of Things: Architecture and Design", McGraw Hill
- Cuno Pfister, "Getting Started with the Internet of Things", O Reilly Media

LIST OF PRACTICALS

- Familiarization with Arduino/Raspberry Pi and perform necessary software installation.
- To interface LED/Buzzer with Arduino/Raspberry Pi and write a program to turn ON LEDfor 1 sec after every 2 seconds.
- To interface Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi and write aprogram to turn ON LED when push button is pressed or at sensor detection.
- To interface DHT11 sensor with Arduino/Raspberry Pi and write a program to printtemperature and humidity readings.
- To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ONmotor when push button is pressed.
- To interface OLED with Arduino/Raspberry Pi and write a program to print temperature andhumidity readings on it.
- To interface Bluetooth with Arduino/Raspberry Pi and write a program to send sensor datato smartphone using Bluetooth.
- To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn LED ON/OFFwhen '1'/'0' is received from smartphone using Bluetooth.
- Write a program on Arduino/Raspberry Pi to upload temperature and humidity data tothingspeak cloud.
- Write a program on Arduino/Raspberry Pi to retrieve temperature and humidity data fromthingspeak cloud.
- To install MySQL database on Raspberry Pi and perform basic SQL queries.
- Write a program on Arduino/Raspberry Pi to publish temperature data to MQTT broker.
- Write a program on Arduino/Raspberry Pi to subscribe to MQTT broker for temperature dataand print it.
- Write a program to create TCP server on Arduino/Raspberry Pi and respond with humiditydata to TCP client when requested.
- Write a program to create UDP server on Arduino/Raspberry Pi and respond with humiditydata to UDP client when requested.



3MCASEC(C) - USER INTERFACE DESIGN

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	0	2	3	0	10	40	50

COURSE OBJECTIVS

- To Understand Importance of Good Interface Design.
- To Know evaluation process in User Interface Design.
- To Indentify design issues in Virtual Environment.
- To Know basic interface design issues for various environment.
- To Know documentation and Online help in UID.

COURSE OUTCOMES

- The Student will gain insight into the basic theories in user-centered interaction design.
- Analyze the new technologies that provide interactive devices and interfaces.
- Apply the guidelines to develop the UID, development methodologies with an analysis of the social impact.
- Understand Direct Manipulation and Virtual Environment
- Persuade user documentations and information search.

UNIT-WISE SYLLABUS

UNIT - I

Introduction, Importance of User Interface Design, Good and Bad Design, principles of UID, Usability of Interactive Systems: Introduction, Usability Goals and Measures, Usability Motivation, Universal Usability, Managing Design Processes: Introduction, Organizational Design to support Usability, The Four Pillars of Design, Development methodologies: Ethnographic Observation, Participatory Design, Scenario Development, Social Impact statement for Early Design Review.

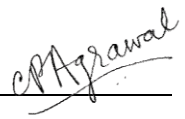
UNIT - II

Evaluating Interface Design - Introduction, Expert Reviews, Usability Testing and Laboratories, Survey Instruments, Acceptance tests, Evaluation during Active Use, Controlled Psychologically Oriented Experiments

UNIT- III

Direct Manipulation and Virtual Environments:Introduction, Examples of Direct Manipulation, Discussion of direct manipulation, 3D Interfaces, Tele-operation, Virtual and Augmented Reality Menu Selection, Form Filling and Dialog Boxes: Introduction, Task-Related Menu Organization, Single Menus, Combination of Multiple Menus, Content Organization, Fast Movement Through Menus, Data Entry With Menus, Form Filling, Dialog Boxes and Alternatives, Audio Menus and Menus for Small Displays

UNIT - IV



Design Issues : Quality of Service: Introduction, Models of Response-Time Impacts, Expectations and Attitudes, User Productivity, Variability in Response time, Frustrating Experiences Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display design, Mobile andweb page design, Window Design, Color

UNIT - V

User Documentation and Online Help :Introduction, Online versus paper documentation, Reading from paper versus Displays, Shaping the content of the Manuals, Accessing the Documentation, Online Tutorials

and animated demonstrations, Online Communities for User Assistance, The Development Process.

Information Search and Visualization

Introduction, Search in Textual Documents and Database Querying, Multimedia document searches, Advanced filtering and Search Interfaces, Information Visualization: Introduction, Data tyoe by task taxonomy, Challenges for information visualization.

TEXT&REFERENCE BOOKS

- Ben Shneiderman, Plaisant, Cohen, Jacobs: Designing the UserInterface, 6th Edition, Pearson, Education.
- About Face The essentials of User Interface Design Alan Coopar.
- Don’t Make me Think Steve Crug
- Wilber O Galitz: The Essential Guide to User Interface Design Wiley publication.
- Alan Dix, Janet Finalay, Gregory D AbiwdmRusselBealel: Human-Computer Interaction, III Edition, Pearson, Education, 2008.
- Eberts: User Interface Design, Prentice Hall, 1994

PRACTICAL LIST (ADOBE XD LIST OF EXPERIMENTS)

1. Design a Menu Screen.
2. Prototype design Login page.
3. Build multiple screens of different sizes.Create a transition between screens
4. Design a Welcome Splash Screen.
5. Design e commerce site of minimum 3 Page with
    a. Create and import graphics
    b. Add text and effects
    c. Create multiple screen layouts
    d. Designed for mobile
    e. Use grid repeating elements
6. Create a sign up page, modal, form, or app screen related to signing up for something. It could be for a volunteer event, contest registration, a giveaway, or anything you can image.
7. Design a calculator. Standard, scientific, or specialty calculator for something such as a mortgage? Is it for a phone, a tablet, a web app?

8. Design a credit card checkout form or page. Don't forget the important elements such as the numbers, dates, security numbers, etc.

3MCAOE(A) - SOCIAL MEDIA MINING

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	0	2	3	40	10	0	50

COURSE OBJECTIVES

- Provide a strong foundation knowledge in social media mining, and Understand the importance of social media mining
- Learn the various features of python tool for social media data mining.
- Provide the basic knowledge of graph theory to represent social media data.
- Learn and understand the basic concepts of data mining, such as Knowledge Discovery in Databases (KDD), Data Quality, Data Preprocessing
- Understand the Supervised Learning and Unsupervised Learning algorithm

COURSE OUTCOMES

- Explain basic concepts of data mining of social media and its importance.
- Apply python tool for social media data mining.
- Explain the Knowledge Discovery in Databases (KDD), Data Quality, Data Preprocessing
- Collect and preprocess the data of social media and identify the pattern and association/friendships, analyze behavior, perform recommendations, classify user profile using Supervised Learning and Unsupervised Learning algorithm.
- Analyze data from data from social media and provide relevant information for business development, product reviews, Find and analyze communities in social media, trend ofinformation propagation in social media

UNIT-WISE SYLLABUS

UNIT I

Social Media – introduction, challenges and opportunities, Social Media Mining, Python tools for data science

UNIT II

Graph Essentials, Graph Basics- Nodes, Edges and Degree, Graph Representation, Types of Graphs, Connectivity in Graphs-Walk, Path, Trail, Tour and Cycle, Trees and Forests, Graph/Tree Traversal- Depth-First Search (DFS) and Breadth-First search (BFS), Shortest Path Dijkstra's Algorithm

UNIT III

Network Measures, Centrality-Degree Centrality, Transitivity and Reciprocity, Balance and Status, Similarity- Structural Equivalence, Properties of Real-World Networks

UNIT IV

Data Mining- Knowledge Discovery in Databases (KDD), Dataset, Data Quality, Data Preprocessing, Supervised Learning- Naive Bayes Classifier, Unsupervised Learning, distance measure, Partitional Algorithm- K-means algorithm

Dr. C.P.Agrawal

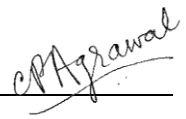
UNIT V

Community Analysis, Social Communities, Community Detection Algorithms, Member-Based Community Detection- Node Degree, Node Reachability, Node Similarity

Information Diffusion in Social Media, Elements of diffusion process, intervention, Local and Global Dependence, introduction of information diffusion types

TEXT &REFERENCE BOOKS

- Reza Zafarani, Mohammad Ali Abbasi, Huan Liu, Social Media Mining: An Introduction, Cambridge University Press
- Marco Bonzanini, Mastering Social Media Mining with Python, Packt Publishing, ISBN 978-1-78355-201-6
- Matthew A. Russell, Published, Mining the Social Web, O'Reilly Media, Inc., ISBN: 978-1-449-36761-9



3MCAOE(B) - SERVICE ORIENTED ARCHITECTURE

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	0	2	3	40	10	0	50

COURSE OBJECTIVES

- To learn fundamentals of XML
- To provide an overview of Service Oriented Architecture and Web services and their importance
- To learn web services standards and technologies
- To learn service-oriented analysis and design for developing SOA based applications

COURSE OUTCOMES

- Understand XML technologies
- Understand service orientation, benefits of SOA
- Understand web services and WS standards
- Use web services extensions to develop solutions
- Understand and apply service modeling, service-oriented analysis and design for application development

UNIT-WISE SYLLABUS

UNIT I

XML: XML document structure – Well-formed and valid documents – DTD – XML Schema – Parsing XML using DOM, SAX – XPath – XML Transformation and XSL – Xquery

UNIT II

SERVICE ORIENTED ARCHITECTURE (SOA) BASICS: Introduction - Fundamental SOA, Characteristics of contemporary SOA, Misperception about SOA, Comparing SOA with Client-Server and Distributed architectures, Tangible benefits of SOA, An SOA timeline, Continuing evolution of SOA, Roots of SOA Service orientation and object-orientation, SOA Standards Stack, SOA with Web Services, Key Principles of SOA, Service layers

UNIT III

WEB SERVICES (WS) AND STANDARDS: Web Services Platform – Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Service-Level Interaction Patterns – Orchestration and Choreography

UNIT IV

WEB SERVICES EXTENSIONS: WS-* Specifications: Message Exchange Pattern, Coordination, Atomic Transactions, BusinessActivities, Orchestration, Choreography, WS-Addressing, WS-Reliable Messaging, WS-Policy (including WS-Policy Attachments and WS-Policy Assertions), WS-Metadata Exchange, WS-Coordination – WS -Transactions , WS-Security (including XML-Encryption, XML-Signature, and SAML), various examples

UNIT V

SERVICE ORIENTED ANALYSIS AND DESIGN: Service Life Cycle, Service Creation, Service Design and Build, Service Deployment, SOA delivery strategies – Service oriented analysis – Service Modelling – Service oriented design – Standards and composition guidelines — Service design – Publish Web service, Business process design – Case Study

TEXT&REFERENCE BOOKS

- Thomas Erl, — Service Oriented Architecture: Concepts, Technology, and Design, Pearson Education, 2005
- Sandeep Chatterjee and James Webber, —Developing Enterprise Web Services: An Architect's Guide, Prentice Hall, 2004
- James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew, —Java Web Services Architecture, Elsevier, 2003.
- Ron Schmelzer et al. — XML and Web Services, Pearson Education, 2002.
- Frank P. Coyle, —XML, Web Services and the Data Revolution, Pearson Education, 2002

LIST OF PRACTICAL

1. Develop DTD and XSD for University Information System having exam enrollment from beginning of semester, along with exam registration and marks submission by teachers to university from various colleges and results sheets generation by University on online report
2. Develop Mark sheet XML Document and display Mark sheet based on CSS and XSL presentation Format
3. Develop Java based program using JAXP or XML API in reading XML file for Students Information and Display HTML Table
4. Develop Java Based web Service using REST and SOAP Based web service in Netbeans for University Course List and Search Course based Course Title and Course ID
5. Create DTD file for student information and create a valid well-formed XML document to store student information against this DTD file.
6. Create XMS schema file for student information and create a valid well-formed XML document to store student information against this DTD file.
7. Create web calculator service in. NET Beans and create Java client to consume this web service.
8. Develop same web service using JX-WS
9. Create web calculator service in. NET and Pr. 9 Create java client to consume web service developed using Apache AXIS.
10. Using WS –GEN and WS- Import develop the java web service & call it by Java Client.

3MCAOE(C) - SOFTWARE TESTING AND QUALITY ASSURANCE

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	1	0	3	40	10	0	50

COURSE OBJECTIVES

- Understand, Learn and Apply the Theoretical and Practical Knowledge of Software Testing.
- Introduce Quality Models, Factors Affecting Quality, Various Characteristics and Relationship, Quality Metrics, Estimation Techniques, Quality Assurance and Control, and Certification.
- Understand, Learn and Analyze the Code by Applying Code Inspection, Review and Structured Walkthrough Approaches for Static Testing Software Product.
- Understand the Key Concepts of Software Testing Such as Types, Levels, Process, Strategies and Metrics of Software Testing and Defect Management.
- Learn the Various Testing Techniques and Hands on Testing Tool for Designing, Exercising the Test Case onset and Auditing the Results.
- Introduce, Understand and Learn Features and Working of Various Tools of Software Testing and Apply on Different Software Artifacts.

COURSE OUTCOMES

- Explain and Apply Knowledge of Key Concepts of Software Testing, Quality and Testing Tools.
- Draw the DD Graph and Identify the Various Test Cases from Paths of Flow Graph of Software Testing Problem and Determine the Complexity of Software.
- Design Test Cases and Develop Test Suite, Write Test Scripts, Set Environmental Variables for Carrying Out the Various Levels of Testing Manually and Automatically.
- Manage Software Defects, and Risks Within a Software Project.
- Work Effectively in Profile of Software Tester, Quality Assurance and Control officer, Project Manager and Leaders.

UNIT-WISE SYLLABUS

UNIT-I

Software Testing Process, Objectives, Testing Techniques, Software Testing Life Cycle, Concept of Testing, Types of Errors, Stubs and DriversVerification and Validation, Different Types of Verification & Validations Mechanisms, Concepts of Software Reviews, Code Inspection and Code Walkthrough, Testingof Component Based Software System, Energy Efficient Testing, Mobile Application Testing.

UNIT-II

Software Testing Methods, Testing Fundamentals, Test Case Design, White Box Testing and its Types, Black Box Testing and its Types, Software Testing Strategies, Strategic Approach to Software Testing, UNIT Testing, Integration Testing, Validation Testing, System Testing, Test Planning, Budgeting and Scheduling.

Dr. C.P.Agrawal

UNIT-III

SoftwareTesting Metrics, Concept and Developing Testing Metrics, Different Types of Metrics, Complexity Metrics, Defect Management, Definition of Defects, Defect Management Process, Defect Reporting, Metrics Related to Defects, Using Defects for Process Improvement.

UNIT-IV

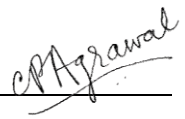
Software Quality, Factors Affecting Software Quality, Quality Models, Software Quality Estimation, Quality Metrics, Quality Assurance, SQA Activities, Software Reviews, Formal Technical Reviews, Quality ControlQuality Management, and, SQA Plan. Quality Improvement, Pareto Diagrams, Cause-Effect Diagrams, Scatter Diagrams, Run Charts, Total Quality Management, Statistical Quality Assurance, Software Reliability, the ISO 9001 Quality Standard, Six Sigma, Informal Reviews.

UNIT-V

Quality Costs, Quality Cost Measurement, Utilizing Quality Costs for Decision-Making. Manual Vs Automatic Testing, Basics of Automated Testing, Drawback of Manual Testing, Advantages of Automation of Testing, Factors for Automation Testing, Types Automation of Testing Tools, Introduction to QTP, QTPIDE, Basic Components in QTP, QTP Framework, Write Scripts, Introduction to Winrunner, and Rational Robot.

TEXT &REFERENCE BOOKS

- Roger S. Pressman, Software Engineering – a Practitioners Approach, McGraw Hill Education;1 April 2009.
- K.K. Aggarwal&Yogesh Singh, "Software Engineering", New Age International Publishers, New Delhi, 2005.
- KshirsagarNaik, PriyadarshiTripathy, Software Testing and Quality Assurance Theory and Practice, Wiley-Spektrum;August 18, 2008.
- Donna C. S. Summers, Quality Management, Pearson; April 26, 2008
- Yogesh Singh, Software Testing, Cambridge University Press, 2012
- William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995
- Louise Tamres, "Software Testing", Pearson Education Asia, 2002
- CemKaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
- Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.



SEMESTER-IV
4MCACCC1 - CLOUD COMPUTING

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CC	3	0	4	5	50	20	30	100

COURSE OBJECTIVES

- To get Introduced to various Computing Paradigms
- To Learn Fundamentals of Cloud Computing and managements.
- To Know Various Cloud Computing Technologies
- To Understand and implement Virtualization
- To study Technological Drivers for Cloud Computing
- To learn Data Storage in Cloud
- To Learn Elements and Services in Cloud Computing
- To Learn and implement Application Platform for Cloud Applications.
- To understand Various Cloud Services.
- To Know and implement Tools of Cloud Computing

COURSE OUTCOMES

- Describe the Key concepts, Advantages, Limitations and Applications of Cloud Computing
- Explain the various Models and services of Cloud.
- Understand and Describe the Core Issues and challenges of cloud computing Such as Security, Privacy, and Interoperability.
- Select and Apply Suitable Technologies, Tools and Applications in the Cloud Computing Driven Systems
- Design and develop the efficient solutions of the Cloud Computing problems and issues with consideration of environment and sustainable development.
- Analyze the interface requirement for deploying the Applications in Cloud

UNIT-WISE SYLLABUS

UNIT – I

Introduction to Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Biocomputing, Mobile Computing, Quantum Computing, Optical Computing, Nano-computing, Network Computing.

Cloud Computing Fundamentals:Motivation, Need, Definition, Principles, Characteristics, Four Cloud Deployment Models, Three Service Offering Models, Cloud Ecosystem, Requirements for Cloud Services, Cloud Computing Architecture- User/Client Layer, Network Layer, Cloud Management Layer, Hardware Resource Layer, Network Connectivity in Cloud Computing, Public Cloud Access Networking, Private Cloud Access Networking.

UNIT – II

Cloud Computing Management:Cloud Applications, Managing the Cloud, Managing the Cloud Infrastructure, Managing the Cloud Application, Migrating Application to Cloud, Cloud Deployment Models: Private Cloud, Outsourced Private Cloud, Community Cloud, On-Premise Community Cloud, Hybrid Cloud. Cloud Service Models:Infrastructure as a Service, Platform as a Service, Software as a Service, Introduction to Open Source Tools for IaaS, Paas& SaaS.

UNIT – III

Technological Drivers for Cloud Computing:SOA and Cloud, SOA and SOC, Benefits of SOA, Multicore Technology:Multicore Processors and VM Scalability, Memory and Storage Technologies, Cloud Storage Requirements, Networking Technologies, Web 2.0:Characteristics, Difference from Web 1.0, Applications, Social Media, Marketing, Education, Web 3.0:Components, Semantic Web, Web Services, Characteristics, Convergence of Cloud and Web 4.0, Connecting Information: Facebook, Agile Software Models: Agile SDLC for Cloud Computing, Features of Cloud SDLC, Agile Software Development Process, Advantages of Agile, Cloud Application Development Platforms:Windows Azure, Google App Engine, Forcecom, IBM Cloud Computing API

UNIT – IV

Virtualization: Full Virtualization, Para virtualization, Hardware-Assisted Virtualization, Hypervisor, OS Virtualization, Server Virtualization, Memory Virtualization, Storage Virtualization, Network Virtualization, Application Virtualization, Processor Virtualization, Memory Virtualization, Storage Virtualization, Network Virtualization, Data Virtualization, Application Virtualization, Hypervisors, Types of Hypervisors, Security Issues and Recommendations, From Virtualization to Cloud Computing, VMware, Microsoft Hyper-V, Open Virtualization (Ovirt) overview

UNIT – V

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 Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM SmartCloud, Security in Cloud Computing, Cloud General Challenges.

TEXT &REFERENCE BOOKS

- Essentials of CLOUD COMPUTING, K Chandrasekaran, CRC Press [ISBN: 3: 978--4822-0544-2]
- Raj Kumar Buyya, James Broberg, and RezeiM Goscinski- Cloud Computing: Principles and Paradigms-Wiley.
- Srinivasan, J.Suresh, -Cloud Computing – A Practical Approach for Learning and Implementation, Pearson India, [ISBN 978131776513]
- Toby Velte, Anthony Velte, Robert Elsenpeter- Cloud Computing, A Practical Approach - McGraw Hill, ISBN: 0071626948
- Greg Schulz -Cloud and Virtual Data Storage Networking, Auerbach Publications, ISBN: 978-1439851739.
- Marty Poniatowski- Foundations of Green IT, ISBN: 978-0137043750.
- Learning Spring Application Development, Ravi Kant Soni, Packt Publishing.

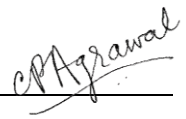
Dr. C.P.Agrawal

- Michael Miller, Cloud Computing.
- Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, Cloud Computing for Dummies.
- Borko Furht, Armando Escalante, Handbook of Cloud Computing, Springer, 2010.

LIST OF PRACTICAL

Suggested Practical for development of applications for following tasks/tools:

- Install Virtual Machine
- Create Virtual Machine
- Manage Virtual Machine Images
- Installing and Configuring Ovirt
- Creating Managing Datacenters and Clusters
- Adding Physical Hosts (Configure Hypervisors)
- Managing User Accounts and Roles
- Managing Red Hat Virtualization Storage
- Deploying and Managing Virtual Machines
- Managing Virtual Machine Images
- Automating Virtual Machine Deployment



4MCACCC2 - PROJECT WORK

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CC	0	2	6	5	0	20	80	100

4MCACCC2 - PROJECT WORK - PROJECT GUIDELINES FOR MCA

WILL BE ANNOUNCED AT THE STARTING OF THIRD SEMESTER

Dr. C.P.Agrawal

4MCACCE(A) - MANAGEMENT THEORY & PRACTICES

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	5	0	0	5	80	20	0	100

COURSE OBJECTIVES

- To help the students gain understanding of the functions and responsibilities of managers.
- To provide them fundamental knowledge of Management theories and take cognizance of the importance of management principles.
- Acquire the knowledge of different Planning, strategies, decision making and forecasting techniques and implement them to solve organizational problems.
- Learn and develop the management skills such communication, presentation, leadership and motivation skills for team building.
- To help the students to learn budgetary control, inventory control and quality control Theory with the help of case study.

COURSE OUTCOMES

- Explain the fundamental knowledge of Management theories and practice them to investigate and solve the organizational.
- Design, Develop and Implement Plans and Strategies, and take decisions to solve organizational problems.
- Demonstrate the management skills through effective communication, presentation, leadership skills and motivate team members for obtaining targets of organization and individual team member.
- Explain and apply budgetary control, inventory control and quality control Theory with the help of case study.

UNIT-WISE SYLLABUS

UNIT–I

Management practices- Meaning and Functions, Development of Management Thought, F.W. Taylor andHerryFayol's Theories of Management, Qualities of an Efficient Management, Management Principles of Modern Times (Empowerment, Kaizen, Quality Circles, and Total Quality Management.

UNIT–II

Planning-Plan, policies, strategies and programs, steps in planning & decision making, forecasting, qualities of an effective planner, relevant case study

UNIT–III

Organizing-Organizational Design, Organizational Structure, Centralization & Decentralization, Delegation, Gantt chart and PERT/CPM, Relevant Case Study

UNIT–IV

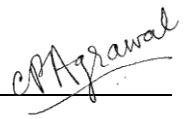
Directing-Motivation and teambuilding, theories of motivation, factors affecting motivation. Leadership, leadership styles, theories of leadership, qualities of an effective leader, effective communication and presentation skills, relevant case studies

UNIT-V

Controlling Meaning and basic principles, types of controls, budget and budgetary control, inventory control and quality control relevant case studies.

TEXT &REFERENCE BOOKS

- Joseph L. Massie, Essentials of Management, Prentice Hall of India
- BiswajeetPatanayak, Human Resource Management, Prentice Hall of India
- Gomes-Mejia, Balkin& Hardy, Managing Human Resource, Prentice Hall of India
- Lesslic W. RueLlyodByurs, Management, Tata McGraw Hill
- Joseph M. Putti, Harold Koontz, Essentials of Management, An Asian Perspective, Tata McGraw hill
- David Boddy, Management: An Introduction, , Pearson
- Laurie J. Mullins with Gill Christy, Management&OrganisationalBehaviour, Pearson



4MCACCE(B) - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	4	0	2	5	80	20	0	100

COURSE OBJECTIVES

- To Understand the Concepts of Artificial Intelligence and Machine Learning such as supervised and unsupervised learning, knowledge representation, Possibility and probability theory and also get update about current and futuristic trends of AI problems and solutions.
- To Gain Knowledge of search space and search strategies, different algorithms of Supervised and Unsupervised Learning
- Understand the various architectures and activation functions, training and testing approach used in Artificial Neural Network and also acquire knowledge of expert systems.
- Understand the concepts of Fuzzy Logic, Genetic Algorithms, and applythem to solve the real-life problems.

COURSE OUTCOMES

- Demonstrate Artificial Intelligence Techniques, Various Types of Production Systems, and Characteristics of Production Systems.
- Design and implement Neural Networks usinglayers, various activation functions and Various Algorithms to solve real life problems.
- Analyze fuzzy nature problem and Design, implement and test the Fuzzy Inference Systems for vague nature real life problem.
- Explain Genetic Algorithms theory, Design and validate the Genetic Algorithms based systems for search space driven problems.

UNIT-WISE SYLLABUS

UNIT-I

AI Introduction, The AI problems, AI technique, Characteristics of AI Applications, Current Trends in AI. Machine Learning: Machine Learning Overview, Design of a Learning system, Types of machine learning, Applications of machine learning, Variables and probabilities - Probability Theory, Probability distributions

UNIT-II

Problem Solving, General Problem Solving, Production Systems, Control Strategies Forward and Backward Chaining, Searching:Searching for Solutions, Uniformed Search Strategies – Breadth First Search, Depth First Search. Heuristic Search, Greedy Best First Search, Knowledge Representations Mapping & Issues

UNIT-III

Soft Computing: Introduction to Soft Computing, Soft Computing vs. Hard Computing, Various Types of Soft Computing Techniques, Applications of Soft Computing. Basic Concepts of Neural Network, Human Brain- Biological Neural Network, Evolution of Artificial Neural Network,

Structure and Function of a Single Neuron, Difference Between ANN and Human Brain, Characteristics and Applications of ANN, Learning Methods, Activation Function, Neural Network Architecture.

UNIT-IV

Supervised Learning: Perceptron learning, - Single layer, multilayer, Back propagation network, Unsupervised Learning Neural Networks – Competitive LearningNetworks – Kohonen Self-Organizing Networks

UNIT-V

Introduction to expert system and application of expert systems, case studies, MYCIN

Fuzzy Logic: Fuzzy Set Theory, Crisp Set, Fuzzy Set, Operations on Fuzzy Sets: Compliment, Intersections, Unions, Product, Difference, Properties of Fuzzy set

Genetic Algorithm: Fundamentals, Basic Concepts, Working Principle, Encoding, Fitness Function, Reproduction, Crossover, Mutation

TEXT &REFERENCE BOOKS

- Elaine Rich and Kevin Knight "Artificial Intelligence" - Tata McGraw Hill.
- Dan W. Patterson "Introduction to Artificial Intelligence and Expert Systems", Prentice India.
- Nils J. Nilson "Principles of Artificial Intelligence", Narosa Publishing House
- Christopher Bishop, "Pattern Recognition and Machine Learning", Springer
- Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press
- EthemAlpaydin, "Introduction to Machine Learning", MIT Press
- Tom Mitchell, "Machine Learning", McGraw-Hill
- Stephen Marsland, "Machine Learning - An Algorithmic Perspective", Chapman andHall/CRC Press
- S, Rajasekaran& G.A. VijayalakshmiPai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & Applications, PHI publication.
- S.N. Sivanandam&S.N.Deepa, Principles of Soft Computing, Wiley Publications.

Dr. C.P.Agrawal

4MCACCE(C) - MOBILE APPLICATION DEVELOPMENT

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
CE	3	0	4	5	80	20	0	100

COURSE OBJECTIVES

- To introduce Android platform and its architecture.
- To learn activity creation and Android UI designing.
- To be familiarized with Intent, Broadcast receivers and Internet services.
- To work with SQLite Database and content providers.
- To integrate multimedia, camera and Location based services & REST full web Services in Android Application.
- To explore publishing process of Android Application

COURSE OUTCOMES

- Describe Android platform, Architecture and features.
- Design User Interface and develop activity for Android App.
- Use Intent, Broadcast receivers and Internet services in Android App.
- Design and implement Database Application and Content providers.
- Use multimedia, camera and Location based services in Android App.
- Discuss various stages in Android App publishing.

UNIT-WISE SYLLABUS

UNIT - I

Various mobile platforms, introduction to android, history and versions of android, android API, android architecture, android runtime, dal vik virtual machine, features of android, introduction and installation of eclipse and ADT plugin and/or introduction and installation of android studio, requirements and installation of android SDK, SDK manager, emulator, avd, android virtual device manager, google play account, installing android app from google play, APK file.

UNIT - II

Setting up Development Environment, Installing Packages using SDK Manager, Android Project Structure, Creating Hello Android App, Deploy it on USB-connected Android device, Setting up an Emulator, Android Tool Repository, Manifest File, DDMS, File Explorer, Installing and Running Android - Hello App, Activity Life Cycle and its methods, Logcat, Components of an Android App – Activity, Service, Broadcast Receiver, Content Provider

UNIT - III

Layout – Linear Layout, Relative Layout, Scroll View Layout, Table Layout, Frame Layout, UI Resources – Layout Resources, UI Elements, Views – Text view, Edit Text, Button, Check Box, Radio Button, Image Button, Spinner, Navigating between Activities – Intent, Exchanging Data between Activities, Action Bar, Event Handling, Listeners, Notifying the User –Toast

UNIT - IV

Using Threads, Image View, Exception Handling, Multimedia - Playing Audio using an Intent, Playing Video using an Intent, Playing Audio using Media Player, Playing Video using Video View, Fragment, Fragment Life Cycle.

UNIT - V

SQLite database, creation of database and tables, CRUD operations – create, retrieve, update and delete operations, Cursor, list view,

Introduction – REST full web Services, JSON, Google Play Services, location services, publishing apps.

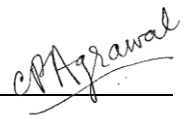
TEXT &REFERENCE BOOKS

- Michael Burton, Donn Felker, "Android Application Development for Dummies", Dummies, ISBN : 9788126538775
- Pradeep Kothari, " Android Application Development (with Kitkat Support)", Kogent Learning Solutions Inc., Black Book, DreamTech Press, ISBN : 9789351194095
- W. Frank Ableson, Robi Sen, Et. Al., " Android in Action", Manning, ISBN : 9789350042915
- Charlie Collins, Michael Galpin, Et. Al., " Android in Practice", Manning, ISBN : 9789350042397
- Anubhav Pradhan, Anil V Deshpande, "Composing Mobile App, Learn | Explore | Apply using Android", Wiley, ISBN : 9788126546602
- James C. Sheusi, " Android Application Development For Java Programmers", Cengage Learning, 2013.
- Wallace Jackson, "Android Apps for Absolute Beginners", Apress, ISBN : 9788132211372
- http://www.developer.android.com

PRACTICAL LIST ON MOBILE APPLICATION DEVELOPMENT

1. Installing Android Environment
2. Create “Hello World” application. That will display “Hello World” in the middle of the screen in the emulator. Also display “Hello World” in the middle of the screen in the Android Phone.
3. Create an application with login module. (Check username and password).
4. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
5. Create a menu with 5 options and selected option should appear in text box.
6. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
7. Create an application with three option buttons, on selecting a button color of the screen will change.

8. Create and Login application as above. On successful login, pop up the message.
9. Create an application to Create, Insert, update, Delete and retrieve operation on the database.
10. Create a Simple Application using Android Resources.
11. Create a Simple Application using Layouts.
12. Create a Simple Application using Intents.
13. Create a Simple Application using user interfaces.
14. Create a Simple Application for playing Audio and Video files.



4MCASEC(A) - CYBER SECURITY

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	0	2	3	40	10	0	50

COURSE OBJECTIVES

- To understand the importance of taking a multi-disciplinary approach to cyber security
- To understand the cyber threat landscape, both in terms of recent emergent issues and those issues which recur over time
- To understand the roles and influences of governments, commercial and other organisations, citizens and criminals in cyber security affairs
- Identify general principles and strategies that can be applied to systems to make them more robust to attack
- Understand key factors in cyber security from different disciplinary views including computer science, management, law, criminology, and social sciences
- Identify various issues surrounding privacy, anonymity and pervasive passive monitoring
- Understand how to manage security incidents, including digital forensic principles

COURSE OUTCOMES

- Understand the importance of cyber security
- Understand various cyber security threats
- Understand the roles and responsibilities of governments, commercial and other organisations, citizens and criminals in cyber security affairs
- Apply general principles and strategies to systems to make them more robust to attack
- Identify various key factors in cyber security from different disciplinary views including computer science, management, law, criminology, and social sciences
- Identify various issues surrounding privacy, anonymity and pervasive passive monitoring
- Manage & response simple security incidents**.**

UNIT – I

Concepts and Definitions - Difference between IT Security, Information Security and Cyber Security, Assets, Cyber Security threats & Vulnerabilities, Likelihood, Consequence and Impact, Inherent Risk, Current Risk and Residual Risk**,** Cyber Threats — Cyber Warfare-Cyber Crime-Cyber Terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy**,** Ethical Hacking**,** Anonymity in Cyberspace

Cyber Security Strategy - Supporting Business Goals and Objectives, Cyber Security Policy Framework, Awareness, Training and Education

Risk Management Concepts - Risk Avoidance, Mitigation, Transfer and Acceptance, Risk Appetite and Risk Tolerance

Threats and Opportunities - Assessing the current threat landscape, Advanced Persistent Threats, Bring Your Own Device or Technologies, The Internet of Things, Insourcing and Outsourcing, Controls and Enablers, Business Impact Analysis

UNIT – II

Security Architecture - The key role of security architecture, Concepts and Definitions, Security Architecture Frameworks. Security Architecture Design Principles, Service Models — In-sourcing, Managed Services, Cloud Services, OSI and TCP/IP Models, Cryptography — Symmetric, Asymmetric and Hashing Algorithms, Non-Repudiation, Real-world Use Cases, Overview of Firewalls - Types of Firewalls, User Management, VPN Security, Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

UNIT - III

Implementing Security - Network Security — Routers, switches, firewalls, intrusion detection and prevention, Endpoint Security — Servers, desktop systems, laptops, tablets and mobile devices, Application Security — Software Development Lifecycle, OWASP Top 10, Web Application Firewall, Data Security — Data owners, data classification, labelling, Access control, Data governance and lifecycle, Data remanence

UNIT - IV

Cyberspace and the Law - Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.

Cybercrime – Various types of cybercrimes, Privacy & Anonymity issues

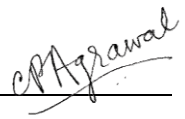
UNIT - V

Business Continuity and Disaster Recovery Planning - Business Continuity Planning, Disaster Recovery Planning, BCP/DRP Training and Awareness, Testing and Maintenance of the BCP/DRP, Security Assurance — Vulnerability Assessments and Penetration Testing, Minimum Security Baselines

Incident Response - Detection — Auditing, logging and security technologies, Security Information and Event Management System (SIEM), Prevention — Authorisation, encryption, firewalls, intrusion prevention, anti-malware, Response — Security events and incidents, Legal aspects, Incident Response Process, Incident Management Team, Computer Forensics, CERT-In — Roles & Responsibilities.

TEXT & REFERENCE BOOKS

- Mayank Bhushan, Rajkumar Singh Rathore, Aatif Jamshed, Fundamentals of Cyber Security, BPB Publications, ISBN: 9789386551559
- Mark Merkow , Information Security: Principles and Practices, Pearson Education, ISBN-9788131712887
- Nina Godbole, Sunit Belapure, Cyber Security, Wiley India, ISBN: 9788126521791
- Matt Bishop, Introduction to Computer Security, Pearson Education, ISBN:8177584251
- Kumar K -Cyber Laws: Intellectual Property & E Commerce, Security, Dominant Publisher
- Information Security Policy & Implementation Issues, NIIT, PHI
- Marine R.C.- Cyber Crime Impact in the New Millennium, Auther Press



Dr. C.P.Agrawal

4MCASEC(B) - AGILE & SCRUM

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	1	0	3	40	10	0	50

COURSE OBJECTIVES

- Introduce Concept and Practices of Agile Methodology in software development
- Gain knowledge of the different Agile methodologies and frameworks
- To understand the benefits and pitfalls of working in an Agile team
- Understand the key roles, events and artefacts of agile
- Work as a team to apply the tools and techniques of the Agile project lifecycle to a simulated project
- Practice Scrum and enhance ability to develop and deliver high quality software.

COURSE OUTCOMES

- Become familiar with Agile Concepts and practice.
- Become competentin Scrum terminologies and their applications
- Perform iterative software development processes: how to plan them, how to execute them.
- Facilitate daily scrums, user stories, sprint planning, and sprint reviews

UNIT-WISE SYLLABUS

UNIT - I

Introduction to Agile, Theories for Agile Management, Agile Software Development, Traditional Model vs. Agile Model, Classification of Agile Methods, Agile Manifesto, What makes agile unique, What the enticing factors of Agile are, Why agile is the trend?

Why Agile? Myths and facts about Agile? Benefits of Agile, How Agile is addressing the current issues, Why an organisation should consider Agile

UNIT - II

Principles of agile, building blocks of Agile, What to take note of, whenever Agile is going to be planned, Agile Project Management, Agile Team Interactions, Ethics in Agile Teams, Agility in Design, Testing, Agile Documentations, Agile Drivers, Capabilities and Values

UNIT - III

Introduction to the Scrum, Agile vs. SCRUM, Scrum Origins, History of Scrum, the foundation of Scrum & where Scrum sits, Scrum methodology, Why do companies move to Scrum?, Comparison overview of all methodologies, Why scrum?

Scrum Pillars and Scrum Principles, Scrum Values and Scrum Resources, Scrum Aspects and Scrum Strengths, Description of the different facets of Scrum, Considerations for implementing Scrum.

UNIT - IV

Quality in Scrum and Change in Scrum, How to manage Quality in Scrum, Risk in Scrum, Managing Risk in your projects with Scrum, What is Scrum for? , Customer Management, Cost Management in Scrum, Some real world, real life applications of Scrum.

Scrum Planning Principles, Multilevel Planning, Portfolio Planning, Product Planning, Release Planning,

UNIT - IV

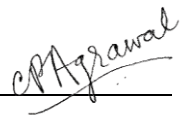
Scrum Rituals and Scrum Roles - Product owner, Scrum master, Development team, Product vision statement, User story creation, Estimation, Review, Retrospective, Daily Scrum

Sprint, Sprint planning, Sprint Review.

Documenting in Scrum, Delivering and Improving in Scrum, Tools you can use on your Scrum Projects

TEXT &REFERENCE BOOKS

- Denise Canty, Agile for project managers, CRC Press
- Rama Bedarkar, Agile Scrum Wiley Emerging Technology Series.
- Keneth S Rubin, Essential Scrum : A practical Guide to the Most popular Agile process, pearson publication.
- Charle G Cobb, Making Sense of Agile project Management by Wiely
- https://theagiledirector.com/images/IntroductiontoScrum-coursenotes.pdf



4MCASEC(C) - DATA VISUALIZATION

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
SE	2	1	0	3	40	10	0	50

COURSE OBJECTIVES

- Acquire and develop the skills for both design and critique visualizations through Conducting Exploratory and Explanatory analysis of data using visualization.
- Understand the importance data visualization, type of data and its impacts on data visualization.
- Understand and learn the principles of perception for Crafting visual presentations of data for effective communication and evaluation of visual design alternatives.

COURSE OUTCOMES

- Prepare data for visualization and analysis.
- Demonstrate and apply Exploratory and Explanatory analysis skills for data visualization and evaluation of visual alternatives.
- Explain the importance data visualization, type of data and its impacts on data visualization.
- Demonstrate the color palettes, principles of perception and cognition and apply them for crafting visual presentations of data for effective communication and evaluation of visual design alternatives.

UNIT-WISE SYLLABUS

UNIT I

Introduction to data visualization, The data visualization process, Importance of data visualization, Model of communication systems, Types of Communication Problems- technical, semantic and effectiveness, Data types, relationships, and visualization formats, Basic principles for data visualization - Principles of Communicating Data- Know your goal, use the right data, select suitable visualizations, design for aesthetics, choose an effective medium and channel, check the results, Data storytelling for social and market communication, Trends in market research and data visualization dashboards

UNIT II

Tableau - Introduction, Features, Tableau Products, Tableau Architecture, Download and Installation of Tableau, Using Workspace Control, Tableau User Interface, Workspace, Toolbar, Menu, Sheets, Dashboards, Data Window, Data Types, File Types

UNIT III

Data Connection with Data Sources like Text File and Microsoft Excel

Tableau Calculation-Function, Field, Operator, Literal, Parameter, and Comment, Tableau Operators- General operators, Arithmetic operators, Relational operators and Logical operators

Tableau functions- Number functions, String functions, Date functions, Logical functions and Aggregate functions, Tableau Basic Filters

UNIT IV

Visual displays of information- Simple text, Tables, Graphs, Points, Lines, Bars, Area

Tableau Charts& Graphs- Bar Chart, Line, Pie, Bubble, Bump, Gantt, Crosstab, Motion, Scatterplot, Heatmap, Waterfall Etc.

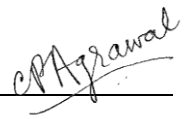
UNIT V

Clutter, Gestalt Principles of Visual Perception-proximity, similarity, enclosure, closure, continuity, and connection

Types of visual clutter- Lack of visual order, Alignment, White space and Non-strategic use of contrast, preattentive attributes.

TEXT & REFERENCE BOOKS

- Visualize It!: A Comprehensive Guide to Data Visualization by Netquest Available online at https://www.netquest.com/en/download-ebook-data-visualization
- Data Visualization Techniques Angie Ficek Available online at https://www.cehd.umn.edu/OLPD/MESI/spring/2015/Ficek-DataVis.pdf
- Ben Jones, Communicating Data with Tableau O'Reilly Media, Inc.Publication, ISBN: 978-1-449-37202-6
- Claus O. Wilke, Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures, O'Reilly Media, Inc.Publication, ISBN - 9781492031086
- Cole Nussbaumer-knaflic, Storytelling with Data, John Wiley Publication, ISBN 9781119002062 (ePub)
- Interactive Data Visualization - Foundations, Techniques, and Applications by Matthew Ward, Georges Grinstein, Daniel Keim, CRC Press, Taylor & Francis Group



4MCAOE(A) - BLOCKCHAIN TECHNOLOGY

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	0	2	3	40	10	0	50

OBJECTIVE

- To provide conceptual understanding of how blockchain technology
- To provide conceptual understanding of how blockchain technology can be used to innovate and improve business processes.
- To acquire skills to develop blockchain based solutions and write smart contract using Hyperledger Fabric and Ethereum frameworks.
- To develop & integrate ideas from various domains and implement them using block chain technology in different perspectives

OUTCOMES

- Understand block chain technology.
- Develop blockchain based solutions and write smart contract using Hyperledger Fabric and Ethereum frameworks.
- Build and deploy block chain application for on premise and cloud based architecture.
- Integrate ideas from various domains and implement them using block chain technology in different perspectives

UNIT-WISE SYLLABUS

UNIT I

Distributed computing introduction, Electronic Cash System introduction, The shortcomings of current, transaction systems,

Overview of Block chain, Public Ledgers, Bitcoin, Smart Contracts, Block in a Block chain, Transactions, Distributed Consensus, Public vs Private Block chain, Understanding Crypto currency to Block chain, Permissioned Model of Block chain, Overview of Security aspects of Block chain

UNIT II

Cryptography- encryption and decryption model, services-Confidentiality, Integrity, Authentication, Non-repudiation and Accountability, Symmetric cryptography, Asymmetric cryptography, Cryptographic Hash Function, Properties of a hash function, SHA-256, Hash pointer and Merkle tree, Digital Signature, Public Key Cryptography, A basic cryptocurrency.

UNIT III

Bitcoin and Block chain:Creation of coins, Payments and double spending, Bitcoin Scripts, Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay.

Working with Consensus in Bitcoin**:** Distributed consensus in open environments, Consensus in a Bitcoin network, Proof of Work (PoW) – basic introduction, Hashcash PoW, Bitcoin PoW,

Attacks on PoW and the monopoly problem, Proof of Stake, Proof of Burn and Proof of Elapsed Time, The life of a Bitcoin Miner, Mining Difficulty, Mining Pool.

UNIT IV

Permissioned Block chain:Permissioned model and use cases, Design issues for Permissioned block chains, Execute contracts, State machine replication, Overview of Consensus models for permissioned block chain- Distributed consensus in closed environment, Paxos, RAFT Consensus, Byzantine general problem, Byzantine fault tolerant system, Lamport-Shostak-Pease BFT Algorithm, BFT over Asynchronous systems.

Enterprise application of Block chain: Cross border payments, Know Your Customer (KYC), Food Security, Mortgage over Block chain, Block chain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, Identity on Block chain

UNIT V

Hyperledger Fabric- Architecture, Identities and Policies, Membership and Access Control, Channels, Transaction Validation, Writing smart contract using Hyperledger Fabric, Writing smart contract using Ethereum, Overview of Ripple and Corda

TEXT &REFERENCE BOOKS

- Mastering Blockchain by Imran Bashir, Packt Publishing Ltd. ISBN 978-1-78883-904-4
- Mastering Bitcoin by Andreas M. Antonopoulos, O'Reilly Media, Inc. ,
- Blockchain For Dummies, IBM Limited Edition by Manav Gupta, John Wiley & Sons, Inc. , ISBN: 978-1-119-37123-6 (pbk); ISBN: 978-1-119-37139-7 (ebk)
- BLOCKCHAIN E-BOOK by Cybrosys Limited Edition
- Melanie Swan, "Block Chain: Blueprint for a New Economy", O'Reilly, 2015
- Josh Thompsons, "Block Chain: The Block Chain for Beginners- Guide to Block chainTechnology and Leveraging Block Chain Programming"
- Daniel Drescher, "Block Chain Basics", Apress; 1st edition, 2017
- Anshul Kaushik, "Block Chain and Crypto Currencies", Khanna Publishing House, Delhi.
- Imran Bashir, "Mastering Block Chain: Distributed Ledger Technology, Decentralization and Smart Contracts Explained", Packt Publishing
- Ritesh Modi, "Solidity Programming Essentials: A Beginner's Guide to Build Smart Contracts for Ethereum and Block Chain", Packt Publishing
- 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

LIST OF PRACTICALS

1. Install and understand Docker container, Node. js, Java and Hyperledger Fabric, Ethereum and perform necessary software installation on local machine/create instance on Cloud to run.

   https://github.com/hyperledger/

   https://docs.docker.com/get-started/

   https://console.ng.bluemix.net/docs/services/blockchain/index.html

Dr. C.P.Agrawal

https://console.bluemix.net/docs/containers/container_index.html#container_index

2. Create and deploy a block chain network using Hyperledger Fabric SDK for Java

   Set up and initialize the channel, install and instantiate chaincode, and perform invoke and query on your block chain network

   (https://developer.ibm.com/patterns/create-and-deploy-blockchain-network-using-fabric-sdk-java/)

3. Interact with a block chain network. Execute transactions and requests against a block chain network by creating an app to test the network and its rules (https://developer.ibm.com/patterns/interacting-with-a-blockchain-network/)

4. Deploy an asset-transfer app using block chain. Learn app development within a Hyperledger Fabric network

   (https://developer.ibm.com/patterns/deploy-an-asset-transfer-app-using-blockchain/)

5. Use block chain to track fitness club rewards

   Build a web app that uses Hyperledger Fabric to track and trace member rewards (https://developer.ibm.com/patterns/fitness-club-rewards-points-iot-and-retail-integration/)

6. Car auction network: A Hello World example with Hyperledger Fabric Node SDK and IBM Block chain Starter Plan. Use Hyperledger Fabric to invoke chaincode while storing results and data in the starter plan

   (https://developer.ibm.com/patterns/car-auction-network-hyperledger-fabric-node-sdk-starter-plan/)

7. Develop an IoT asset tracking app using Block chain. Use an IoT asset tracking device to improve a supply chain by using Block chain, IoT devices, and Node-RED

   (https://developer. ibm. com/patterns/develop-an-iot-asset-tracking-app-using-block chain/)

8. Secure art using block chain digital certificates. Node. js-based auction application can help democratize the art market(https://developer.ibm.com/patterns/securing-art-using-blockchain-digital-certificates/)

9. Mini projects such as :

   - Block chain for telecom roaming, fraud, and overage management. See how communication service providers use block chain to enhance their value chains.

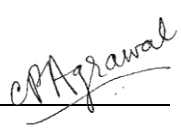
     https://developer.ibm.com/patterns/blockchain-for-telecom-roaming-fraud-and-overagemanagement/

   - Use IoT dashboards to analyze data sent from a Block chain network. Build an IoT app and IoT dashboards with Watson IoT Platform and Node-RED to analyze IoT data sent from a Block chain network

     https://developer.ibm.com/patterns/iot-dashboards-analyze-data-blockchain-network/)

   - Create an Android app with Block chain integration. Build a Block chain enabled health and fitness app with Android and Kubernetes

     https://developer.ibm.com/patterns/create-an-android-app-with-blockchain-integration/



- Create a global finance block chain application with IBM Block chain Platform Extension for VS Code. Develop a Node. js smart contract and web app for a Global Finance with block chain use case

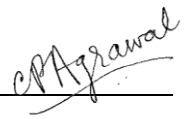
  https://developer.ibm.com/patterns/global-financing-use-case-for-blockchain/

- Develop a voting application using Hyperledger and Ethereum. Build a decentralized app that combines Ethereum's Web3 and Solidity smart contracts with Hyperledger's hosting Fabric and Chaincode EVM

  https://developer.ibm.com/patterns/voting-app-hyperledger-ethereum/

- Create a block chain app for loyalty points with Hyperledger Fabric Ethereum Virtual Machine. Deploy Fabric locally with EVM and create a proxy for interacting with a smart contract through a Node. js web app

  https://developer.ibm.com/patterns/loyalty-points-fabric-evm/



4MCAOE(B) - PROGRAMMING WITH GO

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	1	0	4	3	40	10	0	50

COURSE OBJECTIVES

- To learn the fundamental programming concepts and methodologies which are essential to building good Go language programs.
- To Install and run the Go language environment on a PC &Create and execute Go language programs
- To practice the fundamental programming methodologies in the Go programming language via laboratory experiences.
- To code, document, test, and implement a well-structured, robust computer program using the Go programming language.
- To write Go Packages for reuse.

COURSE OUTCOMES

- Install and run the Go language environment on a PC
- Create and execute programs using basic data structures available in Go Language.
- Able to make Go language programs using functions, pointers, Structs and Methods.
- Demonstrate to develop program for file handling, databases and socket in Go language.
- Able to write reusable packages in Go language and use various programming concepts to solve different problems.

UNIT-WISE SYLLABUS

UNIT- I

Development Environment - Installation, Development Tools, Go Packages

Go Programming Language –Hello world in Go, Common Rule, Variables - Declaring & Assigning Variables, Comment, Arithmetic Operations, Mathematical Functions, Increment and Decrement, Getting Input from Keyboard, Comparison Operators, Logical Operators, Decision, if..then, switch..case, Iteration - for, Iteration - while, break and continue

Arrays, Slices and Maps - Array, Slice, Map

UNIT- II

Functions - Creating A Simple Function, Function with Parameters, Function with Returning Value, Function with Multiple Returning Values, Function with Multiple Parameters and Returning Value, Closure Function, Recursion Function, Testing

Pointers - Pointer in Go, Structs and Methods

String Operations, - Concatenating Strings, String To Numeric, Numeric to String, String Parser, Check String Data Length, Copy Data, Upper and Lower Case Characters, Testing A Program

UNIT- III

File Operations, Writing Data Into A File, Reading Data From A File, Writing All

Error Handling and Logging - Error Handling, defer, panic(), and recover(), try..catch, Logging

Building Own Go Package - Creating Simple Module, Building Own Package

UNIT- IV

Concurrency, Goroutines, Synchronizing Goroutines, Channels

Encoding, Encoding Base64, Hexadecimal, JSON, XML, CSV

Hashing and Cryptography, Getting Started, Hashing, Hashing with MD5, Hashing with SHA256, Hashing with Key Using HMAC, Testing, Cryptography - Symmetric Cryptography, Asymmetric Cryptography

UNIT-V

Database Programming- Database for Go, MySQL Driver for Go, Testing Connection, Querying

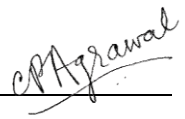
Socket Programming - Socket Module, Client/Server Socket, Server Socket, Client Socket, Testing

TEXT &REFERENCE BOOKS

- GuneyTarikHands-On Go Programming by Paperback, Packt Publishing Limited, SBN: 9781789531756, 9781789531756
- Alan A. A. Donovan, Brian W. Kernighan, The Go Programming Languageby Paperback, Pearson, ISBN: 9789332569713, 9332569711
- Vivien Vladimir, Learning Go Programming by Paperback, Packt Publishing Limited, ISBN: 9781784395438, 9781784395438
- Caleb Doxsey, An Introduction to Programming in GO, Online available at - https://www.golang-book.com/public/pdf/gobook.3186517259.pdf
- Alan Donovan and Brian Kernighan, The Go Programming Language, Addison-Wesley Professional Computing Series) Kindle Edition
- Agus Kurniawan, Go Programming by Examples, Kindle Edition, PE Press
- William Kennedy, Go In Action, Paperback, Manning Publications
- Mark Summerfield, Programming in Go, Paperback, Addison Wesley

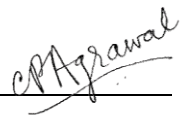
ONLINE RECOURSES

- Go Language Download Page - https://golang.org/
- Go Language Official Documentation Page - https://golang.org/doc/
- Golang Tutorial – Learn Go Programming Language - https://www.geeksforgeeks.org/golang-tutorial-learn-go-programming-language/
- https://www.tutorialspoint.com/go/index.htm
- https://gobyexample.com/
- http://www.golangbootcamp.com/book
- https://www.cosmiclearn.com/go/



PRACTICAL LIST – PROGRAMMING WITH GO LANGUAGE

1. Create a program with comments that shows your name and address
2. Create a program that holds your name in a string.
3. Get a number and a string from the console and check if the numbers is between 1 and 10 and the string length is not greater than 10.
4. Create a program that calculates the average weight of 5 people.
5. Create an array with the number 0 to 10
6. Create an array of strings with names
7. Make a program with loop that counts from 1 to 10.
8. Check if a file exists on your local disk or on an external disk?
9. Create a new file containing names and read it into an array
10. Write a list of cities to a new file.
11. Write a program which uses the package has the rename function.
12. Create a struct house with variables no, Rooms, price and city
13. Create a method that sums two numbers
14. Create a method that calls another method.
15. Write a program that uses a goroutine



4MCAOE(C) - SOFTWARE PROJECT MANAGEMENT

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	2	0	2	3	40	10	0	50

COURSE OBJECTIVES

- Understand the Software Project Planning and Evaluation techniques.
- Plan and manage projects at each stage of the software development life cycle (SDLC).
- Learn about the activity planning and risk management principles.
- Manage software projects and control the software deliverables.
- Learn the management of activities of various phases involved in project management and also learn how to allocate the right job to right people.

COURSE OUTCOMES

- Gain extensive knowledge about the basic project management concepts, framework and the process models.
- Demonstrate and apply the Project Management principles while developing software.
- Explain and Apply software project metrics to estimate the software Efforts, Duration, Cost, and Staff Size, using various estimation techniques.
- Identify, Analyze, categorize, Estimate and Manage the risks involved in various project activities.
- Learn and practice the staff selection process and the issues related to people management.

UNIT-WISE SYLLABUS

UNIT I

Project Evaluation And Project Planning: Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II

Project Life Cycle And Effort Estimation: Software Process and Process Models – Choice of Process models - mental delivery – Rapid Application Development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II, Parametric Productivity Model - Staffing Pattern.

UNIT III

Activity Planning And Risk Management: Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring –

PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.

UNIT IV

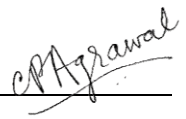
Project Management And Control : Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.

UNIT V

Staffing In Software Projects: Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.

TEXT &REFERENCE BOOKS

- Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management, Tata McGraw Hill, New Delhi, 2012.
- Robert K. Wysocki "Effective Software Project Management" – Wiley Publication, 2011.
- Walker Royce: "Software Project Management"- Addison-Wesley, 1998.
- Gopalaswamy Ramesh, "Managing Global Software Projects" – McGraw Hill Education (India), Fourteenth Reprint 2013.



4MCAOE(D) - ENTERPRISE RESOURCE PLANNING (ERP) & CRM

CC/CE /SE /OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Exam Marks	Total Marks
OE	3	0	0	3	40	10	0	50

UNIT-I

ERP Overview, Benefit, Common myths and evolving realities, Business Process Reengineering, Data ware Housing, Data Mining, LAP, Supply chain Management, ERP Drivers, Decision support system, ERP Domain.

UNIT-II

ERP -A Manufacturing Perspective, ERP Module, ERP Market, ERP implementation life cycle, Options of various paradigms, Identification of suitable platforms, Role of SDLC/SSAD, Object Oriented architecture. Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendors evaluation criterion, ERP Implementation approaches and methodology, ERP implementation strategies, ERP Customization

UNIT-III

Critical success and failure factors for implementation, Model for improving ERP effectiveness, ERP implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations, Technologies in ERP Systems

UNIT-IV

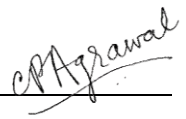
Introduction to CRM, Definitions - Concepts and Context of relationship Management – Evolution - Transactional Vs. Relationship Approach – CRM as a strategic marketing tool – CRM significance to the stakeholders

Understanding Customers, Customer information Database – Customer Profile Analysis - Customer perception, Expectations analysis – Customer behavior in relationship perspectives; individual and group customer's - Customer life time value – Selection of Profitable customer segments

UNIT-V

CRM Structures, Elements of CRM – CRM Process – Strategies for Customer acquisition – Retention and Prevention of defection – Models of CRM – CRM road map for business applications

CRM Planning and Implementation, Strategic CRM planning process – Implementation issues – CRM Tools- Analytical CRM – Operational CRM – Call center management – Role of CRM Managers



TEXT & REFERENCE BOOKS

- Lexis Leon, "Enterprise Resource Planning", TMH
- Brady, Manu, Wegner, "Enterprise Resource Planning", TMH
- Prof. Antony Lawrence, "Customer Relationship Management", Himalaya Publishing House