S.V.K.P & Dr K.S.RAJU A & S COLLEGE (A) :: PENUGONDA

Bachelor of Computer Applications (Major)

SEMISTER-III

COURSE STRUCTURE

S. No.	Paper Code	Subject	Hours per week	Credits	Max. Marks		Total Marks
					Internal	External (Sem End Exams)	
1	23BCA31	Database Management System	3	3	30	70	100
	23BCA31P	Database Management System Lab	2	1	--	50	50
2	23BCA32	Data Structures	3	3	30	70	100
	23BCA32P	Data Structures Lab	2	1	--	50	50
3	23BCA33	Object Oriented Programming Through JAVA	3	3	30	70	100
	23BCA33P	Object Oriented Programming Through JAVA Lab	2	1	--	50	50
4	23BCA34	Software Engineering	3	3	30	70	100
	23BCA34P	Software Engineering Lab	2	1	--	50	50
TOTAL			20	16	120	480	600

II B.C.A (COMPUTER APPLICATIONS)-MAJOR

III SEMESTER

SUBJECT: COMPUTER APPLICATIONS

23BCA31: DATABASE MANAGEMENT SYSTEMS

Course Objectives:

- Graduates will have the expertise in an analyzing real time problems and providing appropriate solutions related to Computer Science & Engineering.
- Graduates will have the knowledge of fundamental principles and innovative technologies to succeed in higher studies and research.
- Graduates will continue to learn and to adapt technology developments combined with deep awareness of ethical responsibilities in profession.

Course Outcomes:

- An ability to apply Knowledge of computing and mathematics in Computer Science & Engineering.
- An ability to analyze a problem, identify and define the computing requirements appropriate to its solution.
- An ability to design, implement and evaluate a computer-based system to meet desired needs with appropriate societal considerations.
- An ability to conduct investigations, interpret data and provide conclusions in investigating complex problems related to Computer Science & Engineering.
- An ability to engage in continuing professional development and life-long learning.

UNIT-I

Overview of Database Systems: Introduction: Introduction to data, information, Database, database management system, Objectives of DBMS, File based system, Drawbacks of file based System, Advantages of Database management systems, classifications of database management system, Database applications, Components of database management system.

Data Models: Introduction; types of data models, Concepts of Schema, three schema architecture of database, Database architecture.

ADD:

Data & information, objectives of DBMS, classifications of DBMS

REMOVE:

Data Base System Structure and Environment

UNIT-II

Relational Model: Introduction to relational model, Codd's rules, concepts of domain, attribute, tuple, relation, constraints and their importance , concept of keys, relational Algebra & relational calculus.

Normalization: Purpose of Normalization, concept of functional dependency, normal forms based on functional dependency (1NF, 2NF and 3 NF),Boyce-codd normal form(BCNF)

UNIT-III:

Entity Relationship Model: Introduction, Representation of entities, attributes, entity set,

relationship, constraints, relationship classification , attribute classifications, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.
BASIC SQL: Commands, data types, DDL operations (create, alter, drop, rename), DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, aggregate functions, grouping, ordering.

UNIT-IV

SQL: Nested queries/ sub queries, implementation of different types of joins, SQL functions(Date, String, Math, Aggregate functions), implementation of key and integrity constraints, views, relational set operations , Transaction Control Language: commit, Rollback, Save point , DCL :Grant, Revoke

UNIT–V

PL/SQL: Data types, Structure of PL/SQL ,Control Structures, Cursors, Procedure, Function, Packages, Exception Handling ,Triggers.

Transaction processing Concepts: Introduction to Transaction, Operations of Transaction, Transaction schedules , serializability , recoverability, testing for serializability, Transaction States, Transaction Properties ,Failure Classifications.

Add:
Transaction & it's operations, transaction schedule.
REMOVE:
Concurrent Executions, Storage, Recovery & Atomicity, Recovery Algorithm**.**

Database management systems Text Books

- DatabaseManagementSystems,3rd Edition, Raghurama Krishnan, Johannes Gehrke, TMH
- DatabaseSystemConcepts,5th Edition, Silberschatz, Korth, TMH

SUBJECT: COMPUTER APPLICATIONS

23BCA31P: DATABASE MANAGEMENT SYSTEMS

List of Experiments

SQL:

Cycle-I:Aim:Marketing company wishes to computerize their operations by using following tables.

Table Name: Client-Master
Description: Used to store client information

Column Name	Data Type	Size	Attribute
CLIENT_NO	Varchar2	6	Primary key
NAME	Varchar2	20	Not null
ADDRESS1	Varchar2	30	
ADDRESSS	Varchar2	30	
CITY	Varchar2	15	
PINCODE	Varchar2	8	
STATE	Varchar2	15	
BAL_DUE	Number	10,2	

Table Name: Product_ Master
Description: Used to store product information

Column Name	Data Type	Size	Attribute
PRODUCT_NO	Varchar2	6	Primary key
DESCRIPTION	Varchar2	15	Not null
PROFIT_PERCENT	Number	4,2	Not null
UNIT_MEASUE	Varchar2	10	
QTY_ON_HAND	Number	8	
REORDER_LVL	Number	8	
SELL_PRICE	Number	8,2	Not null, can not be 0
COST _PRICE	Number	8,2	Not null, can not be 0

Table Name: Salesman _master
Description: Used to store salesman information working for the company.

Column Name	Data Type	Size	Attribute
SALESMAN_NO	Varchar2	6	Primary key

SALESMAN_NAME	Varchar2	20	Not null
ADDRESS1	Varchar2	30	
ADDRESS2	Varchar2	30	
CITY	Varchar2	20	
PINCODE	Number	8	
STATE	Vachar2	20	
SAL_AMT	Number	8,2	Not null, cannotbe0
TGT_TO_GET	Number	6,2	Not null, cannotbe0
YTD_SALES	Number	6,2	Not null
REMARKS	Varchar2	20	

Table Name: SALES- ORDER Description: Used to store client's Orders

Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key
CLIENT_NO	Varchar2	6	Foreign Key
ORDER_DATE	Date		
DELY_ADDRESS	Varchar2	25	
SALESMAN_NO	Varchar2	6	Foreign Key
DELY_TYPE	Char	1	Delivery: part(p)/full(f)and default 'F'
BILL_YN	Char	1	
DELY_DATE	Date		Can't be less than order date
ORDER_STATUS	Varchar2	10	Values("In Process", "Fulfilled", "Back Order", "Cancelled.

Table Name: SALES_ORDER_DETAILS
Description: Used to store client's order with details of each product ordered.

Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key references SALES _ORDER table
PRODUCT_NO	Varchar2	6	Foreign Key references SALES_ORDER_table

QTY_ORDERED	Number	8	
QTY_ DISP	Number	8	
PRODUCT_RATE	Number	10,2	Foreign Key

Solve the following queries by using above tables.

1. Retrieve the list of names, city and the state of all the clients.
2. List all the clients who are located in 'Mumbai' or 'Bangalore'.
3. List the various products available from the product_master table.
4. Find the names of salesman who have a salary equal toRs.3000.
5. List the names having 'a' as the second letter in the names.
6. List all clients whose Bal due is greater than value 1000.
7. List the clients who stay in a city whose first letter is 'M'.
8. List all information from sales-order table for orders placed in the month of July.
9. List the products whose selling price is greater than 1000and less than or equal to3000.
10. Findtheproductswhosesellingpriceisgreaterthan1000andalsofindthe new selling price as original selling price 0.50.

Cycle-II Supplier

Aim: A manufacturing company deals with various parts and various suppliers supplytheseparts.Itconsistsofthreetablestorecorditsentireinformation.Those are as follows.
Supplier(Supplier_No,Sname,City,status)Part(Part_no,pname,color,weight,city, cost)
Shipment (supplier_No, Part_no, city) JX(project_no, project_name, city)
SPJX(Supplier_no, part_no, project_no,city)

1. Get supplier numbers and status for suppliers in Chennai with status>20.
2. Get project names for projects supplied by supplier 'S'.
3. Get colors of parts supplied by supplier S·.
4. Get part numbers for parts supplied to any project in Mumbai.
5. Find the id's of suppliers who supply are do r pink parts.

Cycle–III Employee Database

Aim: An enterprise wishes to maintain a database to automate its operations. Enterprise divided into a certain departments and each department consists of employees. The following two tables describes the automation schemas.

Emp (Empno, Ename,Job, Mgr, Hiredate, Sal, Comm, Deptno)
Dept(Deptno, Dname, Loc)

1. List the details of employees who have joined before the end of September '81.
2. Listthenameoftheemployeeanddesignationoftheemployee,whodoesnotreportto anybody.
3. List the name, salary and PF amount of all the employees(PFiscalculatedas10%of salary)
4. List the names of employees who are more than 2yearsold in the organization.
5. Determine the number of employees, who are taking commission.
6. Update the employee salary by20%, whose experience is greater than 12years.
7. Determine the department does not contain any employees.
8. Create a view, which contains employee name and their manager names working in sales department.
9. Determine the employees, whose total salary is like the minimum salary of any department.
10. List the department numbers and number of employees in each department.

PL/SQLPROGRAMS

1. Write a PL/SQL program to check the given string is palindrome or not.
2. The HRD manager has decide to raise the employee salaryby15% write a PL/SQL block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in Emp table.
3. Write a PL/SQLprogramtodisplaytop10rowsin Emp table based on their job and salary.
4. Write a PL/SQL program toraisetheemployeesalaryby10%fordepartment number 30 people and also maintain the raised details in the raise table.
5. CreateaproceduretoupdatethesalariesofEmployeesby20%,for those who are not getting commission
6. Write a PL/SQL procedure to prepare an electricity bill by using following table. Table used: Elect

Name	Null?	Type
MNNO	NOTNULL	NUMBER(3)
CNAME		VARCHAR2(20)
CUR_READ		NUMBER(5)
PREV_READ		NUMBER(5)
NO_UNITS		NUMBER(5)
AMOUNT		NUMBER(8,2)
SER_TAX		NUMBER(8,2)
NET_AMT		NUMBER(9,2)

7. Createatriggertoavoidanytransactions(insert,update,delete)onEMPtableon Saturday & Sunda

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II B.C.A (COMPUTER APPLICATIONS)-MAJOR

III SEMESTER

SUBJECT: COMPUTER APPLICATIONS

23BCA32: DATA STRUCTURES

Course Objectives:

- The objective of the course is to make a student to implement data structures and organize and manage data, based on data structures for efficient access

Course Learning Outcomes:

- Identify data structures suitable to solve any specific problem.
- Identifying various data structures and their real-time applications
- Identifying the use of Time and Space Complexity.
- Implementing different sorting & searching techniques

UNIT-I

Introduction and Overview- Elementary Data Organization, Data Structures classification, Data Structure Operations, Algorithms: Complexity, Time-Space Trade off.

Preliminaries-Mathematical Notation and Functions, Algorithmic Notation, Control Structures used in algorithms, Complexity of Algorithms. Other Asymptotic Notations, Sub algorithms, Variables, Data Types.

UNIT-II

Arrays, Records and Pointers – Linear Arrays, Representation and Traversing Linear Arrays, Inserting and Deleting. Passing an array to function, Pointer & Arrays, Multidimensional Arrays, Sparse Matrices**.**

UNIT-III

Linked Lists – Representation, Dynamic Memory Allocation, Traversing, Searching, Insertion, Deletion, Header Linked Lists, Two-Way Lists

Stacks- Stacks, Operations on stacks, Array representation of stacks, Linked List representation of stacks, Arithmetic Expressions, Polish notation, Recursion**.**

UNIT-IV

Queues -Queues, Linked representation of Queues, De queues, Priority Queues.

Sorting - Insertion Sort, Bubble Sort, Selection sort, Quick Sort, Merge sort, Heap Sort,

Searching – Linear Search, Binary Search

UNIT-V

Trees- Binary trees, Representing and traversing binary trees, Traversal algorithms using stacks. Binary Search Trees, Searching, Insertion and Deletion in Binary Search Trees,

Graphs- Terminology, Sequential representation of Graphs, Linked representation of Graphs, Operations on Graphs, Traversing a Graph.

Additional Input

B+ Trees

Text Books:

1. **"Data Structures"** by Seymour Lipschutz, McGraw Hill(Schaum's Outlines).

2. **"Data Structures using C"** , Second edition , Dr.ReemaThareja, Oxford University Press

References:

1. "**Data Structures& Algorithms Using C**,"Khanna Publishers

2. **"Theory and Problems of Data Structures"** by Seymour Lipschutz, McGraw Hill (Schaum's Outlines)

3. **"Data Structures& Algorithms in C "**by M.A.Weiss, Addison Wisley.

4**."DataStructuresUsingC**,"ReemaThareja,Oxford..

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II B.C.A (COMPUTER APPLICATIONS)-MAJOR

III SEMESTER

SUBJECT: COMPUTER APPLICATIONS

23BCA32P: DATA STRUCTURES

List of Programs

1. Write a C program to Implement matrix multiplication.
2. Write a C program to Implement stack using arrays.
3. Write a C program to Implement queue using arrays.
4. Write a C program to Implement circular queue using arrays.
5. Write a C program to Implement dequeue using arrays.
6. Write a C program to Implement single linked list using the methods create(), insert(), search(), delete() and display().
7. Write a C program to Implement double linked list.
8. Write a C program to Implement stack using linked list.
9. Write a C program to Implement queue using linked list.
10. Give a solution to towers of Hanoi using C program.
11. Write a C program to Implement bubble sort.
12. Write a C program to Implement selection sort.
13. Write a C program to Implement insertion sort.
14. Write a C program to Implement merge sort.

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II B.C.A (COMPUTER APPLICATIONS)-MAJOR

III SEMESTER

SUBJECT: COMPUTER APPLICATIONS

23BCA33: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Objectives:

To make the students understand the fundamentals of Java programming.

- To expose the students to Window based applications using AWT
- To make the students to design appropriate Exception Handling in Java
- To make the students to understand the concepts of Threads Files and
- I/O Streams, Applets Networking in java.

Course Outcomes:

The student would become competent enough to write, debug ,and document well-structured java applications

- Demonstrate good object-oriented programming skills in Java
- Abletodescriberecognize,apply,andimplementselecteddesignpatternsinJava
- Understand the capabilities and limitations of Java
- Be familiar with common errors in Java and its associated libraries
- Develop excellent debugging kills

UNIT-I

Introduction to OOPS: Paradigms of Programming Languages – Basic concepts of Object Oriented Programming – Differences between Procedure Oriented Programming and Object Oriented programming - Benefits of OOPs – Application of OOPs. Java: History– Java features
– Java Environment – JDK – API. Introduction to Java: Creating and Executing a Java program – Java Tokens- Java Virtual Machine (JVM) – Command Line Arguments –Comments in Java program. Elements: Constants – Variables – Data types - Scope of variables – Type casting – Operators: Special operators – Expressions – Evaluation of Expressions Garbage collector.

UNIT-II

Control Structures: The if Statement, Nested ifs, The if else-if Ladder and, Looping Statements: The while Loop, The do-while Loop, for loop and its variations and Nested Loops. Jumping Statements: Break, continue Statement.

Class and objects: Defining a class-methods-creating-Objects-Accessing class members-Constructors-Parameterized Constructors. Adding a Constructor. Constructor chaining Arrays: One Dimensional Array-Creating an array –Array

Processing-Multidimensional

UNIT-III

Inheritance: Defining inheritance –types of inheritance– Method overloading – Static members – Nesting of Methods – this keyword - Overriding methods – Final variables and methods – Final classes – Final methods - Abstract methods and classes – Visibility Control Access modifiers.

Interfaces: Defining interface – Extending interface – Implementing Interface - Accessing interface variables. Strings: Constructing Strings, Operating on Strings, Arrays of Strings.

UNIT– IV

Packages: Java API Packages – Defining a Package, System Packages – Naming Conventions – Creating & Package Member Access – Adding Class to a Package.
Multithreading: Creating Threads – Life of a Thread – Defining & Running Thread – Thread Methods – Thread Priority – Synchronization Collections – Implementing Runnable interface – Thread Scheduling.

UNIT– V

Exception Handling: Limitations of Error handling –Advantages of Exception Handling – Types of Errors– Basics of Exception Handling – Syntax of Exception Handling Code, Types of exceptions Multiple Catch Statements, Using finally Statement, Throwing Our Own Exceptions

Applets:Introduction,JavaapplicationsversusJavaApplets,AppletLife-cycleWorkingwith Applets, The HTML Applet Tag.

TEXTBOOKS:

1. **Object Oriented Programming through Java,** Universities Press, by P. Radha Krishna.
2. E.Balagurusamy,"*ProgrammingwithJava*",TataMc-GrawHill,5th Edition.

REFERENCES:

1. HerbertSchildt,"ThecompletereferenceJava",TataMc-GrawHill,7thEdition.

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II B.C.A (COMPUTER APPLICATIONS)-MAJOR

III SEMESTER

SUBJECT: COMPUTER APPLICATIONS

23BCA33P: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

List of Programs

1 Write a program to print Biggest of3 Numbers using Logical Operators.

2 Write a program to Test the Prime number.

3 WriteaprogramtocreateaSimpleclasstofindouttheAreaandperimeterofrecta ngle and box using super and this keyword.

4 Writeaprogramtodesignaclassaccountusingtheinheritanceandstaticthatsh owall function of bank (withdrawal, deposit).

5 Write a program to design a class using abstract methods and classes.

6 Write a program to design a string class that perform string method (equal, reverse the string, change case).

7 Write a program to handle the exception using try and multiple catch block.

8 Writeaprogramthatimporttheuserdefinepackageandaccessthemembervaria bleof classes that contained by package.

9 Write a program that show the implementation of interface.

10 Write a program to create a thread that implement the runable interface.

11 Writeaprogramtodrawtheline,rectangle,oval,textusingthegraphicsmethod.

12 Write a program to create menu using the frame.

13 Write a program to create dialog box.

14 Write a program to implement the flow layout and border layout.

15 Write a program to create Frame that display the student information.

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II B.C.A (COMPUTER APPLICATIONS)-MAJOR

III SEMESTER

SUBJECT: COMPUTER APPLICATIONS

23BCA34: SOFTWARE ENGINEERING

Course Objectives:

- The Objective of the course is to assist the student in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.

Course Learning Outcomes:

- Ability to gather and specify requirements of the software projects.
- Ability to analyze software requirements with existing tools
- Able to differentiate different testing methodologies
- Able to understand and apply the basic project management practices in real life projects
- Ability to work in a team as well as independently on software projects

UNIT-I

Introduction to Software Engineering: Definitions - Size Factors - Quality and Productivity Factors – Managerial Issues. Planning a software project: Defining the problem - Developing a Solution Strategy - Planning the Development Process - Planning an Organization structure - Other Planning Activities

Additional Input:

Software Development Life Cycle (SDLC)

UNIT-II

Software Cost Estimation: Software cost factors - Software Cost.

Estimation Techniques – Staffing level Estimation- Estimating Software Maintenance Costs - The Software Requirements, Specification - Formal Specification Techniques - Languages and Processors for Requirements Specification**.**

UNIT-III

Software design: Fundamental Design Concepts - Modules and Modularization Criteria – Design Notations -Design Techniques - Detailed Design Considerations.

Real-Time and Distributed System Design - Test Plans - Milestones, walkthroughs, and Inspections**.**

UNIT-IV

User interface design and real time systems: User interface design - Human factors - Human computer interaction - Human - Computer Interface design - Interface design - Interface standards.

UNIT-V

Software quality and testing: Software Quality Assurance - Quality metrics - Software Reliability - Software testing - Path testing – Control Structures testing - Black Box testing - Integration, Validation and system testing - Reverse Engineering and Reengineering**.**

CASE Tools: Projects management, tools - analysis and design tools – programming tools - integration and testing tool - Case studies**.** .

References:

1. R.Fairley, **"Software Engineering Concepts"** Tata McGraw-Hill, 1997.

2. R.S. Pressman, **"Software Engineering,"**Fourth Ed., McGraw Hill, 1997

3. "**Software Engineering",** H. SommervillIan , Addition Wesley Pub. Co**.**

4. "**Software Engineering: An object Oriented Perspective"** by Braude, E.J., Willey, 2001..

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II B.C.A (COMPUTER APPLICATIONS)-MAJOR

III SEMESTER

SUBJECT: COMPUTER APPLICATIONS

23BCA34P: SOFTWARE ENGINEERING

List of Programs

Case Studies:

1. Student Marks Analysis System
2. E-Commerce Management System
3. Inventory Control System
4. Food Delivery Management system
5. Logistics Management System

Choose any two of above case studies and do the following exercises

Case Study

1. Write the complete problem statement
2. Write the software requirements specification document
3. Draw the entity relationship diagram
4. Draw the data flow diagrams
5. Draw use case diagrams
6. Draw activity diagrams for all use cases
7. Draw sequence diagrams for all use cases
8. Draw collaboration diagram
9. Assign objects in sequence diagrams to classes and make class diagram.

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Bachelor of Computer Applications (Major)

SEMISTER-IV

COURSE STRUCTURE

S. No.	Paper Code	Subject	Hours per week	Credits	Max.Marks		Total Marks
					Internal	External (SEM End Exams)	
1	23BCA41	Python Programming	3	3	30	70	100
	23BCA41P	Python Programming Lab	2	1	--	50	50
2	23BCA42	Operating Systems	3	3	30	70	100
	23BCA42P	Operating Systems Lab	2	1	--	50	50
3	23BCA43	Mobile Application Development Using Android	3	3	30	70	100
	23BCA43P	Mobile Application Development Using Android Lab	2	1	--	50	50
TOTAL			15	12	90	360	450

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II B.C.A (COMPUTER APPLICATIONS)-MAJOR
IV SEMESTER
SUBJECT: COMPUTER APPLICATIONS
23BCA41: PYTHON PROGRAMMING

Unit-I

Getting Started with Python: Introduction to Python , Python Keywords , Identifiers , Variables , Comments, Data Types , Operators, Input and Output , Type Conversion , Debugging . Flow of Control, Selection , Indentation , Repetition , Break and Continue Statement , Nested Loops .
Strings- String Operations , Traversing a String , String handling Functions.

Unit-II

Functions: Functions, Built-in Functions, User Defined Functions, recursive functions, Scope of a Variable
Python and OOP: Defining Classes, Defining and calling functions passing arguments, Inheritance, polymorphism, Modules – date time, math, Packages.
Exception Handling- Exception in python, Types of Exception, User-defined Exceptions.

Unit-III

List: Introduction to List, List Operations, Traversing a List, List Methods and Built-in Functions.
Tuples and Dictionaries, Introduction to Tuples, Tuple Operations, Tuple Methods and Built-in Functions, Nested Tuples. Introduction to Dictionaries, Dictionaries are Mutable, Dictionary Operations, Traversing a Dictionary, Dictionary Methods and Built-in functions.

Unit-IV

Introduction to NumPy, Array , NumPy Array , Indexing and Slicing , Operations on Arrays , Concatenating Arrays , Reshaping Arrays , Splitting Arrays , Statistical Operations on Arrays.
Data Handling using Pandas , Introduction to Python Libraries, Series, Data Frame, Importing and Exporting Data between CSV Files and Data Frames, Pandas Series Vs Num Pyndarray.

Unit-V

Plotting Data using Matplotlib: Introduction, Plotting using Mat plot lib –Line chart, Bar chart, Histogram, Scatter Chart, Pie Chart.
GUI Programming and Database Connectivity Using Python. Graphical User Interfaces. Using the Tkinter, Module, Creating Label, Text, Buttons, info Dialog Boxes, Radio button, Check button, Getting Input, Introduction to MySQL, Create Database, Create table command, Alter table command, Drop table , insert, delete, update, select Commands.
References:

Mark Lutz, Learning Python,5th Ed. O‟REILLY
Core Python Programming by Dr. R. Nageswara Rao
Problem Solving and Python Programming by E. Balaguru Swamy
Python programming: using problem solving approach by Reema Thareja.
Albert Lukaszewski ,MySQL for Python,Packet Publishing

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II B.C.A.(Computer Applications) MAJOR
PRACTICAL SYLLABUS
IV SEMESTER
SUBJECT : COMPUTER APPLICATIONS
23BCA41P: PYTHON PROGRAMMING
w.e.f : 2023– 24

LAB PROGRAMS

1. Write a Program to check whether given number is Armstrong or not.
2. Write a Program to check whether given number is perfect or not.
3. Write a program to find factorial of given number using recursive function
4. Write a program to implement inheritance and polymorphism
5. Demonstrate a python code to print try, except and finally block statements
6. Write a program to demonstrate String handling functions
7. Write a program to input n numbers from the user. Store these numbers in a tuple. Print the maximum and minimum number from this tuple.
8. Write a program to enter names of employees and their salaries as input and store them in a dictionary
9. Write a program to implement statistical operations on arrays using numPy
10. Write a program to import and export CSV file to DataFrame.
11. Create the DataFrame Sales containing year wise sales and perform basic operation on it.
12. Visualize the plots using matplot lib.
13. Create GUI interface with different types button and labels
14. Create GUI interface and connect with MySQL database and perform CRUD(Create, Read, Update and Delete) operations.

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II B.C.A (COMPUTER APPLICATIONS)-MAJOR
IV SEMESTER
SUBJECT: COMPUTER APPLICATIONS
23BCA42: OPERATING SYSTEMS

Course Objectives

To gain knowledge about various functions of an operating system like memory management, process management, device management, etc.

Course Outcomes:

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

1. Demonstrate knowledge and comprehension of operating system functions.
2. Analyze different process scheduling algorithms and apply them to manage processes and threads effectively
3. Create strategies to prevent, detect, and recover from deadlocks, and design solutions for inter-process communication and synchronization problems.
4. Compare and contrast different memory allocation strategies and evaluate their effectiveness
5. Evaluate disk scheduling algorithms while implementing OS security measures

Unit I

Introduction:
What is Operating System? History and Evolution of OS, Basic OS Functions, Computer System Architecture, Operating System Structure.
System Structures: Operating System Services, User Operating System Interface, System Calls, Types of System Calls, Overview of UNIX Operating System, Basic Features of Unix Operating System.

Unit II

Process Management: Process Concept, Operation on Processes, Communication in Client-Server Systems.
Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, CPU Scheduling in UNIX.

Unit III

Synchronization: Process Synchronization, Semaphores: Usage, Implementation, The Critical Section Problem., Classic problems of synchronization.
Deadlocks: Introduction, Deadlock Characterization, Necessary and Sufficient conditions for Deadlock, Deadlock Handling Approaches : Deadlock prevention, Deadlock Avoidance and Deadlock detection and Recovery.

Unit IV

Memory Management: Overview, Swapping, Contiguous Memory Allocation, Paging, Paging Examples, Segmentation, Page Replacement Algorithms, Memory management in UNIX.

Unit V

Files and Directories in UNIX: Files, Directory Structure, File Operations, File System Implementation: File Allocation Methods, Comparison of UNIX and Windows.

TEXTBOOKS

1. Operating System Concepts: Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 8thEdition,Wiley.
2. Unix and shell Programming by B.M H Arwani, OXFORD University Press.

REFERENCEBOOKS:

1. Operating System Principles, Abraham Silber chatz, Peter B. Galvin, Greg Gagne 8thEdition,Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press.
3. Tanenbaum AS, WoodhullAS, Operating SystemDesignandImplementation,3rdedition, PHI2006.
4. Unix Shell Programming-Yashwant Kanetkar

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II B.C.A (COMPUTER APPICATIONS) MAJOR
PRACTICAL SYLLABUS
IV SEMESTER
SUBJECT : COMPUTER APPICATIONS
23BCA42P: OPERATING SYSTEMS
w.e.f : 2023– 24

List of Experiments

1. Illustrate the LINUX commands
a) pwd b) mkdir c) rmdir d) grep e) chmod f) ls g) rm h) cp

2. Write a program to calculate average waiting time and turnaround time of each process using the following CPU Scheduling algorithm for the given process schedules. a) FCFS b) SJF c) Priority d) Round Robin

3. Simulate MVT and MFT memory management techniques

4. Write a program for Bankers Algorithm for Dead Lock Avoidance
5. Implement Bankers Algorithm Dead Lock Prevention.

6. Write a program to simulate Producer-Consumer problem.

7. Simulate all Page replacement algorithms.
a) FIFO b) LRU c) LFU d) Optimal

8. Simulate Paging Techniques of memory management

9. Simulate the following disk scheduling algorithms
a) FCFS b) SSTF c) SCAN d) CSCAN

SVKP & Dr K S RAJU A & S COLLEGE (A) :: PENUGONDA
II B.C.A (COMPUTER APPLICATIONS) MAJOR – SYLLABUS
IVSEMESTER
SUBJECT : COMPUTER APPLICATIONS
23BCA43: Mobile Application Development using Android
w.e.f : 2024– 25

Course Objectives:

- To facilitate students understanding android SDK
- To help students to gain a basic understanding of Android application development
- To instill working knowledge of Android Studio development tool

Course Learning Outcomes:

- Identify various concepts and features of Android operating system.
- Configure Android environment and development tools.
- Develop rich user Interfaces by using layouts and controls.
- Use User Interface components for android application development.
- Create Android application using database.
- Publish Android applications.

UNIT-I

Introduction to Android: - Overview, History, Features of Android, The Android Platform, Understanding the Android Software Stack – Android Application Architecture –The Android Application Life Cycle – The Activity Life Cycle, Creating Android Activity -Views- Layout Android SDK, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.

UNIT-II

Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Creating User Interfaces with basic views- Application Context, Activities, Services, Intents, linking activities with Intents,, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions**.**

UNIT-III

Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation. Layouts, Recycler View, List View, Grid View and Web view

Input Controls: Buttons, Checkboxes, Radio Buttons, Toggle Buttons, Spinners, Input Events, Menus, Toast, Dialogs, Styles and Themes, Creating lists, and Custom lists

UNIT-IV

Testing Android applications: Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources

UNIT-V

Using Common Android APIs: Internal Storage, External Storage, SQLite Databases , Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, JSON Parsing, Using Android Telephony APIs, Deploying Android Application to the World. Google maps, Using GPS to find current location, Sensors, Bluetooth/Wi-Fi Connectivity.

References:

1. Reto Meier, **"Professional Android 2 Application Development",** Wiley India Pvt Ltd
2. Mark L Murphy, **"Beginning Android",** Wiley India Pvt Ltd
3. **"Android Application Development All in one for Dummies"** by Barry Burd, Edition: I
4. "**Android",** Dixit, Prasanna Kumar Vikas Publications, New Delhi 2014,
5. Maclean David, Komatineni Satya, Allen Grant , **"Pro Android 5",**Apress Publications2015
6.**" Android Programming for Beginners"** by Hortan, John, Packet Publication, 2015
7. Lauren Darcey and Shane Conder, **"Android Wireless Application Development"**, Pearson Education, 2nd ed. (2011)

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II B.C.A (COMPUTER APPLICATIONS) MAJOR
PRACTICAL SYLLABUS
IV SEMESTER
SUBJECT : COMPUTER APPLICATIONS
23BCA43P: Mobile Application Development using Android
w.e.f : 2023– 24

List of Programs

1. Develop a program to implement frame layout, table layout and relative layout.
2. Develop a program to implement Text View and Edit Text.
3. Develop a program to implement Auto Complete Text View.
4. Develop a program to implement Button, Image Button and Toggle Button.
5. Develop a program to implement login window using above U1 controls.
6. Develop a program to implement Checkbox.
7. Develop a program to implement Radio Button and Radio Group.
8. Develop a program to implement Progress Bar.
9. Develop a program to implement List View, Grid View, Image View and Scroll View.
10. Develop a program to implement Custom Toast Alert.
11. Develop a program to implement Date and Time Picker.
12. Develop a program to create an activity. Develop a program to implement new activity using explicit intent and implicit intent.
13. Develop a program to implement content provider.
14. Develop a program to implement service.
15. Develop a program for providing Bluetooth connectivity

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S.V.K.P & Dr K.S.RAJU A & S COLLEGE (A) :: PENUGONDA

DEPARTMENT OF COMPUTER SCIENCE (BCA PROGRAMME)

2025-26

Programme: B.C.A.(HONOURS) Computer Applications (Major)
w.e.f. AY 2023-24AB

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No.of Hrs /Week	No. of Credits
I	I	1	Fundamentals of Commerce	3+2	4
		2	Business Organization	3+2	4
	II	3	Office Automation Tools	3	3
			Office Automation Tools Lab	2	1
		4	Programming in C	3	3
			Programming in C Lab	2	1
II	III	5	Database Management System	3	3
			Database Management System Lab	2	1
		6	Data Structures	3	3
			Data Structures Lab	2	1
		7	Object Oriented Programming Through JAVA	3	3
			Object Oriented Programming Through JAVA Lab	2	1
		8	Software Engineering	3	3
			Software Engineering Lab	2	1
	IV	9	Python Programming	3	3
			Python Programming Lab	2	1
		10	Operating Systems	3	3
			Operating Systems Lab	2	1
		11	Mobile Application Development using Android	3	3
			Mobile Application Development using Android Lab	2	1
III	V	12	Web Programming(23BCA51)	3	3
			Web Programming Lab(23BCA51P)	2	1
		13	Web Development Using PHP & MySQL(23BCA52)	3	3
			Web Development Using PHP & MySQL Lab(23BCA52P)	2	1
		14	Machine Learning(23BCA53)	3	3
			Machine Learning Lab(23BCAT53P)	2	1
		15	Foundations of Data Science(23BCA54)	3	3
			Foundations of Data Science Lab(23BCA54P)	2	1
	VI	Semester Internship / Apprenticeship with 12 Credits			

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DEPARTMENT OF COMPUTER SCIENCE (BCA PROGRAMME)

(w.e.f:2023-24A.B)

SEMESTER-V

23BCA51 WEB PROGRAMMING

Theory Credits:3 3 hrs/week

Course Objectives*:*

1. Learn the basics of creating a website.
2. Understand HTML5 coding conventions
3. Understand the philosophy of how HTML and CSS should fit together
4. Learn how Java Script came to be.

Course Outcomes: Upon Completion of the course, the students understand the Web Design Process and will be able to

1. Apply the HTML tags, elements and attributes
2. Apply different types of HTML elements
3. Use of organizational elements, tables and images
4. Use of audio, video files
5. Apply JavaScript concepts

Unit-I

Introduction to Web Programming: Introduction, creating a website, HTML tags, HTML Elements, HTML attributes, CSS Preview, History of HTML, Differences between old HTML and HTML5, how to check your HTML code

Case Study: Create a webpage of your department using standard HTML tags, HTML elements and HTML attributes

Unit-II

Coding Standards, Block Elements: HTML coding conventions, Comments, HTML Elements, Should Describe Web Page Content Accurately, Content Model Categories, Block Elements, block quote Element, Whitespace Collapsing, pre Element, Phrasing Elements, Editing Elements, q and cite Elements, dfn, abbr, and time Elements, Code-Related Elements, br and wbr Elements.

Text Elements, and Character References: sup, sub, s, mark, and small Elements, strong, em, b, u, and i Elements, span Element, Character References, Web Page with Character References, and Phrasing Elements.

Case Study: Create a web page related to famous water reservoir/ famous tourist spots near by your location using block elements, text elements and character references

Unit-III

Cascading Style Sheet(CSS) : CSS Overview, CSS Rules, Example with Type Selectors and the Universal Selector, CSS Syntax and Style, Class Selectors, ID Selectors, span and div Elements, Cascading, style Attribute, style Container, External CSS Files, CSS Properties, Color Properties, RGB Values for Color, Opacity Values for Color, HSL and HSLA Values for Color, Font Properties,

line-height Property, Text Properties, Border Properties, Element Box, padding Property, margin Property.

Case Study: Description of your City or place with the use of CSS and compare it with previous two case studies

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Unit-IV

Organizing a Page's Content with Lists, Figures, and Various, Organizational Elements: List, Descendant selector, Figure with picture and caption, Organizational elements, Navigation bar, Header and Footer, User agent style sheet, Child selector, CSS inheritance

Tables and CSS Layout: Data tables vs Layout tables, Table elements, Format table

Links and Images: Implement a link with an element, different types of href attribute Values, relative URLs, Implement a link that jumps to a particular location within a web page, element's target attribute, Understand the concepts behind GIF, JPEG, and PNG bitmap image formats, implement bitmap image elements within a webpage, implement SVG image elements within a web page.
Case Study: Create a webpage related to your department time table and images of any activity

Unit-V

Image Manipulations, Audio and Video: Position an image, how to display a shortcut icon in a browser's tab area, iframe, Create an image sprite file, Implement an audio player using the audio element, Handle different audio file formats, Cover a web page's background with an image, web fonts, Implement a video player using the video element, Center a web page's content, Cover a web page's background with a color gradient

Introduction to JavaScript: Button control with an event Handler, Syntax rules for functions, variables, identifiers, and assignments, Document Object Model(DOM), form with a text control and a button, event-handler attributes, rollover using mouse events
Case Study: Create a webpage involving audio and video of your college day activities
Prescribed Text Books:

1. **WebProgrammingwithHTML5,CSSandJavaScript,JohnDean,Jones&Bartlett Learning**

Reference Text Books:

1. **HTML&CSS:TheCompleteReference,5thEdition,Thomas.A.Powell**

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DEPARTMENT OF COMPUTER SCIENCE (BCA PROGRAMME)

(w.e.f:2023-24A.B)

SEMESTER-V

23BCA51P: WEB PROGRAMMING

Practical Credits:1 2 hrs/week

Course Outcomes: On successful completion of this practical course, student shall be able to:

1. Create webpages using HTML.
2. Apply different styles to HTML page.
3. Work with different scripting elements.

WEEK-1

1. Write an HTML code to display your education details in a tabular format.
2. Write an HTML code to display your CV on a webpage.

WEEK-2

1. Create a webpage with HTML describing your department. Use paragraph and list tags.
2. Apply various colors to suitably distinguish keywords. Also apply font styling like italics, underline and two other fonts to words you find appropriate. Also use header tags.
3. Create links on the words e.g. “Wi-Fi”and“LAN” to link them to Wikipedia pages.
4. Insert an image and create a link such that clicking on image takes user to other page.
5. Change the background color of the page. At the bottom create a link to take user to the top of the page.

WEEK-3

1. Create a table to show your class time-table.
2. Use tables to provide layout to your HTML page describing your university infrastructure.
3. Use and tags to provide a layout to the above page instead of a table layout.
4. Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.
5. Embed Audio and Video into your HTML webpage.

WEEK-4

1. Write an HTML code to illustrate the usage of the following:
   - Ordered List
   - Unordered List
   - Definition List

WEEK-5

1. Write an HTML code to create a frameset having header, footer, navigation and content sections.

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WEEK-6

1. Write an HTML code to demonstrate the usage of inline CSS.
2. Write an HTML code to demonstrate the usage of internal CSS.
3. Write an HTML code to demonstrate the usage of external CSS.

WEEK-7

1. Create a form similar to the one in previous experiment. Put validation checks on values entered by the user using JavaScript (such as age should be a value between1and150).
2. Write a Java Script program to display information box as soon as page loads.
3. Write a Java Script program to change background color after5secondsofpage load.
4. Write a JavaScript program to dynamically bold, italic and underline words and phrases based on user actions.
5. Write a JavaScript program to display a hidden div(e.g. showing status of a player when user clicks on his name
6. Write a Java script to prompt for users name and display it on the screen.
7. Design HTML form for keeping student record and validate it using Java script.
8. Write programs using Java script for Web Page to display browsers information.

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DEPARTMENT OF COMPUTER SCIENCE (BCA PROGRAMME)

(w.e.f:2023-24A.B)

SEMESTER-V

23BCA52: WEB DEVELOPMENT USING PHP & MYSQL

Theory **Credits: 3** **3 hrs/week**

Course Objectives:

1. This course introduces students to the PHP programming language, the MySQL relational database system commonly used to create dynamic websites.
2. To construct web applications that access simple databases from PHP using dynamically generated SQL.
3. To understand the general concepts of PHP scripting languages for the development of Internet websites.
4. To understand the basic functions of MySQL database program.

Course Outcomes: Upon Completion of the course, the students will be able to

1. Writes implement programs in PHP.
2. Understand how to use regular expressions, handle exceptions, and validate data.
3. Apply In –Built functions and Create User defined functions in PHP programming.
4. Write PHP scripts to handle HTML forms and programs to create dynamic and inter active web-based applications using PHP and MYSQL.
5. Know how to use PHP with MySQL DB and can write database driven web pages.

Unit-I

Using PHP: PHP Basics: Accessing PHP, Creating Sample Application, Embedding PHP in HTML, Adding Dynamic Content, Identifiers, Variables, Constants, Operators, Data types, Accessing Form Variables, Variable handling Functions, Making Decisions with Conditions, Repeating actions through Iterations, Breaking Out of a Control Structure

Storing and Retrieving Data: Processing Files, opening a File, writing to a File, closing a File, Reading from a File, Other File Functions, Locking Files.

CASE STUDY: Web Based Social Network Application Development

Unit-II

Arrays: Arrays basics, Types, Operators, Array Manipulations.

String Manipulation and Regular Expressions: Strings Basics, Formatting Strings, Joining and Splitting Strings with String Functions, Comparing Strings, Matching and Replacing Substrings with String Function, Introducing Regular Expressions, Find, Replace, Splitting in regular Expressions

CASESTUDY: Retail E-commerce Application Development for Apparels & Garments

Unit-III

Reusing Code and Writing Functions: The Advantages of Reusing, Using require() and include(), Using Functions in PHP, Scope, Passing by Reference Versus Passing by Value, keyword, Recursion.

Object-Oriented PHP: OOP Concepts, Creating Classes, Attributes, and Operations in PHP, Implementing Inheritance in PHP, Understanding Advanced Object-Oriented Functionality in PHP.

Error and Exception Handling: Error and Exception Handling, Exception Handling Concepts.

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CASE STUDY: e-Commerce Application for Manufacturing Industry

Unit-IV

Using MySQL : Relational Database Concepts, Web Database Architecture, Introducing MySQL's Privilege System, Creating Database Tables, Understanding MySQL, Identifiers, Database Operations, querying a Database, Understanding the Privilege System, Making Your MySQL Database Secure, Optimization, Backup, Restore.

CASE STUDY: Custom CMS Website Development

Unit-V

Introduction of Laravel PHP Framework: Why Laravel, setting up Laravel Development Environment, Routing and Controllers: introduction to MVC, the HTTP verbs, and REST, Route Definitions, Route Groups, Signed Routes, Views, Controllers, Route Model Binding, Redirects, Custom Responses

Case Study: E-commerce Business Solution delivered for Groceries Vendor

Prescribed Text Books:

1. Luke Welling, Laura Thomson, "PHP and MySQL Web Development",5thEdition
2. Matt Stauffer, "Laravel: Up & Running",2nd Edition
3. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education(2007).
4. Steven Holzner, PHP: The Complete Reference, McGraw-Hill
5. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5 ,Third Edition O'reilly, 2014
6. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson(2006).
7. Web resources:
http://www.codecademy.com/tracks/ph
http://www.w3schools.com/PHPhttp://
www.tutorialpoint.com
8. Other web sources suggested by the teacher concerned and the college librarian including reading material.

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DEPARTMENT OF COMPUTER SCIENCE (BCA PROGRAMME)

(w.e.f:2023-24A.B)

SEMESTER-V

23BCA52P: WEB DEVELOPMENT USING PHP & MYSQL

Practical **Credits: 1** **2 hrs/week**

Course Outcomes:

On successful completion of this practical course, student shall be able to:

1. Write, debug, and implement the Programs by applying concepts and error handling techniques of PHP.
2. Create an interactive and dynamic website.
3. Create a website with reports generated from a database.
4. Create an interactive website for e-commerce sites like online shopping, etc.

Practical (Laboratory) Syllabus: (30hrs.)

1. Write a PHP program to Display "Hello" ,and today's date.
2. Write a PHP program to display Fibonacci series.
3. Write a PHP Program to read the employee details.
4. Write a PHP program to prepare the student marks list.
5. Write a PHP program to generate the multiplication of two matrices.
6. Create student registration form using textbox, checkbox, radio button, select, submit button. And display user inserted value in new PHP page.
7. Create Website Registration Form using text box, checkbox, radio button, select, submit button. And display user inserted value in new PHP page.
8. Write PHP script to demonstrate passing variables with cookies.
9. Write a program to keep track of how many times a visitor has loaded the page.
10. Write a PHP application to add new Rowsina Table.
11. Write a PHP application to modify the Rowsina Table.
12. Write a PHP application to delete the Rows from a Table
13. Write a PHP application to fetch the Rowsina Table.
14. Develop an PHP application to implement the following
Operations. Registration of Users. Insert the details of the Users.
Modify the Details. Transaction Maintenance. No of times Logged in Time
Spent on each login. Restrict the user for three trials only.
Delete the user if he spent more than100 Hrs of transaction.
15. Write a PHP script to connect MySQL server from your website.
16. Write a program to read customer information like cust –no ,cust-name, it empurchased, and mob- no, from customer table and display all these information in table format on output screen.
17. Write a program to edit name of customer to "Kiran "with cust-no =1, and to delete record with cust -no=3.
18. Write a program to read employee information like emp-no ,emp-name, designation and salary from EMP table and display all this information using table format.
19. Create a dynamic website using PHP and MySQL

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DEPARTMENT OF COMPUTER SCIENCE (BCA PROGRAMME)
(w.e.f:2023-24A.B)

SEMESTER-V
23BCA53: MACHINE LEARNING

Theory Credits:3 3hrs/week
Max.Marks:70

Course Objectives:

1. To learn the basics of machine learning
2. To learn the importance of feature engineering
3. To understand the foundational rules of probability
4. To study different classification and cluster techniques
5. To understand the basics of neural networks concepts

Course Outcomes: Upon Completion of the course, the students will be able to

1. Develop an appreciation for what is involved in Learning models from data
2. Understand a wide variety of learning algorithms
3. Understand how to evaluate models generated from data
4. Apply the algorithms to a real problem optimize the models learned and report on the expected accuracy that can be achieved by applying the models
5. Understand different neural network concepts

Unit-I

Introduction to Machine Learning : Introduction, what is human learning, types of human learning, what is machine learning, types of machine learning, problems not to be solved using machine learning, Applications of machine learning , Tools in machine learning, Issues in machine learning

Preparing to Model : Machine learning, activities, Basic types of data in machine learning, Exploring structure of data, Data quality and remediation, Data Preprocessing

Case Study : Machine Learning **Case Study** on Trendyol

Unit-II

Modelling and Evaluation : Selecting a model, Training a Model, Model representation and Interpretability, Evaluating Performance of a model, Improving performance of a model

Basics of Feature Engineering : Introduction, Feature transformation, Feature subset selection

Case study : Machine Learning Case Study on Harley Davidson

Unit-III

Brief Overview of Probability : Importance of Statistical Tools in Machine Leaning, Concept of Probability, Random Variables, Some Common Discrete Distributions, Some Common

Continuous Distributions, Multiple Random Variables, Sampling Distributions, Hypothesis Testing

Bayesian Concept Learning : Why Bayesian methods are important, Bayes Theorem, Concept Learning, Bayesian Belief Network

Case Study : Machine Learning **Case Study** on Tesla

Unit-IV

Supervised Learning : Classification : Example of Supervised Learning, Classification Model, Classification Learning Steps, Common Classification Algorithms

Supervised Learning : Regression : Example of Regression, Common Regression Algorithms

Unsupervised Learning : Unsupervised vs Supervised Learning, Application of Unsupervised Learning, Clustering, Finding Pattern using Association Rule

Case Study : Predicting Heart Failure in Mobile Health

Unit-V

Basics of Neural Network : Understanding Biological Neuron, Exploring the Artificial Neuron, Types of Activation Functions, Early Implementation of ANN, Architectures of Neural Network, Learning Process in ANN, Back Propagation, Deep Learning

Other Types of Learning : Representation Learning, Active Learning Vs Memory Based Learning, Ensemble Learning Algorithm

Case Study : American Cancer Society on Google Cloud ML Engine

Prescribed Text Books :

1. Machine Learning, Pearson by Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das
2. Introduction to Machine Learning with Python : A Guide for Data Scientists by Andreas C.Muller & Sarah Guido
3. Machine Learning for Absolute Beginners, 2nd Edition by Oliver Theobald
4. Machine Learning for Dummies : IBM Limited Edition by Judith Hurwitz and Daniel Kirsch

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DEPARTMENT OF COMPUTER SCIENCE (BCA PROGRAMME)
(w.e.f:2023-24A.B)

SEMESTER-V
23BCA53P: MACHINE LEARNING

Practical hrs/week **Credits:1** **2**

Course Outcomes:

On successful completion of this practical course,student shall be able to:

1. Execute basic programs in either R or Python.
2. Gain practical knowledge on different python libraries/packages.
3. Implement different machine learning algorithms

Implement the following using in either R Language or Python

1. **Introduction to basic commands:**
   a) GetandSet WorkingDirectory
   b) See Directory Content
   c) Install and Load Packages
   d) Compile Source File for Execution
   e) Commands for basic user input/output
   f) Basic Data Types and Data Manipulation Functions
2. **Introduction to basic commands Continued:**
   a) Conditional Statements
   b) Loops
3. Data Manipulation Package installation and different operations using installed package
4. Standard Library function to plot the Graphs
5. Basic Data Exploration on any dataset available publicly
6. Starting to Model to find accuracy of the model
7. Learning Algorithms-kNN Linear Regression
8. Unsupervised Algorithm-k-means
9. Supervised Algorithm-Naïve Bayes
10. Implement Decision Tree and Support Vector Machine using Library Functions
11. Implement Neural Network using Library Function

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DEPARTMENT OF COMPUTER SCIENCE (BCA PROGRAMME)
(w.e.f:2023-24A.B)

SEMESTER-V
23BCA54: Foundations of Data Science

Theory Credits:3 3hrs/week
Max.Marks:70

Course Objectives:

1. To understand the data science fundamentals and process
2. To learn to describe the data for the data science process
3. To learn to describe the relationship between data
4. To utilize the Python libraries for Data Wrangling
5. To present and interpret data using visualization libraries in Python

Course Outcomes: Upon Completion of the course, the students will be able to

1. Define the Data Science
2. Understand the Flow of Data science
3. Identify different steps in Data Science
4. Learn the IPython basics
5. Learn data loading and manipulation techniques
6. Work with different data visualization techniques

Unit-I

Benefits and uses of data science and big data, the big data eco system and data science, the data science process: Overview of data science process, Different steps in data science process: Research Goal, Retrieving data, Cleansing, integrating and transforming data, Exploratory data analysis, Build the models, Presenting findings and building applications

CASE STUDY: Predicting malicious URLs

Unit-II

IPython : Beyond Normal Python, Shell or Notebook? Launching the IPython Shell, Launching the Jupyter Notebook, Help and Documentation in IPython, Accessing Documentation with ?, Accessing Source Code with ??, Exploring Modules with Tab Completion, Keyboard Shortcuts in the IPython Shell, IPython Magic Commands, Input and Output History, Underscore Shortcuts and Previous Outputs, Suppressing Output, IPython and Shell Commands, Shell Commands in IPython, Passing Values to and from the Shell, Shell-Related Magic Commands, Errors and Debugging, Profiling and Timing Code

CASE STUDY: Building a recommender system inside a database

Unit-III

Introduction to Numpy: Data Types in Python, Python List, Fixed-Type Arrays in Python, Creating Arrays from Python Lists, Creating Arrays from Scratch, NumPy Standard Data Types, The Basics of NumPy Arrays, NumPy Array Attributes, Array Indexing : Accessing Single Elements, Array Slicing: Accessing Subarrays, Reshaping of Arrays, Array Concatenation and Splitting, Exploring NumPy's UFuncs, Aggregation functions

CASE STUDY: Assessing risk when loaning money

Unit-IV

Data Manipulation with Pandas: Installing and Using Pandas, Introducing Pandas Objects, The Pandas Series Object, The Pandas DataFrame Object, The Pandas Index Object, Data Indexing and Selection, Data Selection in DataFrame, Operating on Data in Pandas, Handling Missing Missing Data, Operating on Null Values, Combining Datasets: Concat and Append, Combining Datasets: Merge and Join, Working with Time Series

CASE STUDY: Classifying Reddit Posts

Unit-V

Visualization with Matplotlib: Importing matplotlib, Setting Styles, Plotting from a script, Plotting from an IPython shell, Plotting from an IPython notebook, Saving Figures to File, Two Interfaces for the Price of One, Simple Line Plots, Adjusting the Plot: Line Colors and Styles, Adjusting the Plot: Axes Limits, Labeling Plots, Simple Scatter Plots, Density and Contour Plots, Histograms, Binnings, and Density, Customizing Matplotlib: Configuration and Stylesheets, Geographic Data with Basemap, Visualization with Seaborn, Other Python Graphics Libraries

Python Libraries for Machine Learning: Introducing Scikit-Learn, Data Representation in Scikit-Learn, Scikit-Learn's Estimator API

CASE STUDY: Exploring Handwritten Digits

Prescribed Text Books :

1. Introducing Data Science: BIG DATA, MACHINE LEARNING, AND MORE, USING PYTHON
TOOLS by DAVY CIELEN, ARNO D.B.MEYSMAN, MOHAMAD ALI
2. Python Data Science Handbook, Essential Tools for Working with Data by Jake Vander Plas
3. R for Data Science Import, Tidy, Transform, Visualize, and Model Data by Hadley Wickham and Garrett
Grolemund
4. Data Science using Python and R by C.D. Larose and D.T.Larose
5. Mathematical Foundations of Data Science Using R by Frank Emmert-Streib, Salissou Moutari, and
Matthias Dehmer

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DEPARTMENT OF COMPUTER SCIENCE (BCA PROGRAMME)

(w.e.f:2023-24A.B)

SEMESTER-V

23BCA54P : FOUNDATIONS OF DATA SCIENCE

Practical hrs/week **Credits:1** **2**

Course Outcomes :

On successful completion of this practical course, student shall be able to:

1. Execute python basic programs.
2. Work with Python IDEs.
3. Gain practical knowledge on different python libraries.

Implement the lab experiments in Python with any real time example

1. Introduction to programming with Python.
2. Python programming basics
3. Conditional statements
4. Loops
5. Functions
6. Integrated Development Environments(IDEs).
7. How to structure Python code in a project.
8. How to manage libraries in Python using virtual environments.
9. Data Loading,Storage,and File Formats.
10. Data Cleaning and Preparation.
11. Data Manipulation with Pandas.
12. Data Wrangling:Join, Combine, and Reshape.
13. Plotting and Visualization.

14. Data Aggregation and Group Operations.

15. Advanced Numpy.

16. Matplot lib

17. Building and optimizing pipelines in scikit-learn.